Dell EMC Networking Command Line Reference Guide for the S5048F–ON System

9.14.1.5

May 2019
Rev. A00

DELL EMC

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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About this Guide

This guide provides information about the Dell EMC Networking operating system (OS) command line interface (CLI).

This book also includes information about the protocols and features supported in Dell EMC Networking OS.

References

For more information about your system, go to the Dell EMC Networking Support page and refer to the following documents:

- *Dell EMC Networking OS Configuration Guide*
- *Dell EMC Networking OS Installation Guide*
- *Dell EMC Networking OS Quick Start Guide*
- *Dell EMC Networking OS Release Notes*

Topics:

- Objectives
- Audience
- Conventions
- Information Icons

Objectives

This information is intended as a reference guide for the Dell EMC Networking OS CLI commands, with detailed syntax statements, along with usage information and sample output.

NOTE: For more information about when to use the CLI commands, see the *Dell EMC Networking OS Configuration Guide* for your specific system.

Audience

The *Dell EMC Networking OS CLI Guide* is intended for system administrators with an understanding of Layer 2 and Layer 3 networking technologies, who are responsible for configuring or maintaining networks.

Conventions

This guide uses the following conventions to describe command syntax:

Keyword	Keywords are in Courier font and must be entered in the CLI as listed.
parameter	Parameters are in italics and require a number or word to be entered in the CLI.
{X}	Keywords and parameters within braces must be entered in the CLI.
[X]	Keywords and parameters within brackets are optional.
x|y	Keywords and parameters separated by a bar require you to choose one option.
x||y	Keywords and parameters separated by a double bar allow you to choose any or all of the options.

Information Icons

This guide uses the following information symbols:

NOTE: The Note icon signals important operational information.

CAUTION: The Caution icon signals information about situations that could result in equipment damage or loss of data.

NOTE: The Warning icon signals information about hardware handling that could result in injury.

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CLI Basics

This chapter describes the command line interface (CLI) structure and command modes. The Dell EMC Networking operating software commands are in a text-based interface that allows you to use the launch commands, change command modes, and configure interfaces and protocols.

Topics:

- Accessing the Command Line
- Multiple Configuration Users
- Obtaining Help
- Navigating the CLI
- Using the no Command
- Filtering show Commands
- Enabling Software Features on Devices Using a Command Option
- Command Modes

Accessing the Command Line

Access the CLI through a serial console port or a Telnet session.

When the system successfully boots, enter the command line in EXEC mode.

NOTE: You must have a password configured on a virtual terminal line before you can Telnet into the system. Therefore, you must use a console connection when connecting to the system for the first time.

Example

```
telnet 172.31.1.53
Trying 172.31.1.53...
Connected to 172.31.1.53.
Escape character is '^]'.
Login: username
Password: DellEMC>
```

After you log in to the switch, the prompt provides you with the current command-level information. For example:

Prompt	CLI Command Mode
DellEMC>	EXEC
DellEMC#	EXEC Privilege
DellEMC(conf)#	CONFIGURATION

NOTE: For a list of all the command mode prompts, refer to the Command Modes section.

Multiple Configuration Users

When a user enters CONFIGURATION mode and another user is already in CONFIGURATION mode, the Dell EMC Networking operating software generates an alert warning message similar to the following:

```
DellEMC#conf

% Warning: The following users are currently configuring the system:

User "" on line console0
```

```
User "admin" on line vty0 ( 123.12.1.123 )
User "admin" on line vty1 ( 123.12.1.123 )
User "Irene" on line vty3 ( 123.12.1.321 )
DellEMC#conf
```

When another user enters CONFIGURATION mode, Dell EMC Networking OS sends a message similar to the following:

```
% Warning: User "admin" on line vty2 "172.16.1.210" is in configuration
```

In this case, the user is “admin” on vty2.

Obtaining Help

As soon as you are in a Command mode, there are several ways to access help:

To obtain a list of keywords at any command mode:	Type a `?` at the prompt or after a keyword. There must always be a space before the `?`.
To obtain a list of keywords with a brief functional description:	Type `help` at the prompt.
To obtain a list of available options:	Type a keyword, and then enter a space and a `?`.
To obtain a list of partial keywords using a partial keyword:	Type a partial keyword, and then enter a `?`.
Example	The following is an example of entering `ip ?` at the prompt:

```
DellEMC(conf)#ip ?
access-list             Named access-list
as-path                 BGP autonomous system path filter
community-list          Add a community list entry
control-plane           Control plane configuration
dhcp                    DHCP configuration commands
domain-list             Domain name to complete unqualified host name
domain-lookup           Enable IP Domain Name System hostname translation
domain-name             Define the default domain name
ecmp                    Weighted Ecmp Configuration
ecmp-group              ECMP Group Configuration
extcommunity-list       Add a Extended community list entry
ftp                     FTP configuration commands
helper-address          DHCP relay agent configuration
host                    Add an entry to the ip hostname table
http                    HTTP configuration commands
icmp                    ICMP configuration commands
igmp                    Internet Group Management Protocol
max-frag-count          Max. fragmented packets allowed in IP re-assembly
mroute                  Multicast routes and counters
msdp                    Multicast source discovery protocol
multicast-limit         Max entries in Multicast TIB
multicast-msdp          Enable IP multicast MSDP protocol
multicast-routing       Enable IP multicast forwarding
name-server             Specify addess of name server to use
pim                     Protocol Independent Multicast
prefix-list             Build a prefix list
radius                  Interface configuration for RADIUS
redirect-list           Named redirect-list
route                   Establish static routes
route-export            Export routes
route-import            Import routes
scp                     SCP configuration commands
source-route            Process packets with source routing header options
ssh                     SSH configuration commands
tacacs                  Interface configuration for TACACS+
tcp                     global tcp settings
telnet                  Specify telnet options
tftp                    TFTP configuration commands
unicast-host-route      Configuration for ip unicast address-family
unknown-unicast         Enable IPv4 unknown-unicast packets to CPU
vlan-flooding           Vlan flooding
vrf                     Configure VRF instance
```

When entering commands, you can take advantage of the following timesaving features:

- Commands are not case-sensitive.
- Enter partial (truncated) command keywords. For example, you can enter for the `interface twentyfiveGigE 1/1` command.
- Use the TAB key to complete keywords in commands.
- Use the up Arrow key to display the last enabled command.
- Use either the Backspace key or Delete key to erase the previous character.
- Use the left and right Arrow keys to navigate left or right in the Dell EMC Networking OS command line.

The shortcut key combinations at the Dell EMC Networking OS command line are as follows:

Key Combination	Action
CNTL-A	Moves the cursor to the beginning of the command line.
CNTL-B	Moves the cursor back one character.
CNTL-D	Deletes the character at the cursor.
CNTL-E	Moves the cursor to the end of the line.
CNTL-F	Moves the cursor forward one character.
CNTL-I	Completes a keyword.
CNTL-K	Deletes all the characters from the cursor to the end of the command line.
CNTL-L	Re-enters the previous command.
CNTL-N	Returns to the more recent commands in the history buffer after recalling commands with Ctrl-P or the up Arrow key.
CNTL-P	Recalls commands, beginning with the last command.
CNTL-R	Re-enters the previous command.
CNTL-U	Deletes the line.
CNTL-W	Deletes the previous word.
CNTL-X	Deletes the line.
CNTL-Z	Ends continuous scrolling of the command outputs.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Esc D	Deletes all the characters from the cursor to the end of the word.

Navigating the CLI

The Dell EMC Networking OS displays a CLI prompt comprised of the host name and CLI mode.

- Host name is the initial part of the prompt and is “Dell” by default. You can change the host name with the `hostname` command.
- CLI mode is the second part of the prompt and reflects the current CLI mode. For a list of the Dell EMC Networking OS command modes, see the *command mode list* in Accessing the Command Line.

The CLI prompt changes as you move up and down the levels of the command structure. Starting with CONFIGURATION mode, the command prompt adds modifiers to further identify the mode. For more information about command modes, see Command Modes.

Using the no Command

To disable, delete or return to default values, use the `no` form of the commands.

For most commands, if you type the keyword `no` in front of the command, you disable that command or delete it from the running configuration. In this guide, the `no` form of the command is described in the Syntax portion of the command description.

Filtering show Commands

You can filter commands using the `show` command to find specific information, display certain information only, or begin the command output at the first instance of a regular expression or phrase.

Execute a `show` command and a pipe (|), and one of the following parameters and a regular expression to show output that either excludes or includes the specified parameters.

NOTE: The Dell EMC Networking OS accepts a space before or after the pipe, no space before or after the pipe, or any combination. For example: `command | grep gigabit |except regular-expression | find regular-expression`.

except	Displays only the text that does not match the pattern (or regular expression).
find	Searches for the first occurrence of a pattern.
grep	Displays text that matches a pattern. The `grep` command option has an ignore-case suboption that makes the search case-insensitive. For example, the commands: **show run | grep Ethernet** Returns a search result with instances containing a capitalized *Ethernet*, such as `interface twentyfiveGigE 1/2`. **show run | grep ethernet** Does not return the previous search result because it only searches for instances containing a noncapitalized *ethernet*. **show run | grep Ethernet ignore-case** Returns instances containing both *Ethernet* and *ethernet*.
no-more	Does not paginate the display output.
save	Copies the output to a file for future use.

Displaying All Output

Use the `no-more` option after the pipe to display all output at once — not one screen at a time. This operation is similar to `terminal length screen-length` except that the `no-more` option affects the output of just the specified command. For example: `show running-config|no-more`.

Filtering the Command Output Multiple Times

You can filter a single command output multiple times. To filter a command output multiple times, place the `save` option as the last filter. For example: `command | grep regular-expression | except regular-expression | grep other-regular-expression | find regular-expression | no-more | save`.

Enabling Software Features on Devices Using a Command Option

The capability to activate software applications or components on a device using a command is supported on this platform.

Starting with Release 9.4(0.0), you can enable or disable specific software features or applications that need to run on a device by using a command attribute in the CLI interface. This enables effective, streamlined management and administration of applications and utilities that run on a device. You can employ this capability to perform an on-demand activation, or turn-off a software component or protocol. A feature configuration file generated for each image contains feature names, and denotes if this enabling or disabling method is available. You can enable or disable the VRF application globally across the system by using this capability.

Activate the VRF application on a device by using the `feature vrf` command in CONFIGURATION mode.

NOTE: The `no feature vrf` command is not supported on any of the platforms.

To enable the VRF feature and cause all VRF-related commands to be available or viewable in the CLI interface, use the following command. You must enable the VRF feature before you can configure its related attributes.

```
DellEMC(conf)# feature vrf
```

Based on if the VRF feature is identified as supported in the Feature Configuration file, configuration command `feature vrf` becomes available for usage. This command is stored in the running-configuration and precedes all other VRF-related configurations.

To display the state of Dell EMC Networking OS features:

```
DellEMC# show feature
```

Example of show feature output

For a particular target where VRF is enabled, the show output is similar to the following:

```
Feature          State
-----------------------
VRF              Enabled
```

feature vrf

Enable the VRF application on a switch. Once enabled, you cannot deactivate the VRF application.

Syntax `feature vrf`

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.5(0.0)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S5000, and S6000.

Usage Information Activate the VRF application on a device using the `feature vrf` command in CONFIGURATION mode. The `no feature vrf` command is not supported on any platform.

show feature

Verify the status of software applications, such as VRF, that are activated and running on a device.

Syntax `show feature`

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Updated the command to display the `IPV6acloptimized` feature on the S6100–ON and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.4(0.0)	Introduced on the S4810, S4820T, and S6000.

Usage Information You can activate VRF application on a device by using the `feature vrf` command in CONFIGURATION mode. The `no feature vrf` command is not supported on any of the platforms.

Example

```
DellEMC# show feature
Feature       State
------------------------------
VRF              Enabled
DellEMC#
```

Command Modes

To navigate and launch various CLI modes, use specific commands. Navigation to these modes is described in the following sections.

BGP ADDRESS-FAMILY Mode

To enable or configure IPv4 for BGP, use BGP ADDRESS-FAMILY mode. For more information, see Border Gateway Protocol IPv4 (BGPv4).

To enter BGP ADDRESS-FAMILY mode:

1. Verify that you are logged in to ROUTER BGP mode.
2. Enter the `address-family` command.
3. Enter the protocol type:
   - For IPv4, enter the `ipv4 multicast` command. The prompt changes to include `conf-router_bgp_af` for IPv4.

CLASS-MAP Mode

To create or configure a class map, use CLASS-MAP mode. For more information, see Policy-Based QoS Commands.

To enter CLASS-MAP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `class-map` command, and then enter the class map name. The prompt changes to include `config-class-map`.

You can return to CONFIGURATION mode by using the `exit` command.

CONFIGURATION Mode

In EXEC Privilege mode, use the `configure` command to enter CONFIGURATION mode and configure routing protocols and access interfaces.

To enter CONFIGURATION mode:

1. Verify that you are logged in to EXEC Privilege mode.
2. Enter the `configure` command. The prompt changes to include `conf`.

From this mode, you can enter INTERFACE mode by using the `interface` command.

CONTROL-PLANE Mode

To manage control-plane traffic, use CONTROL-PLANE mode. For more information, see Control Plane Policing (CoPP).

To enter CONTROL-PLANE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `control-plane-cpuqos` command. The prompt changes to include `conf-control-cpuqos`.

You can return to CONFIGURATION mode by using the `exit` command.

DHCP Mode

To enable and configure Dynamic Host Configuration Protocol (DHCP), use DHCP mode. For more information, see Dynamic Host Configuration Protocol (DHCP).

To enter DHCP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip dhcp server` command. The prompt changes to include `config-dhcp`.

You can return to CONFIGURATION mode by using the `exit` command.

DHCP POOL Mode

To create an address pool, use DHCP POOL mode. For more information, see Dynamic Host Configuration Protocol (DHCP).

To enter DHCP POOL mode:

1. Verify that you are logged in to DHCP mode.
2. Enter the `pool` command then the pool name. The prompt changes to include `config-dhcp-`*`pool-name`*.

You can return to DHCP mode by using the `exit` command.

ECMP GROUP Mode

To enable or configure traffic distribution monitoring on an ECMP link bundle, use ECMP GROUP mode. For more information, see ecmp_overview.

To enter ECMP GROUP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ecmp-group` command then enter the ECMP group ID. The prompt changes to include `conf-ecmp-group-`*`ecmp-group-id`*.

You can return to CONFIGURATION mode by using the `exit` command.

EIS Mode

To enable or configure Egress Interface Selection (EIS), use EIS mode.

To enter EIS mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `management egress-interface-selection` command. The prompt changes to include `conf-mgmt-eis`.

You can return to CONFIGURATION mode by using the `exit` command.

EXEC Mode

When you initially log in to the switch, by default, you are logged in to EXEC mode. This mode allows you to view settings and enter EXEC Privilege mode, which is used to configure the device.

When you are in EXEC mode, the > prompt is displayed following the host name prompt, which is “DellEMC” by default. You can change the host name prompt using the `hostname` command.

NOTE: Each mode prompt is preceded by the host name.

EXEC Privilege Mode

The `enable` command accesses EXEC Privilege mode. If an administrator has configured an “Enable” password, you are prompted to enter it.

EXEC Privilege mode allows you to access all the commands accessible in EXEC mode, plus other commands, such as to clear address resolution protocol (ARP) entries and IP addresses. In addition, you can access CONFIGURATION mode to configure interfaces, routes and protocols on the switch. While you are logged in to EXEC Privilege mode, the # prompt is displayed.

EXTENDED COMMUNITY LIST Mode

To enable and configure a BGP extended community, use EXTENDED COMMUNITY LIST mode.

To enter EXTENDED COMMUNITY LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip extcommunity-list` command then a community list name. The prompt changes to include `conf-ext-community-list`.

You can return to CONFIGURATION mode by using the `exit` command.

FRRP Mode

To enable or configure Force10 Resilient Ring Protocol (FRRP), use FRRP mode. For more information, see Force10 Resilient Ring Protocol (FRRP).

To enter FRRP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol frrp` command then the ring ID. The prompt changes to include `conf-frrp-`*`ring-id`*.

You can return to CONFIGURATION mode by using the `exit` command.

INTERFACE Mode

Use INTERFACE mode to configure interfaces or IP services on those interfaces. An interface can be physical (for example, a Gigabit Ethernet port) or virtual (for example, the Null interface).

To enter INTERFACE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `interface` command and then enter an interface type and interface number that is available on the switch.

NOTE: In Dell EMC Networking OS, the stack unit number and interfaces start from 0. But in Dell EMC Networking OS Open Networking platforms, the stack unit number and interfaces start from 1.

The prompt changes to include the designated interface and slot/port[/subport] number. For example:

Prompt	Interface Type
DellEMC(conf-if)#	INTERFACE mode
	Ten-Gigabit Ethernet interface then slot/port[/subport] information
	Twenty-five Gigabit Ethernet interface then slot/port information
	Forty-Gigabit Ethernet interface then slot/port/subport information
	Fifty-Gigabit Ethernet interface then slot/port/subport information
	Hundred-Gigabit Ethernet interface then slot/port information
DellEMC(conf-if-lo-0)#	Loopback interface number
DellEMC(conf-if-nu-0)#	Null Interface then zero
DellEMC(conf-if-po-1)#	Port-channel interface number The range is from 1 to 1284096.
DellEMC(conf-if-vl-01#	VLAN Interface then VLAN number (range 1–4094)
DellEMC(conf-if-ma-1/1)#	Management Ethernet interface then slot/port information
DellEMC(conf-if-tu-0)#	Tunnel interface then tunnel ID.
DellEMC(conf-if-range)#	Designated interface range (used for bulk configuration).

IP ACCESS LIST Mode

To enter IP ACCESS LIST mode and configure either standard or extended access control lists (ACLs), use the `ip access-list standard` command or the `ip access-list extended` command.

To enter IP ACCESS LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter either the `ip access-list standard` command or the `ip access-list extended` command. Include a name for the ACL. The prompt changes to include `conf-std-nacl` or `conf-ext-nacl`.

You can return to CONFIGURATION mode by using the `exit` command.

ISIS ADDRESS-FAMILY Mode

To enable or configure IPv6 for ISIS, use ISIS ADDRESS-FAMILY mode. For more information, see Intermediate System to Intermediate System (IS-IS).

To enter ISIS ADDRESS-FAMILY mode:

1. Verify that you are logged in to ROUTER ISIS mode.
2. Enter the `address-family ipv6 unicast` command. The prompt changes to include `conf-router_isis-af_ipv6`.

LLDP Mode

To enable and configure Link Layer Discovery Protocol (LLDP), use LLDP mode. For more information, see Link Layer Discovery Protocol (LLDP).

To enter LLDP mode:

1. To enable LLDP globally, verify that you are logged in to CONFIGURATION mode. To enable LLDP on an interface, verify that you are logged in to INTERFACE mode.
2. Enter the `protocol lldp` command. The prompt changes to include `conf-lldp` or `conf-if-`*`interface`*`-lldp`.

LLDP MANAGEMENT INTERFACE Mode

To enable and configure Link Layer Discovery Protocol (LLDP) on management interfaces, use LLDP MANAGEMENT INTERFACE mode.

To enter LLDP MANAGEMENT INTERFACE mode:

1. Verify that you are logged in to LLDP mode.
2. Enter the `management-interface` command. The prompt changes to include `conf-lldp-mgmtIf`.

LINE Mode

To configure the console or virtual terminal parameters, use LINE mode.

To enter LINE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `line` command. Include the keywords `console` or `vty` and their line number available on the switch. The prompt changes to include `config-line-console` or `config-line-vty`.

You can exit this mode by using the `exit` command.

MAC ACCESS LIST Mode

To enter MAC ACCESS LIST mode and configure either standard or extended access control lists (ACLs), use the `mac access-list standard` or `mac access-list extended` command.

To enter MAC ACCESS LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `mac access-list standard` command or the `mac access-list extended` command. Include a name for the ACL. The prompt changes to include `conf-std-macl` or `conf-ext-macl`.

You can return to CONFIGURATION mode by using the `exit` command.

MONITOR SESSION Mode

To enable and configure a traffic monitoring session using port monitoring, use MONITOR SESSION mode. For more information, see Port Monitoring.

To enter MONITOR SESSION mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `monitor session` command, and then the session ID. The prompt changes to include `conf-mon-sess-`*`sessionID`*.

MULTIPLE SPANNING TREE (MSTP) Mode

To enable and configure MSTP, use MULTIPLE SPANNING TREE mode. For more information, see Multiple Spanning Tree Protocol (MSTP).

To enter MULTIPLE SPANNING TREE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree mstp` command. The prompt changes to include `conf-mstp`.

You can return to CONFIGURATION mode by using the `exit` command.

OPENFLOW INSTANCE Mode

To enable and configure OpenFlow instances, use OPENFLOW INSTANCE mode.

To enter OPENFLOW INSTANCE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `openflow of-instance` command, and then the OpenFlow ID number of the instance you want to create or configure. The prompt changes to include `conf-of-instance` *`of-id`*.

You can return to the CONFIGURATION mode by entering the exit command.

Per-VLAN SPANNING TREE (PVST+) Plus Mode

To enable and configure the Per-VLAN Spanning Tree (PVST+) protocol, use PVST+ mode. For more information, see Per-VLAN Spanning Tree Plus (PVST+).

NOTE: The protocol name is PVST+, but the plus sign is dropped at the CLI prompt.

To enter PVST+ mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree pvst` command. The prompt changes to include `conf-pvst`.

You can return to CONFIGURATION mode by using the `exit` command.

PORT-CHANNEL FAILOVER-GROUP Mode

To configure shared LAG state tracking, use PORT-CHANNEL FAILOVER-GROUP mode. For more information, see Port Channel Commands.

To enter PORT-CHANNEL FAILOVER-GROUP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `port-channel failover-group` command. The prompt changes to include `conf-po-failover-grp`.

You can return to CONFIGURATION mode by using the `exit` command.

PREFIX-LIST Mode

To configure a prefix list, use PREFIX-LIST mode.

To enter PREFIX-LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip prefix-list` command and the name for the prefix list. The prompt changes to include `conf-nprefixl`.

You can return to CONFIGURATION mode by using the `exit` command.

PROTOCOL GVRP Mode

To enable and configure GARP VLAN Registration Protocol (GVRP), use PROTOCOL GVRP mode. For more information, see GARP VLAN Registration (GVRP).

To enter PROTOCOL GVRP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol gvrp` command. The prompt changes to include `config-gvrp`.

You can return to CONFIGURATION mode by using the `exit` command.

RAPID SPANNING TREE (RSTP) Mode

To enable and configure RSTP, use RSTP mode. For more information, see Rapid Spanning Tree Protocol (RSTP).

To enter RSTP mode:

1. Verify that you are logged in to CONFIGURATION mode.

2. Enter the `protocol spanning-tree rstp` command. The prompt changes to include `conf-rstp`.

You can return to CONFIGURATION mode by using the `exit` command.

ROUTE-MAP Mode

To configure a route map, use ROUTE-MAP mode.

To enter ROUTE-MAP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `route-map` *`map-name`* `[permit | deny]` [*`sequence-number`*] command. The prompt changes to include `config-route-map`.

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER BGP Mode

To enable and configure Border Gateway Protocol (BGP), use ROUTER BGP mode. For more information, see Border Gateway Protocol IPv4 (BGPv4)

To enter ROUTER BGP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `router bgp` command, and then enter the AS number. The prompt changes to include `conf-router_bgp`.

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER ISIS Mode

To enable and configure Intermediate System to Intermediate System (ISIS), use ROUTER ISIS mode. For more information, see Intermediate System to Intermediate System (IS-IS).

To enter ROUTER ISIS mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `router isis` command. The prompt changes to include `conf-router_isis`.

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER OSPF Mode

To configure OSPF, use ROUTER OSPF mode. For more information, see Open Shortest Path First (OSPFv2).

To enter ROUTER OSPF mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `router ospf {`*`process-id`*`}` command. The prompt changes to include `conf-router_`*`ospf-id`*.

You can switch to INTERFACE mode by using the `interface` command or you can switch to ROUTER RIP mode by using the `router rip` command.

ROUTER OSPFV3 Mode

To configure OSPF for IPv6, use ROUTER OSPFV3 mode.

To enter ROUTER OSPFV3 mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ipv6 router ospf {`*`process-id`*`}` command. The prompt changes to include `conf-ipv6-router_ospf`.

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER RIP Mode

To enable and configure Router Information Protocol (RIP), use ROUTER RIP mode. For more information, see Routing Information Protocol (RIP).

To enter ROUTER RIP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `router rip` command. The prompt changes to include `conf-router_rip`.

You can return to CONFIGURATION mode by using the `exit` command.

SPANNING TREE Mode

To enable and configure the Spanning Tree protocol, use SPANNING TREE mode. For more information, see Spanning Tree Protocol (STP).

To enter SPANNING TREE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree` *stp-id* command. The prompt changes to include `conf-stp`.

You can return to CONFIGURATION mode by using the `exit` command.

SupportAssist Mode

To enable and configure the SupportAssist, use SupportAssist mode. For more information, see SupportAssist.

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `support-assist` command. The prompt changes to include `conf-supportassist`.

You can return to CONFIGURATION mode by using the `exit` command.

TRACE-LIST Mode

To configure a Trace list, use TRACE-LIST mode.

To enter TRACE-LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip trace-list` command, and the name of the Trace list. The prompt changes to include `conf-trace-acl`.

You can exit this mode by using the `exit` command.

VLT DOMAIN Mode

To enable and configure the VLT domain protocol, use VLT DOMAIN mode. For more information, see Virtual Link Trunking (VLT).

To enter VLT DOMAIN mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `vlt domain` command, and then the VLT domain number. The prompt changes to include `conf-vlt-domain`.

You can return to CONFIGURATION mode by entering the `exit` command.

VRRP Mode

To enable and configure Virtual Router Redundancy Protocol (VRRP), use VRRP mode. For more information, see Virtual Router Redundancy Protocol (VRRP).

To enter VRRP mode:

1. To enable VRRP globally, verify that you are logged in to CONFIGURATION mode.
2. Enter the `vrrp-group` command, and then enter the VRRP group ID. The prompt changes to include `conf-if-`*`interface-type-slot/port`*`-vrid-`*`vrrp-group-id`*.

3

File Management

This section contains command line interface (CLI) commands needed to manage the configuration files, as well as other file management commands.

Topics:

- boot system
- cd
- copy
- delete
- dir
- format
- fsck flash
- mkdir
- mount nfs
- rmdir
- rename
- show boot system
- show bootvar
- show file-systems
- show os-version
- show running-config
- show startup-config
- show version
- upgrade system
- upgrade boot
- verify

boot system

Specify the location where the Dell EMC Networking OS image used to boot the system is stored.

Syntax

```
boot system {gateway ip-address | stack-unit {stack-unit-number | all}
{default | primary | secondary} {ftp: | nfsmount: | system: {A: | B: | bmp-
boot} | tftp: | usbflash:}}
```

To return to the default boot sequence, use the `no boot system` command.

Parameters

gateway	Enter the IP address of the default next-hop gateway for the management subnet.
ip-address	Enter an IP address in dotted decimal format.
stack-unit	Enter the keywords `stack-unit` to specify the stack unit number.
all	Enter the keyword `all` for all the stack units.
stack-unit-number	Enter the stack-unit number. The range is from 1 to 6.
default	Enter the keyword `default` to specify the default Dell EMC Networking OS image.
primary	Enter the keyword `primary` to specify the primary Dell EMC Networking OS image.

secondary	Enter the keyword `secondary` to specify the secondary Dell EMC Networking OS image.
ftp:	Enter the keyword `FTP:` to retrieve the image from an FTP server. ftp://userid:password@hostip/filepath.
nfsmount	Enter the keyword `nfsmount:` to retrieve the image from a mounted NFS file system. nfsmount://filepath
system:	Enter the keyword `system:` to retrieve the image from the system.
usbflash	Enter the keyword `usbflash:` to retrieve the image from the USB flash memory. usbflash://filename.
tftp:	Enter the keyword `TFTP:` to retrieve the image from a TFTP server. tftp://hostip/filepath.
A: | B:	Enter `A:` or `B:` to boot one of the system partitions.
bmp-boot	Enter the keywords `bmp-boot` to boot the system from the image present in the DHCP offer. **NOTE:** In normal-reload, this keyword is not enabled.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced the support for `bmp-boot` on the S-Series and Z-Series switches.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information To display these changes in the `show bootvar` command output, save the running configuration to the startup configuration (using the `copy` command) and reload system.

Use the `bmp-boot` keyword only when the device boots up from bare metal provisioning (BMP). For an industrial standard upgraded device, the Dell EMC Networking OS stores the image partition upgraded from the DHCP offer in the `bmp-boot` option.

cd

Change to a different working directory.

Syntax `cd [flash: | usbflash:] <directory name and path>`

Parameters

flash:	Use the keyword `flash:` to change the current directory to internal flash and its sub directories.
usbflash:	Use the keyword `usbflash:` to change the current directory to the inserted USB.
directory name and path	Enter the directory name and path as follows: `directory name ([[flash://]directory_path])`

NOTE: The `cd` command without any arguments will change the current directory to flash:

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added NFS mount support. Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

copy

Copy one file to another location. Dell EMC Networking OS supports IPv4 and IPv6 addressing for FTP, HTTP, TFTP, and SCP (in the *hostip* field).

Syntax `copy source-file-url destination-file-url`

Parameters

compressed-config	Enter the keywords `compressed-config` to copy a file from the current system configuration.
flash:	Enter the keyword `flash:` to copy from the local file system (`[flash://]filepath`).
ftp:	Enter the keyword `ftp:` to copy from the remote file system, IPv4, or IPv6, (`ftp://userid:password@hostip/filepath`) .
http:	Enter the keyword `http:` to copy from the remote file system, IPv4, or IPv6, (`http://hostip/filepath`) .
nfsmount:	Enter the keyword `nfsmount:` to copy from the nfs mount file system (`nfsmount://<mount-point>/filepath`).

running-config	Enter the keywords `running-config` to copy from the current system configuration.
scp:	Enter the keyword `scp:` to copy from the remote file system, IPv4, or IPv6, (`scp://userid:password@hostip/filepath`).
startup-config	Enter the keywords `startup-config` to copy from the startup configuration.
tftp:	Enter the keyword `tftp:` to copy from the remote file system, IPv4, or IPv6, (`tftp://hostip/filepath`).
usbflash:	Enter the keyword `usbflash:` to copy the file to or from the external USB flash.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added the `nfsmount:<mount-point>` parameters that allow you to mount a remote NFS file system.
9.4(0.0)	Added the compressed-config parameter.
9.3(0.1)	Added the `http` parameter on the S6000, Z9000, S4810, and S4820T.
9.0.2.0	Introduced on the S6000.
8.4.1.0	Added IPv6 addressing support for FTP, TFTP, and SCP.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added `usbflash` and `rpm0usbflash` commands on E-Series.
7.6.1.0	Introduced on the S-Series and added the SSH port number to the SCP prompt sequence on all systems.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information Dell EMC Networking OS supports a maximum of 100 files at the root directory level on both the internal and external flash.

When copying a file to a remote location (for example, using Secure Copy [SCP]), enter only the keywords and Dell EMC Networking OS prompts you for the rest of the information. For example, when using SCP, you can enter `copy running-config scp:` where `running-config` is the source and the target is specified in the ensuing prompts. Dell EMC Networking OS prompts you to enter any required information for the named destination — remote destination, destination filename, user ID, password, and so forth.

When you use the `copy running-config startup-config` command to copy the running configuration to the startup configuration file, Dell EMC Networking OS creates a backup file on the internal flash of the startup configuration.

When you load the startup configuration or a configuration file from a network server such as TFTP to the running configuration, the configuration is added to the running configuration. This does not replace the existing running configuration. Commands in the configuration file has precedence over commands in the running configuration.

Dell EMC Networking OS supports copying the running-configuration to a TFTP server, an FTP server, or a remote NFS file system. For example:

- `copy running-config tftp:`
- `copy running-config ftp:`
- `copy running-config nfsmount://<mount-point>/filepath`

You can compress the running configuration by grouping all the VLANs and the physical interfaces with the same property. You can store the operating configuration to the startup config in Compressed mode and perform an image downgrade without any configuration loss.

Example

```
DellEMC#copy running-config scp:
Address or name of remote host []: 192.168.1.1
Port number of the server [22]: 22
Destination file name [startup-config]:
User name to login remote host: username
Password to login remote host:
!
4080 bytes successfully copied
DellEMC#
```

In this `copy scp: flash:` example, specifying `SCP` in the first position indicates that you need to specify the target in the ensuing prompts. Entering `flash:` in the second position indicates that the target is the internal flash. The source is on a secure server running secure shell (SSH), so you are prompted for the user datagram protocol (UDP) port of the SSH server on the remote host.

Example

```
DellEMC# copy running-config nfsmount://<mount-point>/filepath
Destination file name [test.txt]:
User name to login remote host: usrname
Password to login remote host:
DellEMC#
```

Example

```
DellEMC# copy scp: flash:
Address or name of remote host []: 10.11.199.134
Port number of the server [22]: 99
Source file name []: test.cfg
User name to login remote host: admin
Password to login remote host:
Destination file name [test.cfg]: test1.cfg
DellEMC#
```

Example

```
DellEMC# copy compressed-config compressed-cfg
!
6655 bytes successfully copied
DellEMC#
DellEMC#copy compressed-config ftp:
Address or name of remote host []: 10.11.8.12
Destination file name [startup-config]:
User name to login remote host: spbalaji
Password to login remote host:
!
6655 bytes successfully copied
DellEMC#
```

Example

```
DellEMC# copy http://admin:admin123@10.16.206.77/sample_file flash://
sample_file
DellEMC#
```

Related Commands

- cd – changes the working directory.

delete

Delete a file from the flash. After deletion, files cannot be restored.

Syntax `delete {flash: | nfsmount: | usbflash:} [no-confirm]`

Parameters

flash: To delete a file or directory on the internal flash, enter `flash://` then the filename or directory name (`[flash://]filepath`).

nfsmount: To delete a file or directory on the NFS-mounted file system, enter `nfsmount://` then the mount point and the file path (`nfsmount://filepath`).

NOTE: While deleting a file directory on a remote NFS file system, you must specify the mount-point that indicates the working directory on the NFS file system. You cannot delete the root directory of the remote NFS file system.

usbflash: To delete a file or directory on the external USB flash, enter `usbflash://` then the filename or directory name (`[usbflash://]filepath`).

no-confirm (OPTIONAL) Enter the keywords `no-confirm` to specify that the Dell EMC Networking OS does not require user input for each file prior to deletion.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added support for NFS mount.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

dir

Display the files in a file system. The default is the current directory.

Syntax `dir [flash: | nfsmount: | usbflash:]`

Parameters

flash: For a directory on the internal Flash, enter `flash://` directory name.

nfsmount: For a file or directory on an NFS-mounted file system, enter `nfsmount://` then the mount point and file path.

NOTE: While displaying a file directory on a remote NFS file system, it is mandatory to specify the mount-point that indicates the working directory on the NFS file system. You cannot display details corresponding to the root directory of the remote NFS file system.

usbflash: For a directory on the external USB flash, enter `usbflash://` directory name.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Added support for NFS mount.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
DellEMC# dir
Directory of flash:

 1 drwx  8192 Jan 01 1980 00:00:00 +00:00 .
 2 drwx  3072 Dec 15 2014 06:27:10 +00:00 ..
 3 drwx  4096 Jan 01 1980 00:02:44 +00:00 TRACE_LOG_DIR
 4 drwx  4096 Jan 01 1980 00:02:44 +00:00 CORE_DUMP_DIR
 5 d---  4096 Jan 01 1980 00:02:44 +00:00 ADMIN_DIR
 6 drwx  4096 Jan 01 1980 00:02:44 +00:00 RUNTIME_PATCH_DIR
 7 drwx  4096 Nov 06 2014 06:57:06 +00:00 CONFIG_TEMPLATE
 8 -rwx  4625 Nov 06 2014 06:55:28 +00:00 startup-config
 9 drwx  4096 May 31 2013 02:49:46 +00:00 CONFD_LOG_DIR
```

```
flash: 2056916992 bytes total (2052784128 bytes free)
DellEMC#
```

Example (NFS Mount)

```
DellEMC# dir nfsmount:
Directory of nfsmount:

  1  drwx         512   Jun 15 2015 02:47:57 +00:00 .
  2  drwx         512   Jun 15 2015 02:47:57 +00:00 ..

nfsmount: 1463410688 bytes total (585719808 bytes free)
DellEMC#
```

Related Commands

- cd — changes the working directory.

format

Erase all existing files and reformat the file system. After the file system is formatted, files cannot be restored.

Syntax

```
format {flash: | usbflash:}
```

Defaults

None

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series

Usage Information

You must include the colon (:) when entering this command.

After reformatting is complete, three empty directories are automatically created on flash: CRASH_LOG_DIR, TRACE_LOG_DIR and NVTRACE_LOG_DIR.

CAUTION: This command deletes all files, including the startup configuration file. So, after executing this command, consider saving the running config as the startup config (use the `write memory` command or `copy running-config startup-config` command).

Related Commands

- copy – copy the current configuration to either the startup-configuration file or the terminal.
- show file-systems – display information about the file systems on the system.

fsck flash

Checks the flash file system for errors.

Syntax `fsck {flash: | usbflash:}`

Parameters

flash:	For a directory on the internal Flash, enter `flash://` directory name.
usbflash:	For a directory on the external USB flash, enter `usbflash://` directory name.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Introduced on S4810 and Z9000.
8.3.19.0	Introduced on S4820T.

Usage Information Include the colon (:) when entering this command. This command checks the specified flash memory for errors. If errors are found, the command recommends that you format the flash.

CAUTION: If you elect to format the flash, all files – including the startup configuration file – are lost. If you do decide to format the specified flash, consider saving the running configuration as the startup configuration after formatting the flash (use the `write memory` command or `copy running-config startup-config` command).

Related Commands

- copy — copy one file to another location.
- show file-systems — display information about the file systems on the system.

mkdir

Creates a directory on the NFS mounted file system.

Syntax `mkdir nfsmount://mount-point/usrname`

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Example

```
DellEMC# mkdir nfsmount:/nfs-mountpoint/guest
DellEMC#
```

Related Commands

- rmdir — remove a directory.

mount nfs

Mounts an NFS file system to a device.

Syntax `mount nfs rhost:path mount-point [username password]`

Parameters

Enter the following location keywords and information:

rhost:path	Enter the remote hosts's path directory.
mount-point	Enter the folder name in the local file system.
username	(OPTIONAL) Enter the user name to access the device.
password	(OPTIONAL) Enter the password.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Example

```
DellEMC# mount nfs nfstest nfs-mount-point usrname pwd
DellEMC#
```

Related Commands

- cd — change the working directory.

rmdir

Removes a directory from the NFS mounted file system.

Syntax `rmdir nfsmount://mount-point/usrname`

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Example

```
DellEMC# rmdir nfsmount:/nfs-mountpoint/guest
Proceed to remove the directory [confirm yes/no]: yes
```

Related Commands

- mkdir – create a directory.

rename

Rename a file in the local file system.

Syntax `rename url url`

Parameters

url Enter the following keywords and a filename:

- For a file on the internal Flash, enter `flash://` followed by the filename.
- For a file on an NFS mounted file system, enter `nfsmount://` followed by the mount point and file path.
- For a file on an external USB drive, enter `usbflash://` followed by the filename.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added support for NFS mount.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on S-Series
7.5.1.0	Introduced on C-Series
E-Series	Original command

show boot system

Displays information about boot images currently configured on the system.

Syntax `show boot system stack-unit{stack-unit–id | all}`

Parameters

all	Enter the keyword `all` to display the boot image information for all stack units.
stack-unit-id	Enter the `stack-unit-id` to display boot image information for a stack-unit.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000

Version	Description
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the C-Series and E-Series.

Example

```
DellEMC#show boot system stack-unit 1

Current system image information in the system:
===============================================

Type            Boot Type      A              B
-----------------------------------------------------
stack-unit 1  FLASH BOOT 9.12(1.0)    9.12(1.0) [boot]
DellEMC#
```

show bootvar

Display the variable settings for the boot parameters.

Syntax `show bootvar`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.4	Output expanded to display current reload mode (normal or Jumpstart).
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
DellEMC# show bootvar
PRIMARY IMAGE FILE =  system://B
SECONDARY IMAGE FILE =  tftp://10.16.127.35/FTOS-S5048-9.12.1.0.bin
DEFAULT IMAGE FILE =  system://A
LOCAL CONFIG FILE =  variable does not exist
PRIMARY HOST CONFIG FILE =  variable does not exist
SECONDARY HOST CONFIG FILE =  variable does not exist
```

```
PRIMARY NETWORK CONFIG FILE =  variable does not exist
SECONDARY NETWORK CONFIG FILE =  variable does not exist
CURRENT IMAGE FILE =  system://B
CURRENT CONFIG FILE 1 =  flash://startup-config
CURRENT CONFIG FILE 2 =  variable does not exist
CONFIG LOAD PREFERENCE =  local first
BOOT INTERFACE GATEWAY IP ADDRESS =  10.16.132.254
Reload Mode =  normal-reload
DellEMC#
```

show file-systems

Display information about the file systems on the system.

Syntax `show file-systems`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series
7.5.1.0	Introduced on the C-Series
E-Series	Original command

Example

```
DellEMC#show file-systems

      Size(b)     Free(b)      Feature      Type   Flags  Prefixes
   4286574592  4170424320        FAT32 USERFLASH      rw  flash:
            -           -  unformatted USERFLASH      rw  fcmfs:
   2032525312   590807040      Unknown  NFSMOUNT      rw  nfsmount:
            -           -            -   network      rw  ftp:
            -           -            -   network      rw  tftp:
            -           -            -   network      rw  scp:
            -           -            -   network      rw  http:
DellEMC#
```

Command Fields

Field	Description
size(b)	Lists the size (in bytes) of the storage location. If the location is remote, no size is listed.
Free(b)	Lists the available size (in bytes) of the storage location. If the location is remote, no size is listed.
Feature	Displays the formatted DOS version of the device.
Type	Displays the type of storage. If the location is remote, the word `network` is listed.
Flags	Displays the access available to the storage location. The following letters indicate the level of access: • r = read access • w = write access
Prefixes	Displays the name of the storage location.

Related Commands

- format flash – erases all the existing files and reformats the file system in the internal flash memory.

show os-version

Display the release and software image version information of the image file specified.

Syntax `show os-version [file-url]`

Parameters

file-url (OPTIONAL) Enter the following location keywords and information:
- For a file on the internal flash, enter `flash://` followed by the filename.
- For a file on an FTP server, enter `ftp://user:password@hostip/filepath`.
- For a file on a TFTP server, enter `tftp://hostip/filepath`.
- For a file on the USB port, enter `usbflash://filepath`.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
DellEMC#show os-version

RELEASE IMAGE INFORMATION :
------------------------------------------------------------------------
      Platform          Version        Size           ReleaseTime
 S-Series:S5048F-ON       9.12(1.0)    58997228    Oct  5 2017 12:34:26

TARGET IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
       runtime       9-12(1-23)        Control Processor      passed

BOOT IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
    boot flash         3.38.2.3        Control Processor      passed

BOOTSEL IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
 boot selector       3.38.0.1-3        Control Processor      passed

FPGA IMAGE INFORMATION :
------------------------------------------------------------------------
         Card                        FPGA Name    Version
 stack-unit 1                 S5048F-ON CPLD 1        1.0
 stack-unit 1                 S5048F-ON CPLD 2        1.0
 stack-unit 1                 S5048F-ON CPLD 3        1.0
 stack-unit 1                 S5048F-ON CPLD 4        1.0
 stack-unit 1               S5048F-ON MSS FPGA        0.1
 stack-unit 1                S5048F-ON MSS IAP        1.4
 stack-unit 1               S5048F-ON OOB-FPGA        1.0
DellEMC#
```

Usage Information

NOTE: A filepath that contains a dot (.) is not supported.

show running-config

Display the current configuration and display changes from the default values.

Syntax `show running-config [entity] [configured] [status] [compressed]`

Parameters

entity (OPTIONAL) To display that entity's current (non-default) configuration, enter one of the following keywords:

NOTE: If you did not configure anything that entity, nothing displays and the prompt returns.

aaa	for the current AAA configuration
acl	for the current ACL configuration
arp	for the current static ARP configuration
as-path	for the current AS-path configuration
bfd	for the current BFD configuration

bgp	for the current BGP configuration
boot	for the current boot configuration
cam-profile	for the current CAM profile in the configuration
class-map	for the current class-map configuration
community-list	for the current community-list configuration
ecmp-group	for the current ECMP group configuration
eis	for the current EIS configuration
ethernet	for the current Ethernet CFM configuration
fefd	for the current FEFD configuration
ftp	for the current FTP configuration
frrp	for the current FRRP configuration
fvrp	for the current FVRP configuration
gvrp	for the current GVRP configuration
host	for the current host configuration
hardware-monitor	for hardware-monitor action-on-error settings
hypervisor	for the current hypervisor configuration
igmp	for the current IGMP configuration
interface	for the current interface configuration
interface port-channel	for the current port-channel interface configuration.
interface tunnel	for all configured tunnels. For a specific tunnel, enter the tunnel ID. The range is from 1 to 16383.
ip	for the current IP configuration
isis	for the current ISIS configuration
line	for the current line configuration
lldp	for the current LLDP configuration
load-balance	for the current port-channel load-balance configuration
logging	for the current logging configuration
mac	for the current MAC ACL configuration
mac-address-table	for the current MAC configuration
management-eis	for the current management EIS configuration
management-route	for the current Management port forwarding configuration
mld	for the current MLD configuration
monitor	for the current Monitor configuration
mroute	for the current Mroutes configuration
msdp	for the current MSDP configuration
ntp	for the current NTP configuration
ospf	for the current OSPF configuration

pim	for the current PIM configuration
policy-map-input	for the current input policy map configuration
policy-map-output	for the current output policy map configuration
po-failover-group	for the current port-channel failover-group configuration
prefix-list	for the current prefix-list configuration
privilege	for the current privilege configuration
qos-policy-input	for the current input QoS policy configuration
qos-policy-output	for the current output QoS policy configuration
radius	for the current RADIUS configuration
redirect-list	for the current redirect-list configuration
redundancy	for the current RPM redundancy configuration
resolve	for the current DNS configuration
rip	for the current RIP configuration
rmon	for the current RMON configuration
route-map	for the current route map configuration
sflow	for the current sFlow configuration
snmp	for the current SNMP configuration
spanning-tree	for the current spanning tree configuration
static	for the current static route configuration
status	for the file status information
support-assist	for the current SupportAssist configuration
tacacs+	for the current TACACS+ configuration
tftp	for the current TFTP configuration
trace-group	for the current trace-group configuration
trace-list	for the current trace-list configuration
uplink-state-group	for the uplink state group configuration
users	for the current users configuration
vlt	for the current VLT configuration
wred-profile	for the current wred-profile configuration

configured (OPTIONAL) Enter the keyword `configuration` to display line card interfaces with non-default configurations only.

status (OPTIONAL) Enter the keyword `status` to display the checksum for the running configuration and the start-up configuration.

compressed (Optional) Enter the keyword `compressed` to display the compressed group configuration. Displays the compressed configuration by grouping all similar configurations. The compression is done only for interface related configurations.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2.(0.0)	Added support for the tunnel and EIS interface types.
9.0.0.0	Added support for the VLT option.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added the hardware-monitor option.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Expanded to include the last configuration change, start-up last updated (date and time), and who made the change.
6.5.4.0	Added the status option.

Example

```
DellEMC# show running-config
Current Configuration ...
! Version 9.12(1.0)
! Last configuration change at Thu Apr 18 10:18:39 2013 by admin
! Startup-config last updated at Thu Apr 18 10:18:40 2013 by admin
!
boot system stack-unit 1 primary system: A:
boot system stack-unit 1 secondary tftp://10.16.127.35/FTOS-S5048-
ON-9.12.1.0.bin
boot system stack-unit 1 default system: A:
boot system gateway 10.16.132.254
!
redundancy auto-synchronize full
redundancy disable-auto-reboot stack-unit
!
redundancy disable-auto-reboot stack-unit 1
redundancy disable-auto-reboot stack-unit 2
redundancy disable-auto-reboot stack-unit 3
redundancy disable-auto-reboot stack-unit 4
redundancy disable-auto-reboot stack-unit 5
redundancy disable-auto-reboot stack-unit 6
!
hardware watchdog stack-unit 1
hardware watchdog stack-unit 2
hardware watchdog stack-unit 3
```

Example

```
DellEMC# show running-config status
running-config bytes 10257, checksum 0xFD33339F
startup-config bytes 10257, checksum 0xFD33339F
```

Usage Information

The `status` option allows you to display the size and checksum of the running configuration and the startup configuration.

show startup-config

Display the startup configuration.

Syntax `show startup-config`

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on S-Series
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Expanded to include the last configuration change, start-up last updated (date and time), and who made the change.

Example

```
DellEMC#show startup-config
! Version 9.12(1.0)
! Last configuration change at Wed Sep  9 20:21:33 2017 by default
! Startup-config last updated at Wed Sep  9 20:21:35 2017 by default
!
boot system stack-unit 1 primary system: B:
boot system stack-unit 1 secondary system: B:
boot system stack-unit 1 default system: A:
!
redundancy auto-synchronize full
!
hardware watchdog stack-unit 1
!
service timestamps log datetime
!
```

Related Commands

- show running-config – displays the current (running) configuration.

show version

Display the current Dell EMC Networking Operating System (OS) version information on the system.

Syntax

```
show version
```

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Command Fields

Lines Beginning With	Description
Dell EMC Network...	Name of the operating system
Dell EMC Operating...	OS version number
Dell EMC Application...	Software version
Copyright (c)...	Copyright information
Build Time...	Software build's date stamp
Build Path...	Location of the software build files loaded on the system
Dell EMC Networking OS uptime is...	Amount of time the system has been up

Lines Beginning With	Description
System image...	Image file name
System Type:	System name
Control Processor:...	Control processor information and amount of memory on processor
128K bytes...	Amount and type of memory on system
1 Route Processor...	Hardware configuration of the system, including the number and type of physical interfaces available

Example (Z5048F-ON)

```
DellEMC#show version
Dell EMC Real Time Operating System Software
Dell EMC Operating System Version:  2.0
Dell EMC Application Software Version:  9-12(1-28)
Copyright (c) 1999-2017 by Dell Inc. All Rights Reserved.
Build Time: Mon Oct  9 01:41:06 2017
Build Path: /build/build01/SW/SRC
Dell EMC Networking OS uptime is 3 day(s), 21 hour(s), 44 minute(s)

System image file is "system://A"

System Type: S5048F-ON
Control Processor: Intel Rangeley with 3 Gbytes (3203256320 bytes) of
memory, core(s) 4.

16G bytes of boot flash memory.

  1 54-port TE/TF/FO/FI/HU G (S5048F-ON)
 48 Twenty Five GigabitEthernet/IEEE 802.3 interface(s)
  6 Hundred GigabitEthernet/IEEE 802.3 interface(s)
```

upgrade system

Upgrade the system image.

Syntax

```
upgrade system {flash: | ftp: | scp: | tftp: | usbflash: | stack-unit
{stack-unit-id | all} {A: | B:}
```

Parameters

stack-unit-id	Enter the `stack-unit-id` to upgrade only the mentioned stack-unit.
all	Enter the keyword `all` to upgrade all the member units of the stack.
ftp:	Enter the keyword `ftp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
scp:	Enter the keyword `scp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
tftp:	Enter the keyword `tftp` to follow it with the location of the source file in this form: *//hostlocation/filepath*, or press **Enter** to launch a prompt sequence.
flash:	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
usbflash:	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.

	A:	Enter the keyword `A` to upgrade the bootflash partition A:.
	B:	Enter the keyword `B` to upgrade the bootflash partition B:.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.
9.0(0.0)	Added support for IPv6 for the `file-url` parameter.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000. Added support for the SSD on the Z9000 only.
8.3.7.0	Introduced on the S4810.

Usage Information You must reload FTOS after executing this command. Use the command upgrade system stack-unit to copy FTOS from the management unit to one or more stack members.

Example

```
DellEMC#upgrade system ?
flash: Copy from flash file system (flash://filepath)
ftp: Copy from remote file system, IPv4 or IPv6, (ftp://
userid:password@hostip/filepath)
scp: Copy from remote file system, IPv4 or IPv6, (scp://
userid:password@hostip/filepath)
stack-unit Sync image to the stack-unit
tftp: Copy from remote file system, IPv4 or IPv6, (tftp://
hostip/filepath)
usbflash: Copy from usbflash file system (usbflash://filepath)
DellEMC#
```

upgrade boot

Upgrade the bootflash image or bootselector image.

Syntax `upgrade boot {all | bootflash–image | bootselector-image}stack-unit {stack–unit–id | all}{booted | flash: | ftp: | scp: | tftp: | usbflash:}`

Parameters

all	Enter the keyword `all` to change both the bootflash and bootselector images.
bootflash-image	Enter the keyword `bootflash-image` to change the bootflash image..
bootselector-image	Enter the keyword `bootselector-image` to upgrade the BIOS system image.
stack-unit-id	Enter the `stack-unit-id` to upgrade only the mentioned stack-unit .
all	Enter the keywords `all` to upgrade the member stack-units.
booted	Enter the keyword `booted` to upgrade from the current image on the device.

ftp:	Enter the keyword `ftp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
tftp:	Enter the keyword `tftp` to follow it with the location of the source file in this form: *//hostlocation/filepath*, or press **Enter** to launch a prompt sequence.
flash:	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
usbflash:	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
A:	Enter the keyword `A` to upgrade the bootflash partition A:.
B:	Enter the keyword `B` to upgrade the bootflash partition B:.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.
9.0(0.0)	Added support for IPv6 for the `file-url` parameter.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000. Added support for the SSD on the Z9000 only.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added support for TFTP and SCP.
7.6.1.0	Introduced on the S-Series.

Usage Information You must reload Dell EMC Networking OS after executing this command.

Example

```
DellEMC#upgrade boot ?
all                 Upgrade both boot flash image and selector image
bootflash-image     Upgrade boot flash image
bootselector-image  Upgrade boot selector image
DellEMC#
```

verify

Validate the software image on the flash drive after the image has been transferred to the system, but before the image has been installed.

Syntax `verify { md5 | sha256 }[ flash:// ] img-file [hash-value]`

Parameters

md5	Enter the `md5` keyword to use the MD5 message-digest algorithm.
sha256	Enter the `sha256` keyword to use the SHA256 Secure Hash Algorithm

flash://	(Optional). Enter the `flash://` keyword. The default is to use the flash drive. You can just enter the image file name.
img-file	Enter the name the Dell EMC Networking software image file to validate.
hash-value	(Optional). Enter the relevant hash published on i-Support.

Defaults flash drive

Command Modes EXEC mode

Command History Version 9.5.(0.0)

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information You can enter this command in the following ways:

- **verify md5 flash**:*//img-file*
- **verify md5 flash**:*//img-file <hash-value>*
- **verify sha256 flash**:*//img-file*
- **verify sha256 flash**:*//img-file <hash-value>*

Example

Without Entering the Hash Value for Verification using SHA256

```
DellEMC# verify sha256 flash://FTOS-S5048-ON-9.12.1.0.bin
SHA256 hash for FTOS-S5048-ON-9.12.1.0.bin:
e6328c06faf814e6899ceead219afbf9360e986d692988023b749e6b2093e933
```

Entering the Hash Value for Verification using SHA256

```
DellEMC# verify sha256 flash://FTOS-S5048-ON-9.12.1.0.bin
e6328c06faf814e6899ceead219afbf9360e986d692988023b749e6b2093e933
SHA256 hash VERIFIED for FTOS-S5048-ON-9.12.1.0.bin
```

4

Control and Monitoring

This section contains command information to configure and monitor the system, including Telnet, file transfer protocol (FTP), and trivial file transfer protocol (TFTP).

Topics:

- alias
- banner exec
- banner login
- banner motd
- cam-acl
- clear average-power
- clear line
- configure
- disable
- do
- enable
- enable optic-info-update interval
- end
- exec-timeout
- exit
- ftp-server enable
- ftp-server topdir
- ftp-server username
- hostname
- ip ftp password
- ip ftp source-interface
- ip ftp username
- ip ftp vrf
- ip telnet server enable
- ip telnet server vrf
- ip telnet source-interface
- ip tftp source-interface
- ip tftp vrf
- line
- login concurrent-session
- login statistics
- motd-banner
- ping
- reload
- send
- service timestamps
- show alias
- show alarms
- show cpu-traffic-stats
- show debugging
- show environment
- show inventory
- show login statistics
- show memory
- show processes cpu

- show processes ipc flow-control
- show processes memory
- show reload-type
- show reset-reason
- show software ifm
- show system
- show tech-support
- ssh-peer-stack-unit
- stack-unit location-led
- telnet
- telnet-peer-stack-unit
- terminal length
- traceroute
- undebug all
- virtual-ip
- write

alias

Configure shorter alias names for single-line command input.

Syntax

`alias alias-name command`

To undo the configuration, use the `no alias alias-name command` command.

Parameters

alias *alias-name*

Enter the keyword `alias` then the alias-name.

NOTE: The *alias-name* length is limited to 32 characters starting with alphanumeric and are not case-sensitive. Special characters are not allowed except hyphen— `-`. You cannot use the reserved keywords such as `configure, show, reload, reboot, exit, end, quit, do, no, enable, alias, alias-definition, and malias` to create the alias name.

command

Enter the original command syntax for which you want to configure the alias-name.

NOTE: You can enter the arguments with white spaces and must be enclosed within double quotes—“ ”.

Defaults

None.

Command Modes

CONFIGURATION

ALIAS-DEFINITION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command-Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on all the Dell EMC Networking OS platforms.

Usage Information

- Users with privilege level 15 only can configure the alias-name. You can configure a maximum of 128 aliases.
- Single-line aliases accept a maximum of 128 bytes.
- User can configure up to nine arguments to the aliases—1 to 9. Repetition of arguments are allowed and the system does not allow discontinuous arguments.

Example

The following example shows how to configure single-line alias-name:

```
DellEMC#configure terminal
DellEMC(conf)# alias-definition
DellEMC(conf-alias-definition)# alias showipbr10 show ip interface brief
```

The following example shows how to configure aliases with arguments in EXEC mode:

```
DellEMC#configure terminal
DellEMC(conf)# alias-definition
DellEMC(conf-alias-definition)# alias procpu show processes cpu
management-unit | grep $1
DellEMC(conf-alias-definition)# alias intbr show ip interface brief |
grep "$1"
DellEMC(conf)# end
DellEMC#
```

The following example shows how to configure aliases without arguments in EXEC mode:

```
DellEMC#configure terminal
DellEMC(conf)# alias-definition
DellEMC(conf-alias-definition)# alias ver show version
DellEMC(conf-alias-definition)# alias intst show interface status
DellEMC(conf)# end
DellEMC#
```

The following example shows how to configure aliases with arguments in CONFIGURATION mode:

```
DellEMC#configure terminal
DellEMC(conf)# alias-definition
DellEMC(conf-alias-definition)# alias ifvl interface vlan $1
DellEMC(conf)# end
DellEMC#
```

The following example shows how to configure aliases without arguments in CONFIGURATION mode:

```
DellEMC#configure terminal
DellEMC(conf)# alias-definition
DellEMC(conf-alias-definition)# alias facl feature aclrange
DellEMC(conf)# end
DellEMC#
```

Related Commands

- show alias—display list of all the aliases with alias definition.

banner exec

Configure a message that is displayed when your enter EXEC mode.

Syntax

`banner exec c line c`

To delete a banner, use the `no banner exec` command.

Parameters

c	Enter the keywords `banner exec`, then enter a character delineator, represented here by the letter *c*. Press **ENTER**.
line	Enter a text string for your banner message ending the message with your delineator. In the following example, the delineator is a percent character (%); the banner message is “testing, testing”.

Defaults

No banner is displayed.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original Command

Usage Information

After entering the banner login command, type one or more spaces and a delineator character. Enter the banner text then the second delineator character. When the user is connected to the router, if a message of the day banner is configured, it displays first. If no message of the day banner is configured, the login banner and prompt appear. After the user has logged in, the banner EXEC (if configured) displays.

Example

```
DellEMC(conf)# banner exec ?
LINE c banner-text c, where 'c' is a delimiting character
DellEMC(conf)# banner exec %
Enter TEXT message. End with the character '%'.
This is the banner%
DellEMC(conf)# end
DellEMC# exit
2d18h1m: %STKUNIT1-M:CP %SEC-5-LOGOUT: Exec session is terminated on
console

This is the banner

Dell con0 now available

Press RETURN to get started.
2d18h2m: %STKUNIT1-M:CP %SEC-5-LOGIN_SUCCESS: Login successful on console

This is the banner
DellEMC>
```

Related Commands

- line — enables and configures the console and virtual terminal lines to the system.

banner login

Set a message of the day banner to appear after logging on to the system.

Syntax `banner login {acknowledgement | keyboard-interactive | c line c}`

Enter `no banner login` to delete the banner text. Enter no `banner login keyboard-interactive` to automatically go to the banner message prompt (does not require a carriage return).

Parameters

keyboard-interactive	Enter the `keyboard-interactive` keyword and then press Enter (carriage return) to retrieve the message banner prompt.
acknowledgement	Enter the `acknowledgement` keyword to require a positive acknowledgement from the user while logging in to the system.
c	Enter a delineator character to specify the start and end of the text banner. You cannot use the delineator character in the banner message.
line	Enter text string for your text banner message, with a maximum of 50 lines and up to 255 characters per line.

Defaults No banner is configured and a carriage return (CR) is required when creating a banner.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced the `acknowledgement` keyword.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.2.1.0	Introduced the keyword `keyboard-interactive`.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

Usage Information Enter the banner login command, type one or more spaces and a delineator character, type the banner text, and then type the second delineator character. The message of the day banner displays first when you are connected to the router; otherwise the login banner and prompt appear. After you have logged in, the banner EXEC (if configured) displays.

Example

```
DellEMC(conf)#banner login ?
acknowledgement         Require positive acknowledgment after login
prompt
keyboard-interactive     Press enter key to get prompt
LINE                 c banner-text(max length 255) c, where 'c' is a
delimiting character
DellEMC(conf)#no banner login ?
acknowledgement         Disable positive acknowledgment required after
```

```
login prompt
keyboard-interactive     Prompt will be displayed by default
```

If you configure the `acknowledgement` keyword, the system requires a positive acknowledgement from the user while logging in to the system.

```
$ telnet 10.11.178.16
Trying 10.11.178.16...
Connected to 10.11.178.16.
Escape character is '^]'.
THIS IS A LOGIN BANNER. PRESS 'Y' TO ACKNOWLEDGE. ACKNOWLEDGE?

[y/n]: y
Login: admin
Password:
```

Related Commands

- banner motd — sets a Message of the Day banner.
- banner exec — enables the display of a text string when you enter EXEC mode.

banner motd

Set a message of the day (MOTD) banner.

Syntax

`banner motd c line c`

To delete a Message of the Day banner, enter **no banner motd**.

Parameters

c	Enter a delineator character to specify the limits of the text banner. The delineator is a percent character (%).
line	Enter a text string for your MOTD banner the message with your delineator. The delineator is a percent character (%).

Defaults

No banner is configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

Usage Information

After entering the banner login command, type one or more spaces and a delineator character. Enter the banner text then the second delineator character. When the user is connected to the router, if a message of the day banner is configured, it displays first. If no message of the day banner is configured, the login banner and prompt appear. After the user has logged in, the banner EXEC (if configured) displays.

Related Commands

- banner exec — enables the display of a text string when you enter EXEC mode.
- banner login — sets a banner to display after successful login to the system.

cam-acl

Allocate content addressable memory (CAM) for IPv4 and IPv6 ACLs.

Syntax

```
cam-acl {default | l2acl number ipv4acl number ipv6acl number ipv4qos
number l2qos number l2pt number ipmacacl number [vman-qos | vman-dual-qos]
number {fcoeacl number} {openflow number}
```

Parameters

default — Use the default CAM profile settings and set the CAM as follows:

- L2Acl : 2
- Ipv4Acl : 2
- Ipv6Acl : 0
- Ipv4Qos : 2
- L2Qos : 2
- L2PT : 0
- IpMacAcl : 1
- VmanQos : 0
- EtsAcl : 0
- FcoeAcl : 0
- ipv4pbr : 0
- vrfv4Acl : 0
- Openflow : 0
- fedgovacl : 0
- nlbclusteracl: 0
- ipv4udfmirracl: 0
- ipv4mirracl: 0

cam-acl {default | l2acl *number* ipv4acl *number* ipv6acl *number*, ipv4qos *number* l2qos *number*l2pt*number* ipmacacl *number* ecfmacl *number* [vman-qos | vman-dual-qos *number*}

Allocate space to each CAM region.

Enter the CAM profile name then the amount of CAM space to be allotted. The total space allocated must equal to 9. The ipv6acl range must be a factor of 2.

Enter `3`, `6`, or `9` for the number of OpenFlow FP blocks.

- `3`: Creates 245 entries for use by Openflow controller (256 total entries minus the 11 entries reserved for internal functionality)
- `6`: Creates 501 entries for use by Openflow controller (512 total entries minus the 11 entries reserved for internal functionality)
- `9`: Creates 757 entries for use by Openflow controller (768 total entries minus the 11 entries reserved for internal functionality)

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.2(0.2)	Added support for the `fcoe` parameter on the S4810 and S4820T.
9.1.(0.0)	Added support for OpenFlow on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Added the keywords `fcoeacl` and `iscsioptacl` on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Added the keywords `ecfmacl`, `vman-qos`, and `vman-dual-qos`.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`) then reload the system.

The total amount of space allowed is 12 FP Blocks. System flow requires three blocks and these blocks cannot be reallocated. The `ipv4acl` profile range is from 1 to 8.

When configuring space for IPv6 ACLs, the total number of Blocks must equal 139.

Ranges for the CAM profiles are from 1 to 10, except for the `ipv6acl` profile which is from 0 to 10. The `ipv6acl` allocation must be a factor of 3 (0,3,6,9).

If you enabled BMP, to perform a reload on the chassis to upgrade any configuration changes that have changed the NVRAM content, use the `reload conditional nvram-cfg-change` command.

clear average-power

Reset the average power and average power start time.

Syntax `clear average-power stack-unit {stack-unit-number}`

Parameters

stack-unit-number	Enter the stack unit number.

Defaults None

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.1P1)	Introduced on all Dell EMC Networking OS platforms

Usage Information

This command resets the average power and average power start time to the current time. Average power and average power start time will be calculated from the reset time (i.e current time).

Example

```
DellEMC#clear average-power stack-unit 1
Proceed to clear Average power ? Confirm [yes/no]:yes
DellEMC#
```

clear line

Reset a terminal line.

Syntax `clear line {line-number | console 0 | vty number}`

Parameters

line-number	Enter a number for one of the 12 terminal lines on the system. The range is from 0 to 11.
aux 0	Enter the keywords `aux 0` to reset the auxiliary port.
console 0	Enter the keywords `console 0` to reset the console port.
vty number	Enter the keyword `vty` then a number to clear a terminal line. The range is from 0 to 9.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
E-Series	Original command.

configure

Enter CONFIGURATION mode from EXEC Privilege mode.

Syntax

```
configure [terminal]
```

Parameters

terminal	(OPTIONAL) Enter the keyword `terminal` to specify that you are configuring from the terminal.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
DellEMC# configure
DellEMC(conf)#
```

disable

Return to EXEC mode.

Syntax `disable [level]`

Parameters

level	(OPTIONAL) Enter a number for a privilege level of the Dell EMC Networking OS. The range is from 0 to 15. The default is **1**.

Defaults **1**

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

do

Allows the execution of most EXEC-level commands from all CONFIGURATION levels without returning to the EXEC level.

Syntax `do command`

Parameters

command	Enter an EXEC-level command.

Defaults none

Command Modes
- CONFIGURATION
- INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information The following commands are *not* supported by the `do` command:
- `enable`
- `disable`
- `exit`
- `config`

Example

```
DellEMC(conf-if-tf-1/1)# do clear counters
Clear counters on all interfaces [confirm]
DellEMC(conf-if-tf-1/1)#
DellEMC(conf-if-tf-1/1)# do clear logging
Clear logging buffer [confirm]
DellEMC(conf-if-tf-1/1)#
DellEMC(conf-if-tf-1/1)# do reload
System configuration has been modified. Save? [yes/no]: n
Proceed with reload [confirm yes/no]: n
```

enable

Enter EXEC Privilege mode or any other privilege level configured. After entering this command, you may need to enter a password.

Syntax `enable [level]`

Parameters

level	(OPTIONAL) Enter a number for a privilege level of Dell EMC Networking OS. The range is from 0 to 15.

Defaults **15**

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information Users entering EXEC Privilege mode or any other configured privilege level can access configuration commands. To protect against unauthorized access, use the `enable password` command to configure a password for the `enable` command at a specific privilege level. If no privilege level is specified, the default is privilege level **15**.

NOTE: If you are authorized for the EXEC Privilege mode by your role, you do not need to enter an enable password.

Related Commands

- enable password — configures a password for the `enable` command and to access a privilege level.

enable optic-info-update interval

Enable polling intervals of optical information updates for simple network management protocol (SNMP).

Syntax `enable optic-info-update [interval seconds]`

To disable optical power information updates, use the `no enable optic-info-update interval` command.

Parameters

interval *seconds* Enter the keyword `interval` then the polling interval in seconds. The range is from 120 to 6000 seconds. The default is **300 seconds** (5 minutes).

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Replacement command for the S4820T. Replaces the `enable xfp-power-updates` command.
8.3.11.4	Replacement command for the Z9000. Replaces the `enable xfp-power-updates` command
8.3.10.0	Replacement command for the S4810 only. Replaces the `enable xfp-power-updates` command.

Usage Information To enable polling and to configure the polling frequency, use this command.

end

Return to EXEC Privilege mode from other command modes (for example, CONFIGURATION or ROUTER OSPF modes).

Syntax `end`

Command Modes

- CONFIGURATION
- SPANNING TREE
- MULTIPLE SPANNING TREE
- LINE
- INTERFACE
- TRACE-LIST
- VRRP
- ACCESS-LIST
- PREFIX-LIST
- AS-PATH ACL
- COMMUNITY-LIST
- ROUTER OSPF
- ROUTER RIP
- ROUTER ISIS
- ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and E-Series.
E-Series	Original command.

Related Commands

- exit — returns to the lower command mode.

exec-timeout

Set a time interval that the system waits for input on a line before disconnecting the session.

Syntax

`exec-timeout` *`minutes`* `[`*`seconds`*`]`

To return to default settings, use the `no exec-timeout` command.

Parameters

minutes	Enter the number of minutes of inactivity on the system before disconnecting the current session. The range is from 0 to 35791. The default is **10 minutes** for the console line and **30 minutes** for the VTY line.
seconds	(OPTIONAL) Enter the number of seconds. The range is from 0 to 2147483. The default is **0 seconds**.

Defaults

10 minutes for console line; **30 minutes** for VTY lines; **0 seconds**

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information To remove the time interval, enter `exec-timeout 0 0`.

Example

```
Dell con0 is now available
Press RETURN to get started.
DellEMC>
```

exit

Return to the lower command mode.

Syntax `exit`

Command Modes

- EXEC Privilege
- CONFIGURATION
- LINE, INTERFACE
- TRACE-LIST
- PROTOCOL GVRP
- SPANNING TREE
- MULTIPLE SPANNING TREE
- MAC ACCESS LIST
- ACCESS-LIST
- AS-PATH ACL
- COMMUNITY-LIST
- PREFIX-LIST
- ROUTER OSPF
- ROUTER RIP
- ROUTER ISIS
- ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Related Commands

- end — returns to EXEC Privilege mode.

ftp-server enable

Enable FTP server functions on the system.

Syntax `ftp-server [vrf vrf-name] enable`

Parameters

vrf *vrf-name* Enter the keyword `vrf` and then the name of the VRF to enable the FTP server to listen to that VRF instance.

NOTE: Use this attribute to specify the VRF that is used by the FTP server to accept client connections. If no VRF is specified, then the default VRF is used.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
morpheus% ftp 10.31.1.111
Connected to 10.31.1.111.
220 DellEMC(1.0) FTP server ready
Name (10.31.1.111:dch): dch
331 Password required
Password:
230 User logged in
ftp> pwd
257 Current directory is "flash:"
ftp> dir
200 Port set okay
150 Opening ASCII mode data connection
size  date       time name
-------- ------ ------ --------
 512  Jul-20-2004  18:15:00 tgtimg
 512  Jul-20-2004  18:15:00 diagnostic
 512  Jul-20-2004  18:15:00 other
 512  Jul-20-2004  18:15:00 tgt
226 Transfer complete
329 bytes received in 0.018 seconds (17.95 Kbytes/s)
ftp>
```

ftp-server topdir

Specify the top-level directory to be accessed when an incoming FTP connection request is made.

Syntax `ftp-server topdir directory`

Parameters

directory	Enter the directory path.

Defaults The internal flash is the default directory.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

After you enable FTP server functions with the `ftp-server enable` command, Dell EMC Networking recommends specifying a top-level directory path. Without a top-level directory path specified, the Dell EMC Networking OS directs users to the flash directory when logging in to the FTP server.

Related Commands

- ftp-server enable — enables FTP server functions on the E-Series.
- ftp-server username — sets a username and password for incoming FTP connections to the E-Series.

ftp-server username

Create a user name and associated password for incoming FTP server sessions.

Syntax

`ftp-server username` *`username`* `password [`*`encryption-type`*`]` *`password`*

To delete a user name and its password, use the `no ftp-server username username` command.

Parameters

username	Enter a text string up to 40 characters long as the user name.
password ***password***	Enter the keyword `password` then a string up to 40 characters long as the password. Without specifying an encryption type, the password is unencrypted.
encryption-type	(OPTIONAL) After the keyword `password`, enter one of the following numbers: • `0` (zero) for an unecrypted (clear text) password • `7` (seven) for a hidden text password

Defaults

Not enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

hostname

Set the host name of the system.

Syntax `hostname name`

Parameters

name	Enter a text string, up to 32 characters long.

Defaults **Dell**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information The hostname is used in the prompt.

ip ftp password

Specify a password for outgoing FTP connections.

Syntax `ip ftp password [encryption-type] password`

To remove a password and return to the default setting, use the `no ip ftp password [password]` command.

Parameters

encryption-type (OPTIONAL) Enter one of the following numbers:
- `0` (zero) for an unencrypted (clear text) password
- `7` (seven) for a hidden text password

password Enter a string up to 40 characters as the password.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

The password is listed in the configuration file; you can view the password by entering the `show running-config ftp` command.

Use the `ip ftp password` command when you use the `ftp: parameter` in the `copy` command.

Related Commands

ip ftp source-interface

Specify an interface's IP address as the source IP address for FTP connections.

Syntax

`ip ftp source-interface` *interface*

To delete an interface, use the `no ip ftp source-interface` *interface* command.

Parameters

interface

Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a tunnel interface, enter the keyword `tunnel`.

Defaults

The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
8.2.1.0	Increased number of VLANs on ExaScale to 4094 (was 2094).
8.1.1.0	Introduced on the E-Series ExaScale.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

ip ftp username

Assign a user name for outgoing FTP connection requests.

Syntax `ip ftp username` *`username`*

To return to anonymous FTP connections, use the `no ip ftp username [`*`username`*`]` command.

Parameters

username	Enter a text string as the user name up to 40 characters long.

Defaults No user name is configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information Configure a password with the `ip ftp password` command.

Related Commands

- ip ftp password — sets the password for FTP connections.

ip ftp vrf

Configures an FTP client with a VRF that is used to connect to the FTP server.

Syntax `ip ftp [vrf {vrf-name | management}]`

To undo the FTP client configuration, use the `ip ftp [vrf vrf-name]` command.

Parameters

vrf-name	Enter the *vrf-name* to specify the VRF that is used by the FTP client.
management	Enter the keyword `management` to specify that the VRF used by the FTP client is a management VRF.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information Use this command to make the FTP clients VRF-aware. The VRF name that you specify is used by the FTP client to reach the FTP server. If no VRF name is specified, then the default VRF is used.

ip telnet server enable

Enable the Telnet server on the switch.

Syntax

```
ip telnet server enable
```

To disable the Telnet server, use the `no ip telnet server enable` command.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Related Commands

- ip ssh server — enables the secure shell (SSH) server on the system.

ip telnet server vrf

Configures the TELNET server on either a specific VRF or a management VRF.

Syntax

```
ip telnet server vrf {vrf-name | any | management}
```

To undo the TELNET server configuration, use the `no ip telnet server [vrf vrf-name]` command.

Parameters

vrf-name	Enter the *vrf-name* to specify the VRF that is used by the TELNET server.
any	Enter the keyword `any` to enable server from any VRF.
management	Enter the keyword `management` to specify a management VRF that is used by the TELNET server.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information You can enable the TELNET server on either a management VRF or a user-defined VRF but not both. If you do not specify a VRF name, then the TELNET server is enabled on the default VRF.

Example

```
DellEMC(conf)# ip telnet server vrf vrf1
DellEMC(conf)# no ip telnet server vrf
DellEMC(conf)# ip telnet server vrf management
DellEMC(conf)# no ip telnet server vrf
DellEMC(conf)#
```

ip telnet source-interface

Set an interface's IP address as the source address in outgoing packets for Telnet sessions.

Syntax `ip telnet source-interface` *interface*

To return to the default setting, use the `no ip telnet source-interface [`*interface*`]` command.

Parameters

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a tunnel interface, enter the keyword `tunnel`.

Defaults The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
8.2.1.0	Increased number of VLANs on ExaScale to 4094 (was 2094).
8.1.1.0	Introduced on the E-Series ExaScale.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

Related Commands telnet — telnet to another device.

ip tftp source-interface

Assign an interface's IP address in outgoing packets for TFTP traffic.

Syntax `ip tftp source-interface interface`

To return to the default setting, use the `no ip tftp source-interface interface` command.

Parameters

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4820T.
8.5.1.0	Added support for 4-port 40G line cards.
8.2.1.0	Increased number of VLANs to 4094 (was 2094).
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

ip tftp vrf

Configures an TFTP client with a VRF that is used to connect to the TFTP server.

Syntax `ip tftp [vrf vrf-name]`

To undo the TFTP client configuration, use the `no ip tftp [vrf vrf-name]` command.

Parameters

vrf *vrf-name* Enter the keyword `vrf` and then the name of the VRF to specify the VRF that is used by the TFTP client.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information Use this command to make the TFTP clients VRF aware. The VRF name that you specify is used by the TFTP client to reach the TFTP server. If no VRF is specified, then the default VRF is used.

Related Commands
- ftp-server topdir — sets the directory to be used for incoming FTP connections.
- ftp-server username — sets a username and password for incoming FTP connections.

line

Enable and configure console and virtual terminal lines to the system. This command accesses LINE mode, where you can set the access conditions for the designated line.

Syntax `line {aux 0 |console 0 | vty number [end-number]}`

Parameters

aux 0	Enter the keyword **aux 0** to configure the auxiliary terminal connection.
console 0	Enter the keyword `console 0` to configure the console port. The console option is <0-0>.
vty *number*	Enter the keyword `vty` then a number from 0 to 9 to configure a virtual terminal line for remote sessions. The system supports 10 remote sessions.
end-number	(OPTIONAL) Enter a number from 1 to 9 as the last virtual terminal line to configure. You can configure multiple lines at one time.

Defaults Not configured

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

Usage Information You cannot delete a terminal connection.

Related Commands

- access-class — restricts the incoming connections to a particular IP address in an IP access control list (ACL).
- password — specifies a password for users on terminal lines.

login concurrent-session

Configures the limit of concurrent sessions for each user on console and virtual terminal lines.

Syntax

```
login concurrent-session {limit number-of-sessions | clear–line enable}
no login concurrent-session {limit number-of-sessions | clear–line enable}
```

Parameters

limit *number-of-sessions*	Sets the number of concurrent sessions that any user can have on console and virtual terminal lines. The range is from 1 to 12 (10 VTY lines, one console, and one AUX line).
clear-line enable	Enables you to clear your existing sessions.

Defaults Not configured. You can use all the available sessions.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820, S5000, S6000, S6000-ON, and Z9500.

Usage Information

You must have either the System Administrator or Security Administrator privileges to configure login concurrent-session limit or to enable clear-line.

To limit the number of concurrent sessions that any user can have on console, auxiliary, and virtual terminal lines, use the `login concurrent-session limit` *`number-of-sessions`* command.

If the `login concurrent-session clear-line enable` command is configured, you are provided with an option to clear any of your existing sessions after a successful login authentication. When you reach the maximum concurrent session limit, you can still log in by clearing any of your existing sessions.

Example

The following example shows how to limit the number of concurrent sessions that any user can have to four:

```
DellEMC(conf)# login concurrent-session limit 4
DellEMC(conf)#
```

The following example shows how to use the `login concurrent-session clear-line enable` command.

```
DellEMC(conf)# login concurrent-session clear-line enable
DellEMC(conf)#
```

When you try to log in, the following message appears with all your existing concurrent sessions, providing an option to close any one of the existing sessions:

```
$ telnet 10.11.178.14
Trying 10.11.178.14...
Connected to 10.11.178.14.
Escape character is '^]'.
Login: admin
Password:
Current sessions for user admin:
Line              Location
2  vty 0          10.14.1.97
3  vty 1          10.14.1.97
Clear existing session? [line number/Enter to cancel]:
```

When you try to create more than the permitted number of sessions, the following message appears, prompting you to close one of your existing sessions. Close any of your existing sessions to log in to the system.

```
$ telnet 10.11.178.14
Trying 10.11.178.14...
Connected to 10.11.178.14.
Escape character is '^]'.
Login: admin
Password:
Maximum concurrent sessions for the user reached.
Current sessions for user admin:
Line              Location
2  vty 0          10.14.1.97
3  vty 1          10.14.1.97
4  vty 2          10.14.1.97
5  vty 3          10.14.1.97
Clear existing session? [line number/Enter to cancel]:
```

Related Commands

- login statistics — enable and configure user login statistics on console and virtual terminal lines.
- show login statistics — displays login statistics of users who have used the console or virtual terminal lines to log in to the system.

login statistics

Enable and configure user login statistics on console and virtual terminal lines.

Syntax

```
login statistics {enable | time-period days}
no login statistics {enable | time-period days}
```

Parameters

enable	Enables login statistics for the last 30 days by default.
time-period *days*	Sets the number of days the system stores user login statistics; range is from 1 to 30.

Defaults Not configured

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820, S5000, S6000, S6000-ON, and Z9500.

Usage Information

Only the system and security administrators can configure login activity tracking and view the login activity details of other users.

If you enable user login statistics, the system displays the last successful login details of the current user, the details of any failed login attempts by others, and if the current user's permissions have changed since the last login.

If you use the `login statistics time-period days` command to set a custom time period, the system only reports the login statistics during that interval.

NOTE: Login statistics are not applicable for login sessions that do not use authentication on user names. For example, the system does not report login activity for a telnet session that prompts only a password field.

Example

When you log into the system, it displays a message similar to the following:

```
$ telnet 10.11.178.14
Trying 10.11.178.14...
Connected to 10.11.178.14.
Escape character is '^]'.
Login: admin
Password:
Last successful login: 12:52:01 UTC Tue Mar 22 2016 Line vty0 (
10.11.178.14 ).
There were 1 unsuccessful login attempt(s) since the last successful
login.
There were 1 unsuccessful login attempt(s) for user admin in the last 30
day(s).
```

```
There were 1 successful login attempt(s) for user admin in the last 30
day(s).
```

The preceding message shows that the user had previously logged in to the system using the VTY line from 10.11.178.14. It also displays the number of unsuccessful login attempts since the last login and the number of unsuccessful login attempts in the last 30 days.

```
$ telnet 10.11.178.14
Trying 10.11.178.14...
Connected to 10.11.178.14.
Escape character is '^]'.
Login: admin
Password:
Last successful login: 12:52:01 UTC Tue Mar 22 2016 on console
There were 2 unsuccessful login attempt(s) since the last successful
login.
There were 3 unsuccessful login attempt(s) for user admin in last 12
day(s).
There were 1 successful login attempt(s) for user admin in the last 30
day(s).
```

The preceding message shows that the user had previously logged in to the system using the console line. It also displays the number of unsuccessful login attempts since the last login and the number of unsuccessful login attempts during a custom time period.

Related Commands

- login concurrent-session — configures the limit of concurrent sessions for each user on console and virtual terminal lines.
- show login statistics — displays login statistics of users who have used the console or virtual terminal lines to log in to the system.

motd-banner

Enable a message of the day (MOTD) banner to appear when you log in to the system.

Syntax `motd-banner`

To disable the MOTD banner, use the `no motd-banner` command.

Defaults Enabled on all lines.

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command

ping

Test connectivity between the system and another device by sending echo requests and waiting for replies.

Syntax

```
ping [host | ip-address | ipv6-address] [count {number | continuous}]
[datagram-size] [timeout] [source (ip src-ipv4-address) | interface] [tos]
[df-bit (y|n)] [validate-reply(y|n)] [outgoing-interface] [pattern pattern]
[sweep-min-size] [sweep-max-size] [sweep-interval] [ointerface (ip src-
ipv4-address) | interface] [ethernet | vrf vrf-name]
```

Parameters

host (OPTIONAL) Enter the host name of the devices to which you are testing connectivity.

ip-address (OPTIONAL) Enter the IPv4 address of the device to which you are testing connectivity. The address must be in the dotted decimal format.

ipv6-address (OPTIONAL) Enter the IPv6 address, in the x:x:x:x::x format, to which you are testing connectivity.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

count Enter the number of echo packets to be sent. The default is **5**.

- number: from 1 to 2147483647
- continuous: transmit echo request continuously

datagram size Enter the ICMP datagram size. The range is from 36 to 15360 bytes. The default is **100**.

timeout Enter the interval to wait for an echo reply before timing out. The range is from 0 to 3600 seconds. The default is **2 seconds**.

source Enter the IPv4 or IPv6 source ip address or the source interface. For IPv6 addresses, you may enter global addresses only. Enter the IP address in A.B.C.D format.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a Tunnel interface, enter the keyword `tunnel` then a number from 1 to 16383.

tos	(IPv4 only) Enter the type of service required. The range is from 0 to 255. The default is **0**.
df-bit	(IPv4 only) Enter `Y` or `N` for the "don't fragment" bit in IPv4 header. ● `N`: Do not set the "don't fragment" bit. ● `Y`: Do set "don't fragment" bit Default is **No**.
validate-reply	(IPv4 only) Enter `Y` or `N` for reply validation. ● `N`: Do not validate reply data. ● `Y`: Do validate reply data. Default is `No`.
outgoing-interface	(IPv6 link-local address) Enter the outgoing interface for ping packets to a destination link-local address.
pattern *pattern*	(IPv4 only) Enter the IPv4 data pattern. Range: 0-FFFF. Default: **0xABCD**.
sweep-min-size	Enter the minimum size of datagram in sweep range. The range is from 52 to 15359 bytes.
sweep-max-size	Enter the maximum size of datagram in sweep range. The range is from 53 to 15359 bytes.
sweep-interval	Enter the incremental value for sweep size. The range is from 1 to 15308 seconds.
interface	(IPv4 only) Enter the outgoing interface for multicast packets. Enter the IP address in A.B.C.D format. ● For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. ● For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. ● For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. ● For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. ● For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. ● For a port channel interface, enter the keywords `port-channel` then a number. ● For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
ethernet	Enter the keyword `ethernet` to test layer2 connectivity.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to test connectivity to the VRF.

Defaults None.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0)P5	Introduced on the S4048–ON.
9.8(0.0)P2	Introduced on the S3048–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T. Added support for the `outgoing-interface` option for link-local IPv6 addressing on the S4820T.
8.3.12.0	Added support for the `outgoing-interface` option for link-local IPv6 addressing on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards.
8.4.1.0	IPv6 pinging available on management interface.
8.3.1.0	Introduced extended ping options.
8.2.1.0	Introduced on the E-Series (IPv6).
8.1.1.0	Introduced on the E-Series (IPv4).
7.9.1.0	Introduced VRF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for IPv6 address on the E-Series.

Usage Information

When you enter the `ping` command without specifying an IP/IPv6 address (Extended Ping), you are prompted for a target IP/IPv6 address, a repeat count, a datagram size (up to 1500 bytes), a timeout (in seconds), and for Extended Commands.

The following table provides descriptions for the `ping` command status response symbols displayed in the output.

Symbol	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates the network server timed out while waiting for a reply.
U	A destination unreachable error PDU was received.
Q	Source quench (destination too busy).
M	Could not fragment.
?	Unknown packet type.
&	Packet lifetime exceeded.

Example (IPv4)

```
DellEMC# ping 172.31.1.255

Type Ctrl-C to abort.

Sending 5, 100-byte ICMP Echos to 172.31.1.255, timeout is 2 seconds:
Reply to request 1 from 172.31.1.208 0 ms
Reply to request 1 from 172.31.1.216 0 ms
Reply to request 1 from 172.31.1.205 16 ms
::
Reply to request 5 from 172.31.1.209 0 ms
```

```
Reply to request 5 from 172.31.1.66 0 ms
Reply to request 5 from 172.31.1.87 0 ms
DellEMC#
```

Example (IPv6)

```
DellEMC# ping 100::1

Type Ctrl-C to abort.

Sending 5, 100-byte ICMP Echos to 100::1, timeout is 2 seconds:
!!!!!
Success rate is 100.0 percent (5/5), round-trip min/avg/max = 0/0/0 (ms)
DellEMC#
```

reload

Reboot the system.

Syntax `reload [conditional nvram-cfg-change | no-confirm [discard-running] | dell-diag | onie [install | uninstall | rescue]]`

Parameters

conditional nvram-cfg-change	(OPTIONAL) Reload into the Dell EMC Networking Operating System (OS) if the condition is true. A configuration change to the NVRAM requires a switch reload. To reload the switch, select `nvram-cfg-change`.
no-confirm [discard-running]	Reload the chassis without prompting for further confirmation.
dell-diag	(OPTIONAL) Reload the system into the Dell diagnostics mode.
onie	(OPTIONAL) Reload the system into the ONIE mode. You can also use one of the following options to reload the system and enter the respective modes directly: • `install` — enter the Install mode and install the networking OS • `uninstall` — enter the Uninstall mode and uninstall the networking OS • `rescue` — enter the Rescue mode and access the file system

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Added the optional `dell-diag` and `onie` parameters. Introduced the `no-confirm` option.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.

Version	Description
9.1(0.0)	Added 'conditional' parameter.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

If you use only the `reload` command, the system boots into the Dell EMC Networking OS.

If there is a change in the running configuration, the system prompts you to save the new configuration when you reload the system using the `reload` command. You can also save your running configuration manually using the `copy running-config` command.

You can use the `conditional` parameter if any configuration changes made to the NVRAM, such as, stack-group and fanout configurations, must be saved.

When you use the `reload` command after making configuration changes, the system prompts you to update the hash for the startup configuration using the `verified boot hash` command.

Example

```
DellEMC# reload
Verified startup-configuration is enabled, Hash for startup-
configuration is invalid.
Please update Hash for the startup-configuration before reload.
```

Example

The following example shows how to reload the system:

```
DellEMC# reload
Proceed with reload [confirm yes/no]: yes
```

The following example shows how to reload the system into Dell diagnostics mode:

```
DellEMC#reload dell-diag
Proceed with reload [confirm yes/no]: yes
```

The following example shows how to reload the system into ONIE mode:

```
DellEMC#reload onie
Proceed with reload [confirm yes/no]: yes
```

The following example shows how to reload the system into ONIE prompt and enter the install mode directly:

```
DellEMC#reload onie install
Proceed with reload [confirm yes/no]: yes
```

send

Send messages to one or all terminal line users.

Syntax `send [*] | [line ] | [console] | [vty]`

Parameters

*	Enter the asterisk character * to send a message to all tty lines.
line	Send a message to a specific line. The range is from 0 to 11.
console	Enter the keyword `console` to send a message to the primary terminal line.
vty	Enter the keyword `vty` to send a message to the virtual terminal.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

Usage Information Messages can contain an unlimited number of lines; however, each line is limited to 255 characters. To move to the next line, use <CR>. To send the message use CTR-Z; to abort a message, use CTR-C.

service timestamps

To debug and log messages, add time stamps. This command adds either the uptime or the current time and date with local time zone time difference included or excluded.

Syntax `service timestamps {debug | log} [datetime [localtime] [msec] [show-timezone] [utc] | uptime]`

To disable timestamping, use the `no service timestamps [debug | log]` command.

Parameters

datetime	(OPTIONAL) Enter the keyword `datetime` to have the current time and date as in local time zone added to the message.
debug	(OPTIONAL) Enter the keyword `debug` to add timestamps to debug messages.
log	(OPTIONAL) Enter the keyword `log` to add timestamps to log messages with severity from 0 to 6.
localtime	(OPTIONAL) Enter the keyword `localtime` to include the local time zone time in the timestamp.
msec	(OPTIONAL) Enter the keyword `msec` to include milliseconds in the timestamp.

show-timezone	(OPTIONAL) Enter the keyword `show-timezone` to include the time zone information in the timestamp.
uptime	(OPTIONAL) Enter the keyword `uptime` to have the timestamp based on time elapsed since system reboot.
utc	(OPTIONAL) Enter the keyword `utc` to include the UTC time format (ignoring local time zone) in the timestamp.

Defaults

- `datetime [localtime]`
- `datetime`

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.5)	Added support for UTC time format.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information If you do not specify parameters and enter service timestamps, it appears as service timestamps debug datetime in the running-configuration.

To view the current options set for the `service timestamps` command, use the `show running-config` command.

From 9.14.1.5 release, the default timestamp display format for the logs is set to local time (`service timestamps log datetime localtime`) instead of `service timestamps log datetime`.

show alias

Display list of all the aliases with alias definition.

Syntax `show alias [details [alias-name]]`

Parameters

details	(OPTIONAL) Enter the keyword `details` to display the detailed alias configuration.
alias-name	(OPTIONAL) Enter the alias-name to display the details of a specific alias definition.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command-Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on all the Dell EMC Networking OS platforms.

Usage Information

- Alias definitions display up to 40 characters, and detailed output can be seen using the `details` option.

Example The following example shows the list of alias names configured and its corresponding definition:

```
DellEMC# show alias
------------------------------------------------------------------
Alias Name                      Definition
------------------------------------------------------------------
showipbr10                      show ip interface brief | ….
showipbr40                      show ip interface brief | ….
shboot                          show bootvar…
cr-vlan                         interface vlan $1 ..
------------------------------------------------------------------
Total Alias Configured : 4
------------------------------------------------------------------
```

The following example shows the detailed list of alias names configured on the system:

```
DellEMC# show alias details
------------------------------------------------------------------
Name: showipbr10
Definition:
  show ip interface brief | grep tengig ignore-case
------------------------------------------------------------------
------------------------------------------------------------------
Name: showipbr40
Definition:
  show ip interface brief | grep fortygig ignore-case
------------------------------------------------------------------
DellEMC#
```

The following example shows the details of a specific alias name configured on the system:

```
DellEMC# show alias details showipbr10
------------------------------------------------------------------
Name: showipbr10
Definition:
  show ip interface brief | grep tengig ignore-case
------------------------------------------------------------------
DellEMC#
```

Related Commands

- alias—configure shorter alias names for single-line command input.

show alarms

View alarms currently active in the system.

Syntax `show alarms [threshold]`

Parameters

threshold	(OPTIONAL) Enter the keyword `threshold` to display the temperature thresholds in Celsius for each level.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
DellEMC#show alarms

--  Minor Alarms  --
Alarm Type                                          Duration
------------------------------------------------------------

--  Major Alarms  --
Alarm Type                                          Duration
------------------------------------------------------------
PEM 2 in unit 1 down                                13 min, 36 sec
Fan 1 in PSU 2 of Unit 1 is down or removed 13 min, 34 sec
DellEMC#
```

show cpu-traffic-stats

View the CPU traffic statistics.

Syntax `show cpu-traffic-stats [port number | all | cp ]`

Parameters

port number	(OPTIONAL) Enter the port number to display traffic statistics on that port only. The range is from 1 to 1568.
all	(OPTIONAL) Enter the keyword `all` to display traffic statistics on all the interfaces receiving traffic, sorted based on the traffic.
cp	(OPTIONAL) Enter the keyword `cp` to display traffic statistics on the specified CPU.

Defaults **all**

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series
6.2.1.1	Introduced on the E-Series.

Usage Information Traffic statistics are sorted on a per-interface basis; the interface receiving the most traffic is displayed first. All CPU and port information is displayed unless a specific port or CPU is specified. Traffic information is displayed for router ports only; not for management interfaces. The traffic statistics are collected only after the `debug cpu-traffic-stats` command is executed; not from the system bootup.

NOTE: After debugging is complete, use the `no debug cpu-traffic-stats` command to shut off traffic statistics collection.

Example

```
DellEMC# show cpu-traffic-stats
Processor : CP
--------------
```

```
Received 100% traffic on twentyFiveGigE 1/2 Total packets:100
LLC:0, SNAP:0, IP:100, ARP:0, other:0
Unicast:100, Multicast:0, Broadcast:0
Processor : RP1
---------------
Received 62% traffic on twentyFiveGigE  1/2 Total packets:500
LLC:0, SNAP:0, IP:500, ARP:0, other:0
Unicast:500, Multicast:0, Broadcast:0
Received 37% traffic on twentyFiveGigE  1/1 Total packets:300
LLC:0, SNAP:0, IP:300, ARP:0, other:0
Unicast:300, Multicast:0, Broadcast:0
Processor : RP2
---------------
No CPU traffic statistics.
DellEMC#
```

show debugging

View a list of all enabled debugging processes.

Syntax `show debugging`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series
E-Series	Original command.

Example

```
DellEMC# show debug
Generic IP:
  IP packet debugging is on for
    ManagementEthernet 1/1
```

```
    Port-channel 1-2
    Port-channel 5
    twentyFiveGigE 1/1-1/3,1/5-1/9,1/10-1/19,1/20
    twentyFiveGigE 1/1-1/2,1/4-1/5,1/6-1/9,1/15,1/17,1/19,1/21
  ICMP packet debugging is on for
    twentyFiveGigE 1/1,1/2,1/4,1/6,1/8,1/10,1/12,1/14,1/16
DellEMC#
```

show environment

View system component status (for example, temperature or voltage).

Syntax `show environment [all | fan | pem | stack-unit unit-id | thermal-sensor ]`

Parameters

all	Enter the keyword `all` to view all components.
fan	Enter the keyword `fan` to view information on the fans. The output of this command is chassis dependent.
pem	Enter the keyword `pem` to view only information on power entry modules.
stack-unit *unit-id*	Enter the keywords `stack-unit` then the unit-id to display information on a specific stack member.
thermal-sensor	Enter the keywords `thermal-sensor` to view information on thermal sensors.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Network OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.1P1)	The CLI has been enhanced to show the power, average power and average power start time.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	The output of the `show environment fan` command for the S Series is changed to display fan speeds instead of showing the fan status as up or down.

Usage Information The following example shows the output of the `show environment` command.

Example (all)

```
DellEMC#show environment

--  Fan  Status  --
Unit Bay   TrayStatus  Fan1    Speed   Fan2    Speed
-------------------------------------------------------------------------------
 1    1     up          up      8295    up      8680
 1    2     up          up      8438    up      8548
 1    3     up          up      8456    up      8529
 1    4     up          up      8511    up      8529

Speed in RPM

--  Power Supplies  --
Unit   Bay   Status   Type    FanStatus   FanSpeed   Power  AvgPower  AvgPowerStartTime
-------------------------------------------------------------------------------------------
  1     1    up     AC          up         9104        132     131   09/30/2017-05:18
  1     2    down   UNKNOWN     down       0           0       0    N/A

-- Unit Environment Status  --
Unit  Status        Temp   Voltage
-------------------------------------------------------------------------
* 1   online        35C    ok

 * Management Unit

--  Thermal Sensor Readings (deg C)  --
Unit  Bcm_Int  CpuOnBoard  Bcm56967  SysInt0  SysInt1  Cpu_Int
-----------------------------------------------------------------
  1       51       35       37       21       28       36
```

show inventory

Display the switch type, components (including media), and Dell EMC Networking Operating System (OS), including hardware identification numbers and configured protocols.

Syntax `show inventory [media slot]`

Parameters

media *slot* (OPTIONAL) Enter the keyword `media` then the stack ID of the stack member for which you want to display pluggable media inventory.

NOTE: This parameter is available but not supported in Dell EMC Networking Operating System version 8.3.11.4. Because stacking is not supported, if you use this parameter, the output displays "Media not present or accessible" (refer to the *Usage Information* section).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Added support to display 10GBASE-T information on the S4048, S4048T, S6000, S6000-ON, S6100, Z9500, S6010, and Z9100.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.4	Output expanded to include Piece Part ID (PPID) and eSR4 optics.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced this version of the command for S-Series. S-Series output differs from E-Series.

Usage Information

If there are no fiber ports in the unit, just the header under *show inventory media* displays. If there are fiber ports but no optics inserted, the output displays *Media not present or accessible*.

Example (S5048F–ON)

```
DellEMC>show inventory
System Type            : S5048F-ON
System Mode            : 1.0
Software Version       : 9-12(1-17)

Unit Type               Serial Number  Part Number  Rev  Piece Part ID            Rev  Svc Tag  Exprs Svc Code
--------------------------------------------------------------------------------------------------------------
* 1  S5048F-ON-01-FE-54 NA             082VTG       X00  CN-082VTG-CES00-775-0003 X00  839SG02  176 121 008 66
  1  S5048F-ON-PWR-AC   NA             02RPHX       A00  CN-02RPHX-17972-74I-012L A00  N/A      0
  1  S5048F-ON-FAN      NA             03CH15       A00  CN-03CH15-CES00-76O-0181 A00  N/A      0
  1  S5048F-ON-FAN      NA             03CH15       A00  CN-03CH15-CES00-773-0105 A00  N/A      0
  1  S5048F-ON-FAN      NA             03CH15       A00  CN-03CH15-CES00-76O-0184 A00  N/A      0
  1  S5048F-ON-FAN      NA             03CH15       A00  CN-03CH15-CES00-76O-0185 A00  N/A      0

 * - Management Unit


Software Protocol Configured
----------------------------------------------------------------
  LLDP
  SNMP
```

```
DellEMC>show inventory media
Slot   Port     Type        Media               Serial Number        Dell Qualified
-------------------------------------------------------------------------------
   1      1              Media not present or accessible
   1      2              Media not present or accessible
   1      3              Media not present or accessible
   1      4              Media not present or accessible
   1      5              Media not present or accessible
   1      6              Media not present or accessible
   1      7              Media not present or accessible
   1      8              Media not present or accessible
   1      9              Media not present or accessible
   1     10              Media not present or accessible
   1     11              Media not present or accessible
   1     12              Media not present or accessible
   1     13              Media not present or accessible
   1     14              Media not present or accessible
   1     15              Media not present or accessible
   1     16              Media not present or accessible
   1     17              Media not present or accessible
   1     18              Media not present or accessible
   1     19              Media not present or accessible
   1     20              Media not present or accessible
   1     21              Media not present or accessible
   1     22              Media not present or accessible
   1     23              Media not present or accessible
   1     24              Media not present or accessible
   1     25              Media not present or accessible
   1     26              Media not present or accessible
   1     27     SFP28       25GBASE-CR1-1M        CN077206774032H      Yes
   1     28              Media not present or accessible
   1     29              Media not present or accessible
   1     30              Media not present or accessible
   1     31              Media not present or accessible
   1     32              Media not present or accessible
   1     33              Media not present or accessible
   1     34              Media not present or accessible
   1     35     SFP         1000BASE-T           AN1208QU8H           Yes
   1     36              Media not present or accessible
   1     37              Media not present or accessible
   1     38              Media not present or accessible
   1     39              Media not present or accessible
   1     40              Media not present or accessible
   1     41              Media not present or accessible
   1     42              Media not present or accessible
   1     43              Media not present or accessible
   1     44              Media not present or accessible
   1     45              Media not present or accessible
   1     46              Media not present or accessible
   1     47              Media not present or accessible
   1     48              Media not present or accessible
   1   49/1              Media not present or accessible
   1   49/2              Media not present or accessible
```

```
1   49/3              Media not present or accessible
1   49/4              Media not present or accessible
1     50              Media not present or accessible
1   51/1              Media not present or accessible
1     52              Media not present or accessible
1   53/1              Media not present or accessible
1   53/2              Media not present or accessible
1   53/3              Media not present or accessible
1   53/4              Media not present or accessible
1     54              Media not present or accessible
```

Related Commands

- show interfaces — displays the interface configuration.

show login statistics

Displays login statistics of users who have used the console or virtual terminal lines to log in to the system.

Syntax

```
show login statistics [all | [[successful-attempts | unsuccessful-attempts]
[user login-id] [time-period days]] | user login-id]
```

Parameters

all	(Optional)Displays the login statistics of all users in the last 30 days or the custom defined time period.
time-period *days*	(Optional)Displays the number of failed login attempts by the current user in the specified period.
successful-attempts	(Optional)Displays the number of successful login attempts by the current user in the last 30 days or the custom defined time period
unsuccessful-attempts	(Optional)Displays the number of failed login attempts by the current user in the last 30 days or the custom defined time period.
user *login-id*	(Optional)Displays the login statistics of a specific user in the last 30 days or the custom defined time period. When you use it with the `unsuccessful-attempts` keyword, the system displays the number of failed login attempts by a specific user in the last 30 days or the custom defined time period

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced the `successful-attempts` keyword.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820, S5000, S6000, S6000-ON, and Z9500.

Usage Information

To view the successful and failed login details of the current user in the last 30 days or the custom defined period, use the `show login statistics` command.

To view the successful and failed login details of all users in the last 30 days or the custom defined period, use the `show login statistics all` command. You can use this command only if you have system or security administrator rights.

To view the successful and failed login details of a specific user in the last 30 days or the custom defined time period, use the `show login statistics user user-id` command. If you have system or security administrator rights, you can view the login statistics of other users. If you do not have system or security administrator rights, you can view your login statistics but not the login statistics of others.

NOTE: By default, these commands display the details for the last 30 days. If you set a custom-defined time period for login statistics using the `login statistics time-period days` command, these commands display details only for that period.

Example

The following is sample output of the `show login statistics` command.

```
DellEMC#show login statistics

------------------------------------------------------------------
User: admin
Last login time: 12:52:01 UTC Tue Mar 22 2016
Last login location: Line vty0 ( 10.16.127.143 )
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 0
Successful login attempt(s) in last 30 day(s): 1
------------------------------------------------------------------
```

The following is sample output of the `show login statistics all` command.

```
DellEMC#show login statistics all

------------------------------------------------------------------
User: admin
Last login time: 08:54:28 UTC Wed Mar 23 2016
Last login location: Line vty0 ( 10.16.127.145 )
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 3
Successful login attempt(s) in last 30 day(s): 4
------------------------------------------------------------------

------------------------------------------------------------------
User: admin1
Last login time: 12:49:19 UTC Tue Mar 22 2016
Last login location: Line vty0 ( 10.16.127.145 )
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 3
Successful login attempt(s) in last 30 day(s): 2
------------------------------------------------------------------

------------------------------------------------------------------
User: admin2
Last login time: 12:49:27 UTC Tue Mar 22 2016
Last login location: Line vty0 ( 10.16.127.145 )
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 3
Successful login attempt(s) in last 30 day(s): 2
------------------------------------------------------------------

------------------------------------------------------------------
User: admin3
Last login time: 13:18:42 UTC Tue Mar 22 2016
Last login location: Line vty0 ( 10.16.127.145 )
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 3
Successful login attempt(s) in last 30 day(s): 2
```

The following is sample output of the `show login statistics user user-id` command.

```
DellEMC# show login statistics user admin

------------------------------------------------------------------
User: admin
Last login time: 12:52:01 UTC Tue Mar 22 2016
Last login location: Line vty0 ( 10.16.127.143 )
```

```
Unsuccessful login attempt(s) since the last successful login: 0
Unsuccessful login attempt(s) in last 30 day(s): 0
Successful login attempt(s) in last 30 day(s): 1
---------------------------------------------------------------------
```

The following is sample output of the `show login statistics unsuccessful-attempts` command.

```
DellEMC#show login statistics unsuccessful-attempts
There were 3 unsuccessful login attempt(s) for user admin in last 30
day(s).
```

The following is sample output of the `show login statistics unsuccessful-attempts time-period` *`days`* command.

```
DellEMC# show login statistics unsuccessful-attempts time-period 15
There were 0 unsuccessful login attempt(s) for user admin in last 15
day(s).
```

The following is sample output of the `show login statistics unsuccessful-attempts user` *`login-id`* command.

```
DellEMC# show login statistics unsuccessful-attempts user admin
There were 3 unsuccessful login attempt(s) for user admin in last 12
day(s).
```

The following is sample output of the `show login statistics successful-attempts` command.

```
DellEMC#show login statistics successful-attempts
There were 4 successful login attempt(s) for user admin in last 30
day(s).
```

Related Commands

- login statistics — enable and configure user login statistics on console and virtual terminal lines.
- login concurrent-session — configures the limit of concurrent sessions for each user on console and virtual terminal lines.

show memory

View current memory usage on the switch.

Syntax `show memory [stack-unit id]`

Parameters

stack-unit *id*	(OPTIONAL) Enter the keyword `stack-unit` then the stack unit ID to display memory information on the designated stack member.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced this version of the command for the S-Series.

Usage Information

The output for `show memory` displays the memory usage of LP part (sysdlp) of the system. The sysdlp is an aggregate task that handles all the tasks running on the S-Series' CPU.

Example

```
DellEMC#show memory stack-unit 1
     Statistics On Unit 1 Processor
     ==============================
   Total(b)       Used(b)       Free(b)      Lowest(b)      Largest(b)
  3177185280       2310248    3174875032    3174676264    3174875032
DellEMC#
```

show processes cpu

Display CPU usage information based on processes running.

Syntax

```
show processes cpu [management-unit [1-99 | details] | stack-unit id
[1-99]| summary ]
```

Parameters

management-unit [*1-99* | details]	(OPTIONAL) Display processes running in the control processor. The `1-99` variable sets the number of tasks to display in order of the highest CPU usage in the past five (5) seconds. Add the keyword `details` to display all running processes (except sysdlp). Refer to Example (management-unit).
stack-unit *id*	(OPTIONAL) Enter the keyword `stack-unit` then the stack member ID. As an option of the `show processes cpu` command, this option displays CPU usage for the designated stack member. Or, as an option of the `command`, this option limits the output of memory statistics to the designated stack member. Refer to Example (stack-unit).
summary	(OPTIONAL) Enter the keyword`summary` to view CPU utilization of processes related to stack-unit processing.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added the keywords `management-unit [details]`.
7.6.1.0	Introduced on the S-Series.

Example

```
DellEMC# show processes cpu ?
management-unit         Management Unit
stack-unit              Unit Number
summary                 Summary of CPU utilization
|                       Pipe through a command
```

```
DellEMC# show processes cpu summary

CPU utilization         5Sec    1Min    5Min
-------------------------------------------
UNIT1                    3%      3%      1%
```

```
DellEMC# show processes cpu stack-unit 1

CPUID         5sec            1min            5min
-------------------------------------------------
CORE  0      13.17           11.53            0.00
CORE  2       9.38           12.16            0.00
Overall      11.28           11.84            0.00


CPU utilization of sysdlp for five seconds: 2%/0%; one minute: 3%; five minutes: 1%
PID        Runtime(ms)     Invoked       uSecs     5Sec    1Min     5Min TTY
Process
0xbb773000        5950         595       10000    1.00%   2.25%    1.22%   0
tExcTask
0xbab2a000        4030         403       10000    1.00%   1.33%    0.73%   0
frrpagt
0xbacf3000          10           1       10000    0.00%   0.00%    0.00%   0
F10StkMgr
0xbad0c000         710          71       10000    0.00%   0.00%    0.03%   0
lcMgr
0xbad24000          30           3       10000    0.00%   0.00%    0.00%   0
 dla
0xbad44000          50           5       10000    0.00%   0.00%    0.00%   0
sysAdmTsk
0xbad58000         650          65       10000    0.00%   0.00%    0.00%   0
timerMgr
0xbad6e000          50           5       10000    0.00%   0.00%    0.00%   0
  PM
0xbad85000        1190         119       10000    0.00%   0.00%    0.00%   0
  KP
0xbad9a000           0           0           0    0.00%   0.00%    0.00%   0
evagt
0xbadb4000          30           3       10000    0.00%   0.00%    0.00%   0
 ipc
0xbadc9000          10           1       10000    0.00%   0.00%    0.00%   0
sysReaper
0xbae22000          60           6       10000    0.00%   0.00%    0.02%   0
 tme
```

```
DellEMC# show processes cpu stack-unit 1

CPUID         5sec            1min            5min
-------------------------------------------------
```

```
CORE  0      13.17           11.53             0.00
CORE  2       9.38           12.16             0.00
Overall      11.28           11.84             0.00


CPU utilization of sysdlp for five seconds: 2%/0%; one minute: 3%; five minutes: 1%
PID        Runtime(ms)     Invoked       uSecs     5Sec    1Min     5Min TTY
Process
0xbb773000        5950         595       10000    1.00%   2.25%    1.22%   0
tExcTask
0xbab2a000        4030         403       10000    1.00%   1.33%    0.73%   0
frrpagt
0xbacf3000          10           1       10000    0.00%   0.00%    0.00%   0
F10StkMgr
0xbad0c000         710          71       10000    0.00%   0.00%    0.03%   0
lcMgr
0xbad24000          30           3       10000    0.00%   0.00%    0.00%   0
 dla
0xbad44000          50           5       10000    0.00%   0.00%    0.00%   0
sysAdmTsk
0xbad58000         650          65       10000    0.00%   0.00%    0.00%   0
timerMgr
0xbad6e000          50           5       10000    0.00%   0.00%    0.00%   0
  PM
0xbad85000        1190         119       10000    0.00%   0.00%    0.00%   0
  KP
0xbad9a000           0           0           0    0.00%   0.00%    0.00%   0
evagt
0xbadb4000          30           3       10000    0.00%   0.00%    0.00%   0
 ipc
0xbadc9000          10           1       10000    0.00%   0.00%    0.00%   0
sysReaper
0xbae22000          60           6       10000    0.00%   0.00%    0.02%   0
 tme
```

```
DellEMC#show processes cpu stack-unit 1

CPUID         5sec            1min            5min
-----------------------------------------------------
CORE  0       4.58            3.65             5.14
CORE  2       9.92            9.97            10.52
Overall       7.25            6.81             7.83


CPU utilization of sysdlp for five seconds: 20%/0%; one minute: 17%; five minutes: 18%
PID        Runtime(ms)     Invoked       uSecs     5Sec    1Min     5Min TTY
Process
0xba61e020      300870       30087       10000   15.00%  16.33%   16.17%   0
  KP
0xba4e4020       35720        3572       10000    4.00%   1.42%    1.35%   0
ifagt_1
0xbb206020       27380        2738       10000    1.00%   0.92%    1.07%   0
tExcTask
0xba576020         500          50       10000    0.00%   0.00%    0.00%   0
envmgr
0xba592020         400          40       10000    0.00%   0.00%    0.00%   0
lcMgr
0xba5b3020          40           4       10000    0.00%   0.00%    0.00%   0
 dla
0xba5d5020         190          19       10000    0.00%   0.00%    0.00%   0
sysAdmTsk
0xba5ee020        2730         273       10000    0.00%   0.00%    0.00%   0
timerMgr

[output truncated]
```

```
DellEMC# show processes cpu management-unit ?
<1-99>                  Number of tasks with highest CPU usage last 5 seconds
details                 Detail CPU utilization
|                       Pipe through a command
DellEMC#show processes cpu management-unit details

CPUID         5sec            1min            5min
-----------------------------------------------------
CORE  0      11.73           10.79            12.82
CORE  2      11.73           12.05            14.31
Overall      11.73           11.42            13.56

PID        Runtime(ms)     Invoked       uSecs     5Sec    1Min     5Min TTY
Process
Process: system        PID:   0  CPU usage: 5sec - 13.12%  1min - 13.37%  5min - 12.94%
CoreID: 3
Process: sysdlp        PID: 428  CPU usage: 5sec - 3.78%  1min - 2.56%  5min - 3.40%
CoreID: 0
Process: sysd          PID: 410  CPU usage: 5sec - 1.59%  1min - 0.96%  5min - 2.50%
CoreID: 2
           TID  Runtime(ms)      Invoked    uSecs     5Sec    1Min     5Min   TTY
Thread
```

```
            56           20            2       10000    0.00%    0.00%    0.00%   0
     usm
            55           10            1       10000    0.00%    0.00%    0.00%   0
DHCLIENT
            54            0            0           0    0.00%    0.00%    0.00%   0
     cms
            53           60            6       10000    0.00%    0.00%    0.00%   0
portmirr
            52            0            0           0    0.00%    0.00%    0.00%   0
cfgDataSync
            51            0            0           0    0.00%    0.00%    0.00%   0
sysCompMgr
            50           50            5       10000    0.00%    0.01%    0.00%   0
 statMgr
            49         1010          101       10000    0.05%    0.07%    0.08%   0
   sflCp
            48           30            3       10000    0.00%    0.00%    0.00%   0
    snmp
            47            0            0           0    0.00%    0.00%    0.00%   0
dpi_cmow
            46            0            0           0    0.00%    0.00%    0.00%   0
dpi_taskcmo
```

```
DellEMC# show processes cpu management-unit details ?
|                          Pipe through a command
DellEMC# show processes cpu management-unit ?
<1-99>                     Number of tasks with highest CPU usage last 5
seconds
details                    Detail CPU utilization
|                          Pipe through a command
```

```
DellEMC# show processes cpu management-unit

CPUID          5sec             1min             5min
-------------------------------------------------
CORE  0         9.54             9.92            12.82
CORE  2        10.74            11.56            14.31
Overall        10.14            10.74            13.56

PID         Runtime(ms)      Invoked       uSecs     5Sec    1Min     5Min TTY
Process
0x00000000        45040         4504       10000   13.12%  13.20%   12.94%   0
system
0x000001ac        25750         2575       10000    2.78%   2.48%    3.40%   0
sysdlp
0x0000019a        10650         1065       10000    0.60%   1.16%    2.50%   0
sysd
0x000003a5          860           86       10000    0.40%   0.22%    0.28%   0
clish
0x000001ad          520           52       10000    0.20%   0.30%    0.16%   0
lacp
0x000004ba          330           33       10000    0.20%   0.36%    0.09%   0
clish
0x000000c9         1240          124       10000    0.20%   0.15%    0.44%   0
nvmgr
0x000000e0          530           53       10000    0.20%   0.12%    0.16%   0
igmp
0x00000132          420           42       10000    0.20%   0.10%    0.13%   0
vrrp
0x0000028d          410           41       10000    0.20%   0.05%    0.12%   0
ovsdbsvr
0x000000a9          200           20       10000    0.20%   0.03%    0.06%   0
arpm
0x00000253          100           10       10000    0.20%   0.02%    0.02%   0
 otm
0x00000206          140           14       10000    0.20%   0.02%    0.03%   0
tnlmgr
0x00000012         1290          129       10000    0.00%   0.10%    0.12%   0
mount_mfs
0x0000024d           40           40       10000    0.00%   0.08%    0.14%   0
xstp
DellEMC#
```

Related Commands

- show hardware layer2 acl — displays Layer 2 ACL data for the selected stack member and stack member port-pipe.
- show hardware layer3 — displays Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.
- show hardware stack-unit — displays the data plane or management plane input and output statistics of the designated component of the designated stack member.
- show hardware system-flow — displays Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

- show interfaces stack-unit — displays information on all interfaces on a specific S-Series stack member.
- show processes memory (S-Series) — displays CPU usage information based on processes running in an S-Series.

show processes ipc flow-control

Display the single window protocol queue (SWPQ) statistics.

Syntax

```
show processes ipc flow-control [cp]
```

Parameters

cp	(OPTIONAL) Enter the keyword `cp` to view the control processor's SWPQ statistics.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

Field	Description
Source QID /Tx Process	Source Service Identifier
Destination QID/Rx Process	Destination Service Identifier
Cur Len	Current number of messages enqueued
High Mark	Highest number of packets in the queue at any time

Field	Description
#of to / Timeout	Timeout count
#of Retr /Retries	Number of retransmissions
#msg Sent/Msg Sent/	Number of messages sent
#msg Ackd/Ack Rcvd	Number of messages acknowledged
Retr /Available Retra	Number of retries left
Total/ Max Retra	Number of retries allowed

Important Points:

- The SWP provides flow control-based reliable communication between the sending and receiving software tasks.
- A sending task enqueues messages into the SWP queue3 for a receiving task and waits for an acknowledgement.
- If no response is received within a defined period of time, the SWP timeout mechanism resubmits the message at the head of the FIFO queue.
- After retrying a defined number of times, the `SWP-2-NOMORETIMEOUT` timeout message is generated.
- In the S-Series example, a retry (Retries) value of zero indicates that the SWP mechanism reached the maximum number of retransmissions without an acknowledgement.

Example

```
DellEMC# show processes ipc flow-control cp

Q Statistics on CP Processor
TxProcess     RxProcess Cur High Time Retr Msg  Ack  Aval  Max
                    Len  Mark  Out  ies  Sent Rcvd Retra Retra
    DHCP0          ACL0   0   1    1   1    1    1   25    25
    DHCP0        IPMGR0   0   0    0   0    0    0   25    25
    DHCP0        IPMGR1   0   0    0   0    0    0   25    25
    DHCP0        IFMGR0   0   0    0   0    0    0   25    25
   IPMGR0         NDPM0   0   0    0   0    0    0   60    60
   IFMGR0         FEFD0   0  10    0   0   12   12   60    60
   IFMGR0         SNMP0   0   1    0   0    1    1   60    60
   IFMGR0       SFL_CP0   0  20    0   0   26   26   60    60
   IFMGR0     PORTMIRR0   0   8    0   0    9    9   60    60
   IFMGR0 EVENTTERMLOG0   0   1    0   0    1    1   60    60
   IFMGR0     IPSECMGR0   0   8    0   0   11   11   60    60
   IFMGR0          DHCP0   0   8    0   0   11   11   60    60
   IFMGR0        IPMGR0   0  29    0   0   36   36   60    60
   IFMGR0        IFAGT3   0   1    0   0    2    2   60    60
   IFAGT3        IFMGR0   0   1    0   0    1    1   60    60
   IFMGR0        OFMGR0   0  16    1   1   21   21   60    60
   IFMGR0          ACL0   0   8    0   0   14   14   60    60
   IFMGR0         VRRP0   0  10    0   0   17   17   60    60
   IFMGR0          PIM0   0   1    0   0    1    1    5     5
   IFMGR0       MACMGR0   0   0    0   0    0    0   60    60
   IFMGR0         L2PM0   0  29    0   0   40   40   60    60
   IFMGR0     DIFFSERV0   0  51    0   0   67   67   60    60
   IFMGR0          RTM0   0   9    0   0   11   11   60    60
   IFMGR0        LLDP0   0  12    0   0   12   12   60    60
   IFMGR0         MRTM0   0  10    0   0   10   10   60    60
   IFMGR0        IPMGR1   0  33    0   0   33   33   60    60
   IFMGR0          LACP0   0  23    0   0   23   23   60    60
PORTMIRR0    ACL_AGENT2   0   0    0   0    0    0   50    50
   IFMGR0          IGMP0   0   0    0   0    0    0   50    50
   IFMGR0        IFAGT2   0   1    0   0    1    1   60    60
DellEMC#
```

```
DellEMC# show processes ipc flow-control cp

Q Statistics on CP Processor
TxProcess     RxProcess Cur High Time Retr Msg  Ack  Aval  Max
                    Len  Mark  Out  ies  Sent Rcvd Retra Retra
    DHCP0          ACL0   0   1    1   1    1    1   25    25
    DHCP0        IPMGR0   0   0    0   0    0    0   25    25
    DHCP0        IPMGR1   0   0    0   0    0    0   25    25
    DHCP0        IFMGR0   0   0    0   0    0    0   25    25
   IPMGR0         NDPM0   0   0    0   0    0    0   60    60
   IFMGR0         FEFD0   0  10    0   0   12   12   60    60
   IFMGR0         SNMP0   0   1    0   0    1    1   60    60
```

```
   IFMGR0        SFL_CP0    0   20     0    0    26    26    60     60
   IFMGR0      PORTMIRR0    0    8     0    0     9     9    60     60
   IFMGR0 EVENTTERMLOG0     0    1     0    0     1     1    60     60
   IFMGR0      IPSECMGR0    0    8     0    0    11    11    60     60
   IFMGR0           DHCP0   0    8     0    0    11    11    60     60
   IFMGR0         IPMGR0    0   29     0    0    36    36    60     60
   IFMGR0         IFAGT3    0    1     0    0     2     2    60     60
   IFAGT3         IFMGR0    0    1     0    0     1     1    60     60
   IFMGR0         OFMGR0    0   16     1    1    21    21    60     60
   IFMGR0           ACL0    0    8     0    0    14    14    60     60
   IFMGR0          VRRP0    0   10     0    0    17    17    60     60
   IFMGR0           PIM0    0    1     0    0     1     1     5      5
   IFMGR0        MACMGR0    0    0     0    0     0     0    60     60
   IFMGR0          L2PM0    0   29     0    0    40    40    60     60
   IFMGR0      DIFFSERV0    0   51     0    0    67    67    60     60
   IFMGR0           RTM0    0    9     0    0    11    11    60     60
   IFMGR0          LLDP0    0   12     0    0    12    12    60     60
   IFMGR0          MRTM0    0   10     0    0    10    10    60     60
   IFMGR0         IPMGR1    0   33     0    0    33    33    60     60
   IFMGR0           LACP0   0   23     0    0    23    23    60     60
PORTMIRR0     ACL_AGENT2    0    0     0    0     0     0    50     50
   IFMGR0          IGMP0    0    0     0    0     0     0    50     50
   IFMGR0         IFAGT2    0    1     0    0     1     1    60     60
DellEMC#
```

```
DellEMC#show processes ipc flow-control cp

Q Statistics on CP Processor
TxProcess RxProcess Cur High Time Retr Msg  Ack  Aval  Max
                    Len  Mark Out  ies  Sent Rcvd Retra Retra
 ACL0     RTM0       0    0    0    0    0    0    10    10
 ACL0     DIFFSERV0  0    0    0    0    0    0    10    10
 ACL0     SNMP0      0    0    0    0    0    0    10    10
 LACP0    IFMGR0     0    0    0    0    0    0    25    25
 DHCP0    ACL0       0    0    0    0    0    0    25    25
 DHCP0    IPMGR0     0    0    0    0    0    0    25    25
 DHCP0    IFMGR0     0    0    0    0    0    0    25    25
```

show processes memory

Display memory usage information based on processes running in the S-Series or Z-Series system.

Syntax `show processes memory {management-unit | stack unit {unit-id | all | summary}}`

Parameters

management-unit	Enter the keyword `management-unit` for CPU memory usage of the stack management unit.
stack unit *unit id*	Enter the keyword `stack unit` then a stack unit ID of the member unit for which to display memory usage on the forwarding processor.
all	Enter the keyword `all` for detailed memory usage on all stack members.
summary	Enter the keyword `summary` for a brief summary of memory availability and usage on all stack members.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.7.1.0	Added the `management-unit` option.
7.6.1.0	Introduced on the S-Series.

Usage Information

`show processes memory output` Field	**Description**
Total:	Total system memory available
MaxUsed:	Total maximum memory used ever (history indicated with time stamp)
CurrentUsed:	Total memory currently in use
CurrentFree:	Total system memory available
SharedUsed:	Total used shared memory
SharedFree:	Total free shared memory
PID	Process ID
Process	Process Name
ResSize	Actual resident size of the process in memory
Size	Process test, stack, and data size
Allocs	Total dynamic memory allocated
Frees	Total dynamic memory freed
Max	Maximum dynamic memory allocated
Current	Current dynamic memory in use

The output for the `show process memory` command displays the memory usage statistics running on CP part (sysd) of the system. The sysd is an aggregate task that handles all the tasks running on S-Series' CP.

For the S-Series, the output of the `show memory` command and this command differ based on which Dell OS processes are counted.

- In the `show memory` output, the memory size is equal to the size of the application processes.
- In the output of this command, the memory size is equal to the size of the application processes plus the size of the system processes.

Example

```
DellEMC# show processes memory stack-unit 1
Total: 268435456, MaxUsed: 2420244, CurrentUsed: 2420244, CurrentFree:
266015212
TaskName TotalAllocated TotalFreed MaxHeld CurrentHolding
tme      435406         397536     54434   37870
ipc       16652              0     16652   16652
timerMgr  33304              0     33304   33304
sysAdmTsk 33216              0     33216   33216
tFib4   1943960              0   1943960 1943960
aclAgent  90770          16564     74206   74206
ifagt_1   21318          16564     21318    4754
```

```
dsagt       6504              0      6504     6504
MacAgent 269778               0    269778   269778
DellEMC#
```

Example (management-unit)

```
DellEMC# show processes management-unit

Total      : 151937024,   MaxUsed : 111800320 [2/25/2008 4:18:53]
CurrentUsed: 98848768, CurrentFree: 53088256

SharedUsed : 13007848, SharedFree : 7963696
PID Process      ResSize     Size Allocs Frees   Max Current
337 KernLrnAgMv 117927936       0      0     0      0       0
331 vrrp          5189632  249856  50572     0  50572   50572
323 frrp          5206016  241664 369238     0 369238  369238
322 xstp          7430144 2928640  38328     0  38328   38328
321 pim           5267456  823296  62168     0  62168   62168
314 igmp          4960256  380928  18588 16564  18588    2024
313 mrtm          6742016 1130496  72758     0  72758   72758
308 l2mgr         5607424   552960 735214 380972 619266 354242
301 l2pm         5001216   167936 1429522 1176044 286606 253478
298 arpm          4628480  217088  71092  33128  71092  37964
294 ospf          5468160  503808 724204 662560  78208  61644
288 dsm           6778880 1159168  39490  16564  39490  22926
287 rtm           5713920  602112 442280 198768 376024 243512
284 rip           4562944  258048    528      0    528    528
281 lacp          4673536  266240 221060      0 221060 221060
277 ipm1          4837376  380928  83788      0  83788  83788
273 acl           5005312  512000 239564 149076 123616  90488
272 topoDPC     117927936       0      0      0      0      0
271 bcmNHOP     117927936       0      0      0      0      0
270 bcmDISC     117927936       0      0      0      0      0
269 bcmATP-RX   117927936       0      0      0      0      0
268 bcmATP-TX   117927936       0      0      0      0      0
267 bcmSTACK    117927936       0      0      0      0      0
266 bcmRX       117927936       0      0      0      0      0
265 bcmLINK.0   117927936       0      0      0      0      0
!----------- output truncated --------------!
DellEMC#
```

show reload-type

Shows the reload type which occurs on the next reboot.

Syntax `show reload-type`

Parameters N/A

Defaults normal-reload

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
8.3.11.4	Introduced on all Dell EMC Networking OS platforms.

Example

```
DellEMC#show reload-type
Reload-Type                          : normal-reload [Next boot :
normal-reload]
DellEMC#
```

show reset-reason

Display the reason for the last system reboot.

Syntax

```
show reset-reason [stack-unit {stack-unit-number | all}]
```

Parameters

stack-unit unit-number	(OPTIONAL) Enter the keyword `stack-unit` and the stack unit number to view the reason for the last system reboot for that stack unit.
all	(OPTIONAL) Enter the keyword `stack-unit` and the keyword `all` to view the reason for the last system reboot of all stack units in the stack.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S5048F-ON.
9.13(0.0)	Introduced on the S3048–ON, S3100 series, S4048–ON, S4048T–ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, C9010, MXL, M-IOA, and FN-IOM.

Usage Information

You can use the `show reset-reason` without the `stack-unit` option to view the reason for the last system reboot of the local system.

Example — User-initiated reboot with the `reload` command

```
DellEMC#show reset-reason
Cause      : Reset by User through CLI command
Reset Time: 11/05/2017-08:36
```

Example — System reboot due to the `upgrade` command

```
DellEMC# show reset-reason
Cause: Reboot by Software upgrade Module.
Reset Time: 8/9/2017 1:39 PM.
```

Example — System reboot for unknown reasons

```
DellEMC# show reset-reason
Cause: N/A
Reload Time: N/A
```

Example — System reboot due to power loss or pressing the power button off and on.

The example shows that the last system reboot was due to warm reset.

```
DellEMC#show reset-reason
Cause           : Warm Reset
Reset Time      : N/A.
```

Example — System reboot due to watchdog timeout

```
DellEMC#show reset-reason
Cause: Watchdog timeout.
Reset Time: N/A
```

Example — System reboot due to thermal shutdown

The example shows that the last system reboot was due to thermal shutdown.

```
DellEMC#show reset-reason
Cause: Thermal Shutdown.
Reset Time: N/A.
```

Example — System reboot due to BIOS boot fail

The example shows the reason for the last reboot was due to BIOS boot fail.

```
DellEMC#show reset-reason
Cause: Reset on Boot Ok Fail.
Reset Time: N/A.
```

Example — Unknown reason

If the reason for the last system reboot is not available, the system displays the reason as N/A.

```
DellEMC# show reload-reason
Cause: N/A
Time: N/A
```

Example — Reset reason of a single stack unit

```
DellEMC# show reset-reason stack-unit 1
Cause      : Reset by User through CLI command
Reset Time: 11/05/2017-08:36
```

Example — Reset reason of all stack units

```
DellEMC#show reset-reason stack-unit all

Last Reset Reason:
---------------------
Type                Cause                                  Time
-------------------------------------------------------------------------------
stack-unit 1        Reboot by Software                     11/05/2017-09:04
stack-unit 2        Reboot by Software                     11/05/2017-09:04
stack-unit 3        Cold Reset                             N/A
stack-unit 4        N/A                                    N/A
stack-unit 5        N/A                                    N/A
stack-unit 6        N/A                                    N/A
```

show software ifm

Display interface management (IFM) data.

Syntax

`show software ifm {clients [summary] | ifagt` *`number`* `| ifcb` *`interface`* `| stack-unit` *`unit-ID`* `| trace-flags}`

Parameters

clients Enter the keyword `clients` to display IFM client information.

summary (OPTIONAL) Enter the keyword `summary` to display brief information about IFM clients.

ifagt *number* Enter the keyword `ifagt` then the number of an interface agent to display software pipe and IPC statistics.

ifcb *interface* Enter the keyword `ifcb` then one of the following interface IDs then the interface information to display interface control block information for that interface:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

stack-unit *unit-ID* Enter the keyword `stack-unit` then the stack member number to display IFM information for that unit.

trace-flags Enter the keyword `trace-flags` to display IFM information for internal trace flags.

Defaults None.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
7.6.1.0	Introduced for the C-Series and S-Series.

Example

```
DellEMC# show software ifm clients summary
ClntType Inst svcMask subSvcMask tlvSvcMask tlvSubSvc swp
IPM      0 0x00000000 0x00000000 0x90ff71f3 0x021e0e81 31
RTM      0 0x00000000 0x00000000 0x800010ff 0x01930000 43
VRRP     0 0x00000000 0x00000000 0x803330f3 0x00400000 39
L2PM     0 0x00000000 0x00000000 0x87ff79ff 0x0e032200 45
ACL      0 0x00000000 0x00000000 0x867f50c3 0x000f0218 44
OSPF     0 0x00000dfa 0x00400098 0x00000000 0x00000000 0
PIM      0 0x000000f3 0x00030000 0x00000000 0x00000000 0
IGMP     0 0x000e027f 0x00000000 0x00000000 0x00000000 0
SNMP     0 0x00000000 0x00000000 0x800302c0 0x00000002 30
EVTTERM  0 0x00000000 0x00000000 0x800002c0 0x00000000 29
MRTM     0 0x00000000 0x00000200 0x81f7103f 0x00000000 38
DSM      0 0x00000000 0x00000000 0x80771003 0x00000000 32
LACP     0 0x00000000 0x00000000 0x8000383f 0x00000000 35
DHCP     0 0x00000000 0x00000000 0x800000c2 0x0000c000 37
V6RAD    0 0x00000433 0x00030000 0x00000000 0x00000000 0
Unidentified Client0 0x006e0002 0x00000000 0x00000000 0x00000000 0
DellEMC#
```

show system

Display the status of all stack members or a specific member.

Syntax

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to view an abbreviated list of system information.

stack-unit *unit-id* (OPTIONAL) Enter the keywords `stack-unit` then the stack member ID for information on that stack member.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for the `disabled-ports` parameter .
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.4	The `brief` parameter no longer displays the current Reload mode. To display Reload mode, use the `show reload-type` command. Modified the `show system stack-unit` command output to support Piece Part ID (PPID).
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	The Boot Flash field displays the code level for boot code 2.8.1.1 and newer, while older boot codes display as "Present".
7.7.1.0	Added Master Priority field.
7.6.1.0	Introduced on the S-Series.

Example (show system brief)

```
DellEMC#show system brief

Stack MAC                       : 34:17:eb:37:2d:00
Reload-Type                     : normal-reload [Next boot : normal-reload]

--  Stack Info  --
Unit  UnitType     Status         ReqTyp          CurTyp          Version     Ports
-------------------------------------------------------------------------------
  1   Management   online         S5048F-ON       S5048F-ON       9-12(1-28)  72
  2   Member       not present
  3   Member       not present
  4   Member       not present
  5   Member       not present
  6   Member       not present

--  Power Supplies  --
Unit   Bay   Status   Type    FanStatus   FanSpeed   Power  AvgPower  AvgPowerStartTime
-------------------------------------------------------------------------------------
  1     1    up     AC          up        26240       119     119   10/08/2017-16:11
  1     2    up     AC          up        26912       133     133   10/08/2017-16:11

--  Fan  Status  --
Unit Bay   TrayStatus  Fan1    Speed   Fan2    Speed
-------------------------------------------------------------------------------
```

```
  1    1      up          up       21370   up       22215
  1    2      up          up       21370   up       22090
  1    3      up          up       21487   up       22090
  1    4      up          up       21487   up       22090

Speed in RPM
```

show tech-support

Display a collection of data from other `show` commands, necessary for Dell EMC Networking technical support to perform troubleshooting.

Syntax `show tech-support [stack-unit unit-id | page]`

Parameters

stack-unit	(OPTIONAL) Enter the keywords `stack-unit` to view CPU memory usage for the stack member designated by unit-id.
page	(OPTIONAL) Enter the keyword `page` to view 24 lines of text at a time. Press the SPACE BAR to view the next 24 lines. Press the ENTER key to view the next line of text. When using the pipe command (|), enter one of these keywords to filter command output. For details about filtering commands, refer to CLI Basics.
save	Enter the keyword `save` to save the command output. `flash`: Save to local flash drive (`flash://filename`. A maximum of 20 characters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Updated to display the `show revision` and `show os-version` command outputs.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced `save` to the file options.
7.6.1.0	Introduced on the S-Series.

Usage Information Without the `page or stack-unit` option, the command output is continuous. To interrupt the command output, use Ctrl-z.

The `save` option works with other filtering commands. This allows you to save specific information of a `show` command. The `save` entry must always be the last option. For example: `DellEMC#show tech-support |grep regular-expression |except regular-expression | find regular-expression | save flash://result`

This display output is an accumulation of the same information that is displayed when you execute one of the following `show` commands:

- `show version`
- `show os-version`
- `show revision`
- `show clock`
- `show running-config`
- `show system stack-ports`
- `show interfaces`
- `show process memory`
- `show process cpu`
- `show file system`
- `show system`
- `show environment`
- `show ip traffic`
- `show ip management route`
- `show ip route summary`
- `show Inventory`
- `show log summary`
- `show command-history (last 20 commands)`
- `show log`

Example (options under show tech-support)

```
DellEMC# show tech-support ?
page        Page through output
stack-unit  Unit Number
|           Pipe through a command
<cr>
DellEMC#show tech-support stack-unit 1 ?
|           Pipe through a command
<cr>
DellEMC# show tech-support stack-unit 1 | ?
except      Show only text that does not match a pattern
find        Search for the first occurrence of a pattern
grep        Show only text that matches a pattern
no-more     Don't paginate output
save        Save output to a file

DellEMC# show tech-support stack-unit 1 | save ?
flash:      Save to local file system (flash://filename (max 20
chars) )

DellEMC# show tech-support stack-unit 1 | save flash://LauraSave
Start saving show command report .......
DellEMC#

DellEMC# dir
Directory of flash:
1  drw-  16384   Jan 01 1980 00:00:00 +00:00 .
2  drwx  1536    Jul 13 1996 02:38:06 +00:00 ..
3  d---  512     Nov 20 2007 15:46:44 +00:00 ADMIN_DIR
DellEMC#
```

Example(show tech-support)

```
DellEMC#show tech-support page

------------ show version -------------
Dell EMC Real Time Operating System Software
Dell EMC Operating System Version:  2.0
```

```
Dell EMC Application Software Version:  9.14(0.0)
Copyright (c) 1999-2018 by Dell Inc. All Rights Reserved.
Build Time: Mon Oct  9 01:41:06 2018
Build Path: /build/build01/SW/SRC
Dell EMC Networking OS uptime is 3 day(s), 21 hour(s), 44 minute(s)

System image file is "system://A"

System Type: S5048F-ON
Control Processor: Intel Rangeley with 3 Gbytes (3203256320 bytes) of
memory, core(s) 4.

16G bytes of boot flash memory.

  1 54-port TE/TF/FO/FI/HU G (S5048F-ON)
 48 Twenty Five GigabitEthernet/IEEE 802.3 interface(s)
  6 Hundred GigabitEthernet/IEEE 802.3 interface(s)

 ----------------------------------- show os version
-----------------------------

RELEASE IMAGE INFORMATION :
------------------------------------------------------------------------
      Platform          Version        Size           ReleaseTime
 S-Series:S5048F-ON     9.14(0.0)    62789040    Jul  3 2018 13:53:48

TARGET IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
       runtime        9.14(0.0)        Control Processor      passed

BOOT IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
    boot flash         3.38.2.6        Control Processor      passed

BOOTSEL IMAGE INFORMATION :
------------------------------------------------------------------------
          Type          Version                    Target    checksum
 boot selector       3.38.0.1-3        Control Processor      passed

FPGA IMAGE INFORMATION :
------------------------------------------------------------------------
         Card                        FPGA Name    Version
 stack-unit 1                S5048F-ON CPLD 1        1.0
 stack-unit 1                S5048F-ON CPLD 2        1.0
 stack-unit 1                S5048F-ON CPLD 3        1.0
 stack-unit 1                S5048F-ON CPLD 4        1.0
 stack-unit 1              S5048F-ON MSS FPGA        0.1
 stack-unit 1               S5048F-ON MSS IAP        1.4
 stack-unit 1              S5048F-ON OOB-FPGA        1.0


 ----------------------------------- show revision
--------------------------------

--  Stack unit 1  --
S5048F-ON CPLD 1         : 1.0

S5048F-ON CPLD 2         : 1.0

S5048F-ON CPLD 3         : 1.0

S5048F-ON CPLD 4         : 1.0

S5048F-ON MSS FPGA       : 0.1

S5048F-ON MSS IAP        : 1.4

S5048F-ON OOB-FPGA       : 1.0

 ----------------------------------- show clock
```

```
--------------------------------
05:15:31.830 UTC Wed Jul 4 2018

<output truncated for brevity>
```

Example(show tech-support stack-unit)

```
DellEMC#show tech-support stack-unit 1

------------ show version -------------
Dell EMC Real Time Operating System Software
Dell EMC Operating System Version:  2.0
Dell EMC Application Software Version:  9-12(1-28)
Copyright (c) 1999-2018 by Dell Inc. All Rights Reserved.
Build Time: Mon Oct  9 01:41:06 2018
Build Path: /build/build01/SW/SRC
Dell EMC Networking OS uptime is 3 day(s), 21 hour(s), 44 minute(s)

System image file is "system://A"

System Type: S5048F-ON
Control Processor: Intel Rangeley with 3 Gbytes (3203256320 bytes) of
memory, core(s) 4.

16G bytes of boot flash memory.

  1 54-port TE/TF/FO/FI/HU G (S5048F-ON)
 48 Twenty Five GigabitEthernet/IEEE 802.3 interface(s)
  6 Hundred GigabitEthernet/IEEE 802.3 interface(s)

------------ show clock -------------
21:44:30.965 UTC Sat Sep 19 2018

------------ show running-config -------------
Current Configuration ...
! Version 9.12(1.0)
! Last configuration change at Sat Sep 19 21:08:22 2017 by default
!
boot system stack-unit 1 primary system: B:
boot system stack-unit 1 secondary system: B:
boot system stack-unit 1 default system: A:
!
redundancy auto-synchronize full
!
hardware watchdog stack-unit 1
!
hostname Dell
!
stack-unit 1 provision S5048F-ON
<Output truncated for brevity>
```

ssh-peer-stack-unit

Open an SSH connection to the peer stack-unit.

Syntax `ssh-peer-stack-unit [-l username]`

Parameters

-l *username* (OPTIONAL) Enter the keyword `-l` then your user name. The default is the user name associated with the terminal.

Defaults Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.11.1	Introduced on the S-Series.

stack-unit location-led

Toggle the stack unit location LED on or off.

Syntax `stack-unit stack-unit-number location–led { off | on}`

Parameters

stack-unit *stack-unit-number*	Enter the keywords `stack-unit` and the stack unit number.
on | off	Turn the stack unit location LED on or off.

Default None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON and S5000.
9.8(1.0)	Introduced on the Z9100–ON.

Example

```
DellEMC#stack-unit 1 location-led on
```

telnet

Connect through Telnet to a server. The Telnet client and server in Dell EMC Networking support IPv4 and IPv6 connections. You can establish a Telnet session directly to the router or a connection can be initiated from the router.

Syntax `telnet {host | ip-address | ipv6-address prefix-length | vrf vrf instance name} [/source-interface]`

Parameters

host	Enter the name of a server.

ip-address	Enter the IPv4 address in dotted decimal format of the server.
ipv6-address prefix-length	Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
vrf instance	(Optional) Enter the keyword `vrf` then the VRF instance name.
source-interface	(OPTIONAL) Enter the keywords `/source-interface` then the interface information to include the source interface. Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Null interface, enter the keyword null then the Null interface number. • For a port channel interface, enter the keywords `port-channel` then a number. • For Tunnel interface types, enter the keyword `tunnel` then the slot/ port information. The range is from 1 to 16383. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810. Added support for *source-interface* for link-local IPv6 addressing.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.2.1.0	Introduced on the E-Series (IPv6). Increased the number of VLANs to 4094 (was 2094).
8.1.1.0	Introduced on the E-Series (IPv4).
7.9.1.0	Introduced VRF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and added support for IPv6 address on the E-Series only.

Usage Information

The source interface configured using this command has a higher precedence than the source interface configured using the `ip telnet source-interface` command. If you do not configure a source interface using this command, then the TELNET client uses the source interface configured using the `ip telnet source-interface` command.

telnet-peer-stack-unit

Open a Telnet connection to the peer stack unit.

Syntax `telnet-peer-stack-unit`

Defaults Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.11.1	Introduced on the S-Series.

terminal length

Configure the number of lines displayed on the terminal screen.

Syntax `terminal length screen-length`

Parameters

screen-length	Enter a number of lines. Entering zero causes the terminal to display without pausing. The range is from 0 to 512.

Defaults 24 lines

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

traceroute

View a packet's path to a specific device.

Syntax `traceroute {host | vrf instance | ip-address | ipv6-address}`

Parameters

host	Enter the name of device.
vrf instance	(Optional) E-Series Only: Enter the keyword `vrf` then the VRF Instance name.
ip-address	Enter the IP address of the device in dotted decimal format.
ipv6-address	Enter the IPv6 address, in the x:x:x:x::x format, to which you are testing connectivity.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

Defaults

- Timeout = **5 seconds**
- Probe count = **3**
- 30 hops max
- 40 byte packet size
- UDP port = **33434**

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.2.1.0	Introduced on the E-Series with IPv6.
8.1.1.0	Introduced on the E-Series (IPv4 only).
7.9.1.0	Introduced VRF.
7.6.1.0	Added support for the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for IPv6 address on the E-Series.
E-Series	Original command.

Usage Information

When you enter the `traceroute` command without specifying an IP address (Extended Traceroute), you are prompted for a target and source IP address, timeout (in seconds) (default is **5**), a probe count (default is **3**), minimum TTL (default is **1**), maximum TTL (default is **30**), and port number (default is **33434**). To keep the default setting for those parameters, press the ENTER key.

For IPv6, you are prompted for a minimum hop count (default is **1**) and a maximum hop count (default is **64**).

Example (IPv4)

```
DellEMC# traceroute www.Dell EMC Networking.com

Translating "www.Dell EMC Networking.com"...domain server (10.11.0.1)
[OK]
```

```
Type Ctrl-C to abort.

------------------------------------------------
Tracing the route to www.Dell EMC Networking.com (10.11.84.18),
30 hops max, 40 byte packets
------------------------------------------------

TTL Hostname      Probe1     Probe2     Probe3
1   10.11.199.190 001.000 ms 001.000 ms 002.000 ms
2   gwegress-sjc-02.Dell EMC Networking.com (10.11.30.126) 005.000 ms
001.000 ms 001.000 ms
3   fw-sjc-01.Dell EMC Networking.com (10.11.127.254) 000.000 ms 000.000
ms 000.000 ms
4   www.Dell EMC Networking.com (10.11.84.18) 000.000 ms 000.000 ms
000.000 ms
DellEMC#
```

Example (IPv6)

```
DellEMC# traceroute 100::1

Type Ctrl-C to abort.

------------------------------------------------
Tracing the route to 100::1, 64 hops max, 60 byte packets
------------------------------------------------
Hops Hostname Probe1    Probe2    Probe3
1    100::1 000.000 ms 000.000 ms 000.000 ms

DellEMC#traceroute 3ffe:501:ffff:100:201:e8ff:fe00:4c8b

Type Ctrl-C to abort.

------------------------------------------------
Tracing the route to 3ffe:501:ffff:100:201:e8ff:fe00:4c8b,
64 hops max, 60 byte packets
------------------------------------------------
Hops Hostname  Probe1   Probe2    Probe3
 1  3ffe:501:ffff:100:201:e8ff:fe00:4c8b
             000.000 ms 000.000 ms 000.000 ms
DellEMC#
```

Related Commands

- ping — tests the connectivity to a device.

undebug all

Disable all debug operations on the system.

Syntax `undebug all`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

virtual-ip

Configure a virtual IP address for the active management interface. You can configure virtual addresses both for IPv4 and IPv6 independently.

Syntax `virtual-ip {ipv4-address | ipv6-address}`

To return to the default, use the `no virtual-ip {ipv4-address | ipv6-address}` command.

Parameters

ipv4-address Enter the IP address of the active management interface in a dotted decimal format (A.B.C.D.).

ipv6-address Enter an IPv6 address of the active management interface, in the x:x:x:x::x format.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

You can configure both IPv4 and IPv6 virtual addresses simultaneously, but only one of each. Each time this command is issued, it replaces the previously configured address of the same family, IPv4 or IPv6. The `no virtual-ip` command takes an address/prefix-length argument, so that the desired address only is removed. If you enter the `no virtual-ip` command without any specified address, then both IPv4 and IPv6 virtual addresses are removed.

Related Commands

- ip address — assigns a primary and secondary IP address to the interface.

write

Copy the current configuration to either the startup-configuration file or the terminal.

Syntax

```
write [memory [compressed] | terminal]
```

Parameters

memory	Enter the keyword `memory` to copy the current running configuration to the startup configuration file. This command is similar to the `copy running-config startup-config` command.
compressed	Enter the keyword `compressed` to write the operating configuration to the startup-config file in the compressed mode.
terminal	Enter the keyword `terminal` to copy the current running configuration to the terminal. This command is similar to the `show running-config` command.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

The `write memory` command saves the running-configuration to the file labeled startup-configuration. When using a LOCAL CONFIG FILE other than the startup-config not named “startup-configuration” (for example, you used a specific file during the `boot config` command), the running-config is not saved to that file; use the `copy` command to save any running-configuration changes to that local file.

When you use the `write memory` command to copy the running configuration to the startup configuration file with the startup configuration verification feature enabled, the system prompts you to update the hash for the startup configuration using the `verified boot hash` command.

5

802.1X

802.1X is a port-based Network Access Control (PNAC) that provides an authentication mechanism to devices wishing to attach to a LAN or WLAN. Until the authentication, only extensible authentication protocol over LAN (EAPOL) traffic is allowed through the port to which a client is connected. After authentication is successful, normal traffic passes through the port.

The Dell EMC Networking OS supports remote authentication dial-in service (RADIUS) and active directory environments using 802.1X Port Authentication.

Important Points to Remember

Dell EMC Networking OS limits network access for certain users by using virtual local area network (VLAN) assignments. 802.1X with VLAN assignment has these characteristics when configured on the switch and the RADIUS server.

- If the primary RADIUS server becomes unresponsive, the authenticator begins using a secondary RADIUS server, if configured.
- If no VLAN is supplied by the RADIUS server or if you disable 802.1X authorization, the port configures in its access VLAN after successful authentication.
- If you enable 802.1X authorization but the VLAN information from the RADIUS server is not valid, the port returns to the Unauthorized state and remains in the configured access VLAN. This safeguard prevents ports from appearing unexpectedly in an inappropriate VLAN due to a configuration error. Configuration errors create an entry in Syslog.
- If you enable 802.1X authorization and all information from the RADIUS server is valid, the port is placed in the specified VLAN after authentication.
- If you enable port security on an 802.1X port with VLAN assignment, the port is placed in the RADIUS server assigned VLAN.
- If you disable 802.1X on the port, it returns to the configured access VLAN.
- When the port is in the Force Authorized, Force Unauthorized, or Shutdown state, it is placed in the configured access VLAN.
- If an 802.1X port is authenticated and put in the RADIUS server assigned VLAN, any change to the port access VLAN configuration does not take effect.
- The 802.1X with VLAN assignment feature is not supported on trunk ports, dynamic ports, or with dynamic-access port assignment through a VLAN membership.

Topics:

- debug dot1x
- dot1x auth-fail-vlan
- dot1x auth-server
- dot1x auth-type mab-only
- dot1x authentication (Configuration)
- dot1x authentication (Interface)
- dot1x critical-vlan
- dot1x guest-vlan
- dot1x host-mode
- mac
- dot1x mac-auth-bypass
- dot1x max-eap-req
- dot1x max-supplicants
- dot1x port-control
- dot1x profile
- dot1x quiet-period
- dot1x reauthentication
- dot1x reauth-max
- dot1x server-timeout
- dot1x static-mab

- dot1x supplicant-timeout
- dot1x tx-period
- show dot1x cos-mapping interface
- show dot1x interface
- show dot1x profile

debug dot1x

Display 802.1X debugging information.

Syntax

```
debug dot1x [all | auth-pae-fsm | backend-fsm | eapol-pdu] [interface interface]
```

Parameters

all	Enable all debugs in dot1x.
auth-pae-fsm	Enable Authentication PAE FSM debugs in dot1x.
backend-fsm	Enable Backend Auth FSM debugs in dot1x.
eapol-pdu	Enable EAPOL frame trace in dot1x.
interface *interface*	Restricts the debugging information to an interface. The interface option is available only when the interface is either operationally up or dot1x related interface configuration exists before enabling debugging for that interface.

Defaults Disabled

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Introduced on the C-Series and S-Series.

dot1x auth-fail-vlan

Configure an authentication failure VLAN for users and devices that fail 802.1X authentication.

Syntax

`dot1x auth-fail-vlan` *`vlan-id`* `[max-attempts` *`number`*`]`

To delete the authentication failure VLAN, use the `no dot1x auth-fail-vlan` *`vlan-id`* `[max-attempts` *`number`*`]` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.
max-attempts ***number***	(OPTIONAL) Enter the keywords `max-attempts` followed number of attempts desired before authentication fails. The range is from 1 to 5. The default is **3**.

Defaults

3 attempts

Command Modes

CONFIGURATION (*conf-if-interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information

If the host responds to 802.1X with an incorrect login/password, the login fails. The switch attempts to authenticate again until the maximum attempts configured is reached. If the authentication fails after all allowed attempts, the interface moves to the authentication failed VLAN.

After the authentication VLAN is assigned, the port-state must be toggled to restart authentication. Authentication occurs at the next reauthentication interval (`dot1x reauthentication`).

Related Commands

- dot1x port-control — enable port control on an interface
- dot1x guest-vlan — configure a guest VLAN for limited access users or for devices that are not 802.1X capable.
- show dot1x interface — display the 802.1X configuration of an interface.

dot1x auth-server

Configure the authentication server to RADIUS.

Syntax `dot1x auth-server radius`

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x auth-type mab-only

To authenticate a device with MAC authentication bypass (MAB), only use the host MAC address.

Syntax `dot1x auth-type mab-only`

Defaults Disabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.

Usage Information

The prerequisites for enabling MAB-only authentication on a port are:

- Enable 802.1X authentication globally on the switch and on the port (the `dot1x authentication` command).
- Enable MAC authentication bypass on the port (the `dot1x mac-auth-bypass` command).

In MAB-only authentication mode, a port authenticates using the host MAC address even though 802.1xauthentication is enabled. If the MAB-only authentication fails, the host is placed in the guest VLAN (if configured).

To disable MAB-only authentication on a port, enter the `no dot1x auth-type mab-only` command.

Related Commands

- dot1x mac-auth-bypass — enable MAC authentication bypass.

dot1x authentication (Configuration)

Enable dot1x globally. Enable dot1x both globally and at the interface level.

Syntax

`dot1x authentication`

To disable dot1x on a globally, use the `no dot1x authentication` command.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- dot1x authentication (Interface) — enable dot1x on an interface.

dot1x authentication (Interface)

Enable dot1x on an interface. Enable dot1x both globally and at the interface level.

Syntax

```
dot1x authentication
```

To disable dot1x on an interface, use the `no dot1x authentication` command.

Defaults Disabled

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- dot1x authentication (Configuration) — enable dot1x globally.

dot1x critical-vlan

Configure critical-VLAN for users or devices when authentication server is not reachable.

Syntax `[no] dot1x critical-vlan vlan-id`

Parameters

vlan-id	Enter the VLAN identifier. The VLAN-ID range is from 1 to 4094.

Defaults Not Configured.

Command Modes INTERFACE

INTERFACE (BATCH MODE)

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series, S4048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, S6100–ON, the Configuration Terminal Batch mode on C9010, Z9100–ON, and Z9500.
9.9(0.0)	Introduced on the C9000 Series.

Usage Information The `dot1x critical-vlan` command configures critical VLAN for the interface. If the authentication server is not reachable or not responding, the authenticator places the port or the supplicant in critical VLAN within the first attempt.

Use this command in Interface Batch mode to configure critical VLAN for users in a dual-homing setup.

Example

```
DellEMC(conf)#show dot1x interface twentyFiveGigE 1/41
```

```
802.1x information on Tf 1/41:
------------------------------
Dot1x Status:               Enable
Port Control:               AUTO
Port Auth Status:           AUTHORIZED (CRITICAL-VLAN)
Re-Authentication:          Enable
Untagged VLAN id:           400
Guest VLAN:                 Enable
Guest VLAN id:              400
Auth-Fail VLAN:             Enable
Auth-Fail VLAN id:          400
Auth-Fail Max-Attempts:     3
Critical VLAN:              Enable
Critical VLAN id:           400
Mac-Auth-Bypass:            Disable
Mac-Auth-Bypass Only:       Disable
Tx Period:                  30 seconds
Quiet Period:               60 seconds
ReAuth Max:                 2
Supplicant Timeout:         30 seconds
Server Timeout:             30 seconds
Re-Auth Interval:           60 seconds
Max-EAP-Req:                2
Host Mode:                  SINGLE_HOST
Auth PAE State:             Authenticated
Backend State:              Idle
```

dot1x guest-vlan

Configure a guest VLAN for limited access users or for devices that are not 802.1X capable.

Syntax

`dot1x guest-vlan vlan-id`

To disable the guest VLAN, use the `no dot1x guest-vlan vlan-id` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION (*conf-if-interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Usage Information

1X authentication is enabled when an interface is connected to the switch. If the host fails to respond within a designated amount of time, the authenticator places the port in the guest VLAN.

If a device does not respond within 30 seconds, it is assumed that the device is not 802.1X capable. Therefore, a guest VLAN is allocated to the interface and authentication, for the device, occurs at the next reauthentication interval (`dot1x reauthentication`).

If the host fails authentication for the designated number of times, the authenticator places the port in authentication failed VLAN (`dot1x auth-fail-vlan`).

NOTE: You can create the Layer 3 portion of a guest VLAN and authentication fail VLANs regardless if the VLAN is assigned to an interface or not. After an interface is assigned a guest VLAN (which has an IP address), routing through the guest VLAN is the same as any other traffic. However, the interface may join/leave a VLAN dynamically.

Related Commands

- dot1x auth-fail-vlan — Configure an authentication failure VLAN.
- dot1x reauthentication — Enable periodic re-authentication of the client.
- dot1x reauth-max —

  Configure the maximum number of times to re-authenticate a port before it becomes unauthorized

dot1x host-mode

Enable single-host or multi-host authentication.

Syntax `dot1x host-mode {single-host | multi-host | multi-auth}`

Parameters

single-host	Enable single-host authentication.
multi-host	Enable multi-host authentication.
multi-auth	Enable multi-supplicant authentication.

Defaults **single-host**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Added the `multi-auth` option on the C-Series and S-Series.
8.3.2.0	Added the `single-host` and `multi-host` options on the C-Series, E-Series, and S-Series.

Usage Information

- Single-host mode authenticates only one host per authenticator port and drops all other traffic on the port.
- Multi-host mode authenticates the first host to respond to an Identity Request and then permits all other traffic on the port.
- Multi-supplicant mode authenticates every device attempting to connect to the network on the authenticator port.

Related Commands

- show dot1x interface — display the 802.1X configuration of an interface.

mac

Configure a list of supplicant MAC addresses for dot1x profile represented with a profile-name.

Syntax `[no] mac {mac-address1 mac-address2… mac-address6}`

Parameters

mac-address1 mac-address2… mac-address6	Enter the keyword `mac` and type the 48– bit MAC addresses using the H.H.H format. A maximum of 6 MAC addresses are allowed.

Defaults None

Command Modes DOT1X PROFILE CONFIG (conf-dot1x-profile)

CONFIGURATION TERMINAL BATCH

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series, S4048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, S6100–ON, the Configuration Terminal Batch mode on C9010, Z9100–ON, and Z9500.
9.9(0.0)	Introduced on the C9010.

Usage Information The `mac` command configures a list of supplicant MAC addresses for a dot1x profile represented with a profile-name. You can configure up to 6 MAC addresses in a single `mac` command. The maximum number of MAC addresses that you can configure in a single profile is limited to 100.

Use this command in Configuration Terminal Batch mode to configure a list of supplicant MAC addresses for dot1x profile in a dual-homing setup.

Example

```
DellEMC(conf)#dot1x profile mySupplicants
DellEMC(conf-dot1x-profile)#mac 00:50:56:AA:01:10 00:50:56:AA:01:11

DellEMC(conf-dot1x-profile)#show config
dot1x profile mySupplicants
 mac 00:50:56:aa:01:10
 mac 00:50:56:aa:01:11
DellEMC(conf-dot1x-profile)#
DellEMC(conf-dot1x-profile)#exit
```

dot1x mac-auth-bypass

Enable MAC authentication bypass. If 802.1X times out because the host did not respond to the Identity Request frame, Dell EMC Networking OS attempts to authenticate the host based on its MAC address.

Syntax `dot1x mac-auth-bypass`

To disable MAC authentication bypass on a port, use the `no dot1x mac-auth-bypass` command.

Defaults Disabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information To disable MAC authentication bypass on a port, enter the `no dot1x mac-auth-bypass` command.

dot1x max-eap-req

Configure the maximum number of times an extensive authentication protocol (EAP) request is transmitted before the session times out.

Syntax `dot1x max-eap-req` *number*

To return to the default, use the `no dot1x max-eap-req` command.

Parameters

number	Enter the number of times an EAP request is transmitted before a session time-out. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x max-supplicants

Restrict the number of supplicants that can be authenticated and permitted to access the network through the port. This configuration is only takes effect in Multi-auth mode.

Syntax `dot1x max-supplicants number`

Parameters

number	Enter the number of supplicants that can be authenticated on a single port in Multi-auth mode. The range is from 1 to 128. The default is **128**.

Defaults 128 hosts can be authenticated on a single authenticator port.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Introduced on the C-Series and S-Series.

Related Commands

- dot1x host-mode — enable single-host or multi-host authentication.

dot1x port-control

Enable port control on an interface.

Syntax `dot1x port-control {force-authorized | auto | force-unauthorized}`

Parameters

force-authorized	Enter the keywords `force-authorized` to forcibly authorize a port.
auto	Enter the keyword `auto` to authorize a port based on the 802.1X operation result.
force-unauthorized	Enter the keywords `force-unauthorized` to forcibly de-authorize a port.

Defaults None

Command Modes Auto

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information The authenticator completes authentication only when you set `port-control` to `auto`.

dot1x profile

Configure a dot1x profile to define a list of trusted supplicant MAC addresses.

Syntax `[no] dot1x profile profile-name`

Parameters

profile-name	Enter a dot1x `profile-name`. The profile name length is limited to 32 characters.

Defaults None

Command Modes CONFIGURATION

CONFIGURATION TERMINAL BATCH

Error Strings NONE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series, S4048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, S6100–ON, the Configuration Terminal Batch mode on C9010, Z9100–ON, and Z9500.
9.9(0.0)	Introduced on the C9010.

Usage Information The `dot1x profile` command configures a dot1x profile to define a list of trusted supplicant MAC addresses. Maximum number of dot1x profiles is limited to 10. This command launches dot1x profile mode for entering profile related commands such as the `mac` command. The `dot1x static-mab` command assigns the dot1x profile to an interface.

Use this command in Configuration Terminal Batch mode to configure the dot1x profile in a dual-homing setup.

Related Commands
- dot1x static-mab
- mac

dot1x quiet-period

Set the number of seconds that the authenticator remains quiet after a failed authentication with a client.

Syntax `dot1x quiet-period seconds`

To disable quiet time, use the `no dot1x quiet-time` command.

Parameters

seconds	Enter the number of seconds. The range is from 1 to 65535. The default is **60**.

Defaults **60** seconds

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x reauthentication

Enable periodic reauthentication of the client.

Syntax `dot1x reauthentication [interval seconds]`

To disable periodic reauthentication, use the `no dot1x reauthentication` command.

Parameters

interval *seconds* (Optional) Enter the keyword `interval` then the interval time, in seconds, after which reauthentication is initiated. The range is from 1 to 31536000 (one year). The default is **3600** (1 hour).

Defaults **3600** seconds (1 hour)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x reauth-max

Configure the maximum number of times a port can re-authenticate before the port becomes unauthorized.

Syntax `dot1x reauth-max number`

To return to the default, use the `no dot1x reauth-max` command.

Parameters

number	Enter the permitted number of re-authentications. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x server-timeout

Configure the amount of time after which exchanges with the server time-out.

Syntax `dot1x server-timeout seconds`

To return to the default, use the `no dot1x server-timeout` command.

Parameters

seconds	Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults **30** seconds

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

When you configure the `dot1x server-timeout` value, take into account the communication medium used to communicate with an authentication server and the number of RADIUS servers configured. Ideally, the `dot1x server-timeout` value (in seconds) is based on the configured RADIUS-server timeout and retransmit values and calculated according to the following formula: `dot1x server-timeout` *seconds* > (radius-server retransmit *seconds* + 1) * radius-server timeout *seconds*.

Where the default values are as follows: `dot1x server-timeout` (30 seconds), radius-server retransmit (3 seconds), and radius-server timeout (5 seconds).

Example

```
DellEMC(conf)# radius-server host 10.11.197.105 timeout 6
DellEMC(conf)# radius-server host 10.11.197.105 retransmit 4
DellEMC(conf)# interface twentyFiveGigE 1/23
DellEMC(conf-if-tf-1/23)# dot1x server-timeout 40
DellEMC(conf-if-tf-1/23)#
```

dot1x static-mab

Enable static MAC authorization bypass (MAB) and configure static MAB profile to an interface.

Syntax `[no] dot1x static-mab profile profile-name`

Parameters

profile *profile-name*	Enter the keyword `profile` and the *profile-name* to configure the static MAB profile name. The profile name length is limited to 32 characters.

Defaults Disabled.

Command Modes INTERFACE

INTERFACE (BATCH MODE)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series, S4048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, S6100–ON, the Configuration Terminal Batch mode on C9010, Z9100–ON, and Z9500.
9.9(0.0)	Introduced on the C9010.

Usage Information

The `dot1x static-mab` command enables static MAB (mac auth bypass) and configures the associated profile on a dot1x interface. Static MAB bypasses the authentication server for the supplicant MAC addresses configured in the associated profile.

Before you enable static MAB, you must do the following:

- Enable MAC authentication bypass on the port by configuring the `dot1x mac-auth-bypass` command.
- Ensure that no configured profile exists at the time of configuring the `static-mab` command.
- Use this command in Interface Batch Mode to enable static MAB in a dual-homing setup.

Example

```
DellEMC(conf)#do show dot1x interface twentyFiveGigE 1/41

802.1x information on Tf 1/41:
----------------------------------------
Dot1x Status:              Enable
Port Control:              AUTO
Port Auth Status:          AUTHORIZED (STATIC-MAB)
Re-Authentication:         Enable
Untagged VLAN id:          400
Guest VLAN:                Enable
Guest VLAN id:             400
Auth-Fail VLAN:            Enable
Auth-Fail VLAN id:         400
Auth-Fail Max-Attempts:    3
Critical VLAN:             Enable
Critical VLAN id:          400
Mac-Auth-Bypass:           Disable
Mac-Auth-Bypass Only:      Disable
Static-MAB:                Enable
Static-MAB Profile:        Sample
Tx Period:                 30 seconds
Quiet Period:              60 seconds
ReAuth Max:                2
Supplicant Timeout:        30 seconds
Server Timeout:            30 seconds
Re-Auth Interval:          60 seconds
Max-EAP-Req:               2
Host Mode:                 SINGLE_HOST
Auth PAE State:            Authenticated
Backend State:             Idle
```

dot1x supplicant-timeout

Configure the amount of time after which exchanges with the supplicant time-out.

Syntax

`dot1x supplicant-timeout` *seconds*

To return to the default, use the `no dot1x supplicant-timeout` command.

Parameters

seconds	Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults **30** seconds

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x tx-period

Configure the intervals at which EAPOL PDUs the Authenticator PAE transmits.

Syntax

`dot1x tx-period` *seconds*

To return to the default, use the `no dot1x tx-period` command.

Parameters

seconds	Enter the interval time, in seconds, that EAPOL PDUs are transmitted. The range is from 1 to 65535. The default is **30**.

Defaults

30 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

show dot1x cos-mapping interface

Display the CoS priority-mapping table the RADIUS server provides and applies to authenticated supplicants on an 802.1X-enabled system.

Syntax `show dot1x cos-mapping interface` *`interface`* `[mac-address` *`mac-address`*`]`

Parameters

interface Enter one of the following keywords and the interface information:
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport][/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

mac-address (Optional) MAC address of an 802.1X-authenticated supplicant.

Defaults None

Command Modes
- EXEC
- EXEC privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.

Usage Information

Enter a supplicant's MAC address using the `mac-address` option to display CoS mapping information only for the specified supplicant.

You can display the CoS mapping information applied to traffic from authenticated supplicants on 802.1X-enabled ports that are in Single-Hot, Multi-Host, and Multi-Supplicant authentication modes.

Example

```
DellEMC# show dot1x cos-mapping interface twentyFiveGigE 1/32

802.1p CoS re-map table on Tf 1/32:
-----------------------------------
Dot1p         Remapped Dot1p
0             7
1             6
2             5
3             4
4             3
5             2
6             1
7             0
DellEMC#

DellEMC# show dot1x cos-mapping interface twentyFiveGigE 1/32 mac-
address 00:00:00:00:00:10
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1p CoS re-map table on Tf 1/32:
-----------------------------------

802.1p CoS re-map table for Supplicant: 00:00:00:00:00:10

Dot1p         Remapped Dot1p
0             7
1             6
2             5
3             4
4             3
5             2
6             1
7             0
DellEMC#
```

show dot1x interface

Display the 802.1X configuration of an interface.

Syntax `show dot1x interface` *interface* `[mac-address` *mac-address*`]`

Parameters

interface Enter one of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport][/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

mac-address (Optional) MAC address of a supplicant.

Defaults None

Command Modes
- EXEC
- EXEC privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Added the `mac-address` option on the C-Series and S-Series.
7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Usage Information If you enable 802.1X multi-supplicant authentication on a port, additional 802.1X configuration details (Port Authentication status, Untagged VLAN ID, Authentication PAE state, and Backend state) display for each supplicant, as shown in the following example.

Example

```
DellEMC# show dot1x interface twentyFiveGigE 1/32

802.1x information on Tf 1/32:
------------------------------
Dot1x Status:              Enable
Port Control:              AUTO
Port Auth Status:          AUTHORIZED(MAC-AUTH-BYPASS)
Re-Authentication:         Disable
Untagged VLAN id:          400
Guest VLAN:                Enable
```

```
Guest VLAN id:              100
Auth-Fail VLAN:             Disable
Auth-Fail VLAN id:          NONE
Auth-Fail Max-Attempts:     NONE
Mac-Auth-Bypass:            Enable
Mac-Auth-Bypass Only:       Enable
Tx Period:                  3 seconds
Quiet Period:               60 seconds
ReAuth Max:                 2
Supplicant Timeout:         30 seconds
Server Timeout:             30 seconds
Re-Auth Interval:           3600 seconds
Max-EAP-Req:                2
Host Mode:                  SINGLE_HOST
Auth PAE State:             Authenticated
Backend State:              Idle
DellEMC#
```

Example (mac-address)

```
DellEMC# show dot1x interface twentyFiveGigE 1/32 mac-address
00:00:00:00:00:10
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1x information on Tf 1/32:
------------------------------
Dot1x Status:               Enable
Port Control:               AUTO
Re-Authentication:          Disable
Guest VLAN:                 Enable
Guest VLAN id:              100
Auth-Fail VLAN:             Disable
Auth-Fail VLAN id:          NONE
Auth-Fail Max-Attempts:     NONE
Mac-Auth-Bypass:            Enable
Mac-Auth-Bypass Only:       Enable
Tx Period:                  3 seconds
Quiet Period:               60 seconds
ReAuth Max:                 2
Supplicant Timeout:         30 seconds
Server Timeout:             30 seconds
Re-Auth Interval:           3600 seconds
Max-EAP-Req:                2
Host Mode:                  MULTI_AUTH
Max-Supplicants:            128

Port status and State info for Supplicant: 00:00:00:00:00:10

Port Auth Status:           AUTHORIZED(MAC-AUTH-BYPASS)
Untagged VLAN id:           400
Auth PAE State:             Authenticated
Backend State:              Idle
DellEMC#

DellEMC# show dot1x interface twentyFiveGigE 1/32 mac-address
00:00:00:00:00:11
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1x information on Tf 1/32:
------------------------------
Dot1x Status:               Enable
Port Control:               AUTO
Re-Authentication:          Disable
Guest VLAN:                 Enable
Guest VLAN id:              100
Auth-Fail VLAN:             Disable
Auth-Fail VLAN id:          NONE
Auth-Fail Max-Attempts:     NONE
Mac-Auth-Bypass:            Enable
Mac-Auth-Bypass Only:       Enable
Tx Period:                  3 seconds
Quiet Period:               60 seconds
```

```
ReAuth Max:                2
Supplicant Timeout:        30 seconds
Server Timeout:            30 seconds
Re-Auth Interval:          3600 seconds
Max-EAP-Req:               2
Host Mode:                 MULTI_AUTH
Max-Supplicants:           128

Port status and State info for Supplicant: 00:00:00:00:00:11

Port Auth Status:          AUTHORIZED(GUEST-VLAN)
Untagged VLAN id:          100
Auth PAE State:            Authenticated
Backend State:             Idle
DellEMC#
```

show dot1x profile

Display all the dot1x profiles or the details of a specific profile configured in the system.

Syntax `show dot1x profile profile-name`

Parameters

profile-name	Specify a static dot1x *profile-name*. The maximum character limit for a profile name is 32 characters.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series, S4048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, S6100–ON, C9010, Z9100–ON, and Z9500.
9.9(0.0)	Introduced on the C9010.

Example

```
DellEMC#show dot1x profile

802.1x profile information
------------------------------
Dot1x Profile mySupplicants
 Profile MACs
  00:50:56:aa:01:10 00:50:56:aa:01:11
```

6

Access Control Lists (ACL)

Access control lists (ACLs) are supported by the Dell EMC Networking OS.

Dell EMC Networking OS supports the following types of ACL, IP prefix list, and route maps:

- Commands Common to all ACL Types
- Common IP ACL Commands
- Standard IP ACL Commands
- Extended IP ACL Commands
- Common MAC Access List Commands
- Standard MAC ACL Commands
- Extended MAC ACL Commands
- IP Prefix List Commands
- Route Map Commands
- AS-Path Commands
- IP Community List Commands

NOTE: For ACL commands that use the Trace function, see *Trace List Commands* section in Security.

NOTE: For IPv6 ACL commands, see IPv6 Access Control Lists (IPv6 ACLs).

Topics:

- Commands Common to all ACL Types
- Common IP ACL Commands
- Standard IP ACL Commands
- Extended IP ACL Commands
- Common MAC Access List Commands
- Standard MAC ACL Commands
- Extended MAC ACL Commands
- IP Prefix List Commands
- Route Map Commands
- deny (for Standard IP ACLs)
- deny (for Extended IP ACLs)
- seq (for Standard IPv4 ACLs)
- deny tcp (for Extended IP ACLs)
- deny (for Standard MAC ACLs)
- deny (for Extended MAC ACLs)
- permit (for Standard IP ACLs)
- permit icmp (for Extended IP ACLs)
- permit udp (for Extended IP ACLs)
- permit (for Extended IP ACLs)
- permit (for Standard MAC ACLs)
- seq (for Standard MAC ACLs)
- permit tcp (for Extended IP ACLs)
- seq (for IP ACLs)
- seq (for IPv6 ACLs)
- permit udp (for IPv6 ACLs)
- permit tcp (for IPv6 ACLs)
- permit icmp (for IPv6 ACLs)
- permit (for IPv6 ACLs)
- deny udp (for IPv6 ACLs)
- deny tcp (for IPv6 ACLs)

- deny icmp (for Extended IPv6 ACLs)
- deny (for IPv6 ACLs)

Commands Common to all ACL Types

The following commands are available within each ACL mode and do not have mode-specific options. Some commands in this chapter may use similar names, but require different options to support the different ACL types (for example, the `deny` and `permit` commands).

remark

Enter a description for an ACL entry.

Syntax

`remark remark-number description`

To remove a remark, use the `no remark` command.

Parameters

remark-number (Optional) Enter the remark number. The range is from 0 to 65535 for MAC ACL and 0 to 4294967290 for IP ACL.

NOTE: You can use the same sequence number for the remark and an ACL rule.

description Enter a description of up to 80 characters.

Defaults

Not configured.

Command Modes

- CONFIGURATION-STANDARD-ACCESS-LIST
- CONFIGURATION-EXTENDED-ACCESS-LIST
- CONFIGURATION-MAC ACCESS LIST-STANDARD
- CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced the remark number as an optional value on S4810 and S4820T.
9.14.0.0	Made the remark number as an optional value.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced on the E-Series.

Usage Information

The `remark` command is available in each ACL mode. You can configure up to 4294967291 remarks for a given IP ACL and 65536 remarks for a given MAC ACL.

You can include a remark with or without a remark number. If you do not enter a remark number, the remark inherits the sequence number of the last ACL rule. If there is no ACL rule when you enter a remark, the remark takes sequence number 5. If you configure two remarks with the same sequence number and different strings, the second one replaces the first string. You cannot configure two or more remarks with the same string and different sequence numbers.

To remove a remark, use the `no remark` command with or without the sequence number. If there is a matching string, the system deletes the remark.

Example

The following example shows the use of the `remark` command twice within CONFIGURATION-STANDARD-ACCESS-LIST mode. The remark precedes the rule in the running configuration because it is assumed that the remark is for the rule with the same sequence number, or the group of rules that follow the remark.

```
DellEMC(config-std-nacl)# remark 10 Deny rest of the traffic
DellEMC(config-std-nacl)# remark 5 Permit traffic from XYZ Inc.
DellEMC(config-std-nacl)# show config
!
ip access-list standard test
remark 5 Permit traffic from XYZ Inc.
seq 5 permit 1.1.1.0/24
remark 10 Deny rest of the traffic
seq 10 deny any
DellEMC(config-std-nacl)#
```

The following example shows adding a remark without a sequence number:

```
DELLEMC(config-ext-nacl)#permit ip any any
DELLEMC(config-ext-nacl)#remark permit any ip
DELLEMC(config-ext-nacl)#show c
!
ip access-list extended testac
 seq 5 permit ip any any
 remark 5 permit any ip
```

The following example shows that the system displays an error message when the same remark string is used with different remark numbers.

```
DELLEMC(config-ext-nacl)#seq 100 permit ip any any
DELLEMC(config-ext-nacl)#remark 10 permit any ip
DELLEMC(config-ext-nacl)#remark permit any ip
DELLEMC(config-ext-nacl)#% Error : Remark string already exists
```

Related Commands

- show config — display the current ACL configuration.

show config

Display the current ACL configuration.

Syntax `show config`

Command Modes

- CONFIGURATION-STANDARD-ACCESS-LIST

- CONFIGURATION-EXTENDED-ACCESS-LIST
- CONFIGURATION-MAC ACCESS LIST-STANDARD
- CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(config-std-nacl)# show conf
!
ip access-list standard test
 remark 5 Permit traffic from XYZ Inc.
 seq 5 permit 1.1.1.0/24 count
 remark 10 Deny traffic from ABC
 seq 10 deny 2.1.1.0/24 count
DellEMC(config-std-nacl)#
```

Common IP ACL Commands

The following commands are available within both Ingress and Egress IP ACL modes (Standard and Extended) and do not have mode-specific options. When an ACL is created without a rule and then is applied to an interface, ACL behavior reflects an implicit permit.

The platform supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types section.

access-class

Apply a standard ACL to a terminal line.

Syntax

`access-class` *`access-list-name`* `[ipv4 | ipv6]`

To remove an ACL, use the `no access-class` command.

Parameters

access-list-name	Enter the name of a configured Standard ACL, up to 140 characters.
ipv4	Enter the keyword `ipv4` to configure an IPv4 access class.
ipv6	Enter the keyword `ipv6` to configure an IPv6 access class.

Defaults

Not configured.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the `ipv4` and `ipv6` parameters to the command.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

When you use the `access-class` *`access-list-name`* command without specifying the `ipv4` or `ipv6` attribute, both IPv4 as well as IPv6 rules that are defined in that ACL are applied to the terminal. This method is a generic way of configuring access restrictions.

To be able to filter access exclusively using either IPv4 or IPv6 rules, use either the `ipv4` or `ipv6` attribute along with the `access-class` *`access-list-name`* command. Depending on the attribute that you specify (`ipv4` or `ipv6`), the ACL processes either IPv4 or IPv6 rules, but not both. Using this configuration, you can set up two different types of access classes with each class processing either IPv4 or IPv6 rules separately.

However, if you already have configured generic IP ACL on a terminal line, then you cannot further apply IPv4 or IPv6 specific filtering on top of this configuration. Because, both IPv4 and IPv6 access classes are already configured on this terminal line. Before applying either IPv4 or IPv6 filtering, first undo the generic configuration using the `no access-class access-list-name` command.

Similarly, if you have configured either IPv4 or IPv6 specific filtering on a terminal line, you cannot apply generic IP ACLs on top of this configuration. Before applying the generic ACL configuration, first undo the existing configuration using the `no access-class access-list-name [ipv4 | ipv6]` command.

aclrange profile-name

Create ACL range profiles for L4 ports.

Syntax

`aclrange profile-name`

After entering the configuration mode of the ACL range, enter the following: `type [inverse value] lower threshold upper-threshold`

Parameters

profile-name	Enter a valid name for the range profile.
type	Specify the type of the L4 port as source or destination.
inverse	Enter the keyword `inverse` followed by a value. This is used as a negative (not equal to) match.
lower threshold	Enter the minimum inclusive value of the range.
upper-threshold	Enter the maximum inclusive value of the range.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000-ON, S6100-ON, Z9100-ON.

Usage Information

Ensure that the ACL range feature is enabled before creating the profile names for the ranges using the `feature aclrange` command. Reboot the system for the range profiles to come up.

Example

```
DellEMC(conf)#aclrange profile-name
DellEMC(conf-aclrange-profile-name)#
```

```
DellEMC(conf)#aclrange sportrange1
DellEMC(conf-aclrange-sportrange1)# l4srcport 1024 65535

DellEMC(conf)#aclrange destportrange1
DellEMC(conf-acl-destportrange1)# l4dstport 500 500

DellEMC(conf)#aclrange inverserange
DellEMC(conf-acl-inverserange)# l4dstport inverse 1000
```

Related Commands

feature aclrange on page 186— Enable the ACL range.

clear counters ip access-group

Erase all counters maintained for access lists.

Syntax `clear counters ip access-group [access-list-name]`

Parameters

access-list-name (OPTIONAL) Enter the name of a configured access-list, up to 140 characters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

feature acloptimized

Enable the acloptimized feature, and optimize ACL to increase the number of the IPv4 ACL rules.

Syntax `feature acloptimized`

To remove this feature and bring the system to default, use the `no feature acloptimized` command, save the configuration, and reload the system.

Defaults Not configured.

Command Modes CONFIGURATION mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S5048F–ON.
9.13(0.0)	Introduced on the S6100–ON and Z9100–ON.

Usage Information After enabling the acloptimized feature, reboot the system.

Example

```
DellEMC(conf)#feature acloptimized
Configuration change will be in effect after save and reload. ACL
config containing TTL, layer3 and VRF conflicts with ACL Cam optimzation
feature and these keywords would be discarded while applying the ACL.
```

feature aclrange

Enable the ACL range option.

Syntax `feature aclrange`

Use the `no feature aclrange` command to disable the option.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000-ON, S6100-ON, Z9100-ON.

Usage Information After enabling the range option, create the range profiles using the `aclrange` *`profile-name`* command. Reboot the system for the range profiles to come up.

Related Commands aclrange profile-name on page 184 — Create range profiles.

ip access-group

Assign an IP access list (IP ACL) to an interface.

Syntax `ip access-group` *`access-list-name`* `{in | out} [implicit-permit] [vlan` *`vlan-id`*`] [layer3] [vrf` *`vrf-name`*`]ip access-group` *`access-list-name`* `{in | out} [implicit-permit [vlan` *`vlan-id`* `| vrf` *`vrf-name`* `| optimized] | vlan` *`vlan-id`* `| vrf` *`vrf-name`* `| optimized] [layer3]`

To delete an IP access-group configuration, use the `no ip access-group` *`access-list-name`* `{in | out} [implicit-permit] [vlan` *`vlan-id`*`][layer3]no ip access-group` *`access-list-name`* `{in | out}` command.

Parameters

access-list-name	Enter the name of a configured access list, up to 140 characters.
in	Enter the keyword `in` to apply the ACL to incoming traffic.
out	Enter the keyword `out` to apply the ACL to outgoing traffic.

implicit-permit	(OPTIONAL) Enter the keyword `implicit-permit` to change the default action of the ACL from implicit-deny to implicit-permit (that is, if the traffic does not match the filters in the ACL, the traffic is permitted instead of dropped).
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the ID numbers of the VLANs. The range is from 1 to 4094 (you can use IDs from 1 to 4094).
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` then the ID numbers of the VRFs. The range is from 1 to 511 (you can use IDs from 1 to 511). **NOTE:** When you specify a single VRF, use the name of the VRF instead of the VRF ID number. Use the VRF ID numbers only when you specify a range of VRFs.
optimized	(OPTIONAL) Enter the keyword `optimized` to enable ACL optimization
layer3	(OPTIONAL) Enter the keyword `layer3` to enable layer 3 mode. It ensures that all the ACL rules in the access-group are applied only for L3 router packets.

Defaults Not enabled.

Command Modes INTERFACE/VRF MODE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information You can assign one ingress ACL and one egress ACL to an interface.

NOTE: This command supports Loopback interfaces EE3 and EF series route processor modules (RPMs). This command does not support Loopback interfaces ED series RPMs and S-Series Loopback interfaces.

NOTE: If you apply outbound(egress) IP acl on a switch port, the filter applies only for routed traffic egressing out of that port.

To associate an access-list to a non-default VRF, use the `vrf` attribute of this command. You can use this command at the interface context (physical/LAG) to apply the access-list to a range of VRFs.

The VRF MODE is not available for the default and management VRFs.

In the Dell EMC Networking OS versions prior to 9.13(0.0), the system does not install any of your ACL rules if the available CAM space is lesser than what is required for your set of ACL rules. Effective with the Dell EMC Networking OS version 9.13(0.0), the system installs your ACL rules until all the allocated CAM memory is used. If there is no implicit permit in your rule, the Dell EMC Networking OS ensures that an implicit deny is installed at the end of your rule. This behavior is applicable for IPv4 and IPv6 ingress and egress ACLs.

One of the usage scenarios for using the **layer3** keyword at the VLAN level, is to avoid ACL being applied on the L2 traffic which comes in via ICL.

NOTE: The usage scenario listed above is one of many other usage scenarios.

Related Commands

- ip access-list standard — configure a standard ACL.
- ip access-list extended — configure an extended ACL.

ip control-plane egress-filter

Enable egress Layer 3 ACL lookup for IPv4 CPU traffic.

Syntax `ip control-plane egress-filter`

Defaults Not enabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

ipv6 control-plane egress-filter

Enable egress Layer 3 ACL lookup for IPv6 CPU traffic.

Syntax `ipv6 control-plane egress-filter`

Defaults Not enabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

show aclrange

Display the list of ACL ranges configured and ACLs using the range profiles.

Syntax `show aclrange [access-list]`

Parameters

access-list	Enter the keyword `access-list` to display the ACLs that are using the range profiles config

Default None

Command Modes EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000-ON, S6100-ON, Z9100-ON.

Usage Information Use the `show aclrange` to display the list of ACL ranges configured.

Use the `show aclrange access-list` to display the ACLs associated with the configured range profiles.

Examples

To display the list of ACL ranges:

```
DellEMC# show aclrange
INDEX     PROFILE_NAME          TYPE         INVERSE     LOWER       UPPER      REF_
                                                         THRESHOLD   THRESHOLD
-------------------------------------------------------------------------------------
 1        dport1              l4dstport    No          80          89          0
 2        dport2              l4dstport    No          3000        3500        2
 3        dportgt5000         l4dstport    No          5001        65535       1
 4        ip-mtu-782          mtu          No          782         782         1
 5        sport1              l4srcport    No          1024        65535       1
 6        sportinv1           l4srcport    Yes         2500        2500        1
```

To display the list of ACLs using the configured range profiles:

```
DellEMC# show aclrange access-list
Profile-name     type    Acl-name    seqno
abc               v4      abc         5
                  V4      zyx         10
                  V6      def         8
bgp               V6      ghi         8
```

show ip accounting access-list

Display the IP access-lists created on the switch and the sequence of filters.

Syntax

```
show ip accounting {access-list access-list-name | cam_count} interface
interface [vrf vrf-name]show ip accounting access-list [access-list-name
[cam-count | interface interface [cam_count] | vrf {management | vrf-name}
[cam_count] {in | out}]
```

Parameters

access-list-name	Enter the name of the ACL to be displayed.
cam_count	List the count of the CAM rules for this ACL.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
in | out	Identify whether ACL is applied on the ingress or egress side.
vrf *vrf-name*	(Optional) Enter the keyword vrf and then the name of the VRF to view the IP accounting information on either a default or a non-default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Updated the show command output to include monitor option.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for the 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced.

Usage Information

NOTE: The vrf option is available only when VRF feature is enabled.

`show ip accounting access-lists` Field	Description
"Extended IP..."	Displays the name of the IP ACL.
"seq 5..."	Displays the filter. If the keywords `count` or `byte` were configured in the filter, the number of packets or bytes the filter processes is displayed at the end of the line.
"order 4"	Displays the QoS order of priority for the ACL entry.

Example

Standard IP ACL Commands

When you create an ACL without any rule and then apply it to an interface, the ACL behavior reflects an implicit permit.

The platform supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types and Common IP ACL Commands sections.

deny

To drop packets with a certain IP address, configure a filter.

Syntax

```
deny {source | any | host {ip-address}} [count [bytes] | log] [dscp value]
[ecn value] [fragments] [monitor] [no-drop] [order]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source [mask] | any | host ip-address}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address only.
count	(OPTIONAL) Enter the keyword `count` to count the packets.
bytes	(OPTIONAL) Enter the keyword `bytes` to count the bytes.
log	(OPTIONAL) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match the IP DSCP values. The range is from 0 to 63.
ecn	(OPTIONAL) Enter the keyword `ecn` to match the ECN bits. The range is from 0 to 3.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the *Quality of Service* section in the *Dell EMC Networking OS Configuration Guide*.

The software cannot count both packets and bytes; when you enter the `count byte` options, only bytes increment.

Related Commands

- ip access-list standard — configure a standard ACL.
- permit — configure a permit filter.

ip access-list standard

Create a standard IP access list (IP ACL) to filter based on IP address.

Syntax

`ip access-list standard` *`access-list-name`*

To delete an access list, use the `no ip access-list standard` *`access-list-name`* command.

Parameters

access-list-name Enter a string up to 140 characters long as the ACL name.

Defaults

All IP access lists contain an implicit “deny any,” that is, if no match occurs, the packet is dropped.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

Dell EMC Networking OS supports one ingress and one egress IP ACL per interface.

Prior to Dell EMC Networking OS version 7.8.1.0, names are up to 16 characters long.

The number of entries allowed per ACL is hardware-dependent. For detailed specifications on entries allowed per ACL, refer to your line card documentation.

Example

```
DellEMC(conf)# ip access-list standard TestList
DellEMC(config-std-nacl)#
```

Related Commands

- ip access-list extended — create an extended access list.
- show config — display the current configuration.

permit

To permit packets from a specific source IP address to leave the switch, configure a filter.

Syntax

```
permit {source [mask]| any | host ip-address} [count [bytes] | log] [dscp
value] [ecn value] [fragments] [monitor ] [no-drop] [order]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {source [mask] | any | host ip-address}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.
count	(OPTIONAL) Enter the keyword `count` to count the packets.
bytes	(OPTIONAL) Enter the keyword `bytes` to count the bytes.

log	(OPTIONAL) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match the IP DSCP values. The range is from 0 to 63.
ecn	(OPTIONAL) Enter the keyword `ecn` to match the ECN bits. The range is from 0 to 3.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the "Quality of Service" section of the *Dell EMC Networking OS Configuration Guide*.

Related Commands

- deny — assign a IP ACL filter to deny IP packets.
- ip access-list standard — create a standard ACL.

resequence access-list

Re-assign sequence numbers to entries of an existing access-list.

Syntax

resequence access-list {ipv4 | ipv6 | mac} {*access-list-name StartingSeqNum Step-to-Increment*}

Parameters

ipv4 | ipv6 | mac	Enter the keyword `ipv4`or `mac` to identify the access list type to resequence.
access-list-name	Enter the name of a configured IP access list.
StartingSeqNum	Enter the starting sequence number to resequence. The range is from 0 to 4294967290.
Step-to-Increment	Enter the step to increment the sequence number. The range is from 1 to 4294967290.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series (IPv6).
8.1.1.0	Introduced on the E-Series (IPv4).
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

When you have exhausted all the sequence numbers, this feature permits re-assigning a new sequence number to entries of an existing access-list.

seq

Assign a sequence number to a deny or permit filter in an IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {source [mask] | any | host ip-address}} [count [byte] | log] [dscp value] [ecn value] [fragments] [monitor] [no-drop] [order]
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 0 to 4294967290.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
source	Enter an IP address in dotted decimal format of the network from which the packet was received.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
bytes	(OPTIONAL) Enter the keyword `bytes` to count bytes the filter processes.
log	(OPTIONAL) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values. The range is from 0 to 63.
ecn	(OPTIONAL) Enter the keyword `ecn` to match to the ECN values. The range is from 0 to 3.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, see “Flow-based Monitoring” in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information The `order` option is relevant in the context of the Policy QoS feature only. The following applies:

- The `seq` *`sequence-number`* command is applicable only in an ACL group.
- The `order` option works across ACL groups that are applied on an interface via the QoS policy framework.
- The `order` option takes precedence over `seq` *`sequence-number`*.
- If you do not configure *`sequence-number`*, the rules with the same order value are ordered according to their configuration order.
- If you configure *`sequence-number`*, the sequence-number is used as a tie breaker for rules with the same order.

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

Extended IP ACL Commands

When an ACL is created without any rule and then applied to an interface, ACL behavior reflects an implicit permit.

The following commands configure extended IP ACLs, which in addition to the IP address, also examine the packet's protocol type.

The platform supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types and Common IP ACL Commands sections.

deny

Configure a filter that drops IP packets meeting the filter criteria.

Syntax

```
deny {ip | ip-protocol-number} {source mask | any | host ip-address}
{destination mask | any | host ip-address} [ttl operator][count [byte] |
log] [dscp value] [order] [monitor] [fragments] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {ip | ip-protocol-number} {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ip	Enter the keyword `ip` to configure a generic IP access list. The keyword `ip` specifies that the access list denies all IP protocols.
ip-protocol-number	Enter a number from 0 to 255 to deny based on the protocol identified in the IP protocol header.
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or noncontiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
count	(OPTIONAL) Enter the keyword `count` to count packets that the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes that the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.

order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see *Flow-based Monitoring* in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the noncontiguous mask and added the `monitor` option.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the Quality of Service section in the *Dell EMC Networking OS Configuration Guide*.

When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, see Port Monitoring.

The C-Series and S-Series cannot count both packets and bytes, when you enter the count byte options, only bytes are incremented.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

- deny tcp — assign a filter to deny TCP packets.
- deny udp — assign a filter to deny UDP packets.
- ip access-list extended — create an extended ACL.

deny icmp

To drop all or specific internet control message protocol (ICMP) messages, configure a filter.

Syntax

```
deny icmp {source mask | any | host ip-address} {destination mask | any
| host ip-address} [type] [ttl operator] [dscp] [count [byte] [order]
[fragments] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny icmp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.

type	Enter the ICMP packet type. The following types are available:
	For IPv4:
	`echo count`
	`echo-reply count`
	`host-unreachable count`
	`host-unknown count`
	`network-unknown count`
	`net-unreachable count`
	`packet-too-big count`
	`parameter-problem count`
	`port-unreachable count`
	`source-quench count`
	`time-exceeded count`
	For IPv6:
	`echo count`
	`echo-reply count`
	`nd-ns count`
	`nd-na count`
	`packet-too-big count`

```
parameter-problem count
time-exceeded count
port-unreachable count
```

The ICMP packets cannot be filtered using mirroring ACL.

ttl Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.

operator Enter one of the following logical operand:

- `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value.
- `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value.
- `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value.
- `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value.
- `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

dscp Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.

count (OPTIONAL) Enter the keyword `count` to count packets processed by the filter.

byte (OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.

order (OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).

fragments Enter the keyword `fragments` to use ACLs to control packet fragments.

monitor (OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see *Flow-based Monitoring* in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.

no-drop Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(2.0P0)	Added the *`type`* parameter to filter the ICMP packets based on the type and code on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.4.1.0	Added support for non-contiguous mask and added the `monitor` option.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the *Quality of Service* section of the *Dell EMC Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, see Port Monitoring .

deny tcp

Configure a filter that drops transmission control protocol (TCP) packets meeting the filter criteria.

Syntax

```
deny tcp {source mask | any | host ip-address} [bit] [operator port [port]]
{destination mask | any | host ip-address} [ttl operator] [dscp] [bit]
[operator port [port]] [count [bytes] [order] [fragments] [monitor] [no-
drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value.

- `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value.
- `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value.
- `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

dscp Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.

bit Enter a flag or combination of bits:

- `ack`: acknowledgement field
- `fin`: finish (no more data from the user)
- `psh`: push function
- `rst`: reset the connection
- `syn`: synchronize sequence numbers
- `urg`: urgent field
- `established`: datagram of established TCP session

Use the `established` flag to match only ACK and RST flags of established TCP session.

You cannot use `established` along with the other control flags

While using the `established` flag in an ACL rule, all the other TCP control flags are masked, to avoid redundant TCP control flags configuration in a single rule. When you use any TCP control flag in an ACL rule, `established` is masked and other control flags are available.

operator (OPTIONAL) Enter one of the following logical operand:

- `eq` = equal to
- `neq` = not equal to
- `gt` = greater than
- `lt` = less than
- `range` = inclusive range of ports (you must specify two ports for the `port` command)

port port Enter the application layer port number. Enter two port numbers if using the range logical operand. The range is from 0 to 65535.

The following list includes some common TCP port numbers:

- 23 = Telnet
- 20 and 21 = FTP
- 25 = SMTP
- 169 = SNMP

destination Enter the IP address of the network or host to which the packets are sent.

mask Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.

count (OPTIONAL) Enter the keyword `count` to count packets the filter processes.

byte (OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.

order (OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).

fragments Enter the keyword `fragments` to use ACLs to control packet fragments.

monitor (OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored

	interface. For more information, see *Flow-based Monitoring* in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(2.0P0)	Added the `established` parameter on the on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the Quality of Service section of the *Dell EMC Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, see the Port Monitoring section.

The C-Series and S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule#  Data              Mask              From To #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data              Mask              From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

- deny — assign a filter to deny IP traffic.
- deny udp — assign a filter to deny UDP traffic.

deny udp

To drop user datagram protocol (UDP) packets meeting the filter criteria, configure a filter.

Syntax

```
deny udp {source mask | any | host ip-address} [operator port [port]]
{destination mask | any | host ip-address} [ttl operator] [dscp] [operator
port [port]] [count [byte] [order] [fragments] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny udp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value.

- `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value.
- `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value.
- `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

dscp Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.

operator (OPTIONAL) Enter one of the following logical operand:
- `eq` = equal to
- `neq` = not equal to
- `gt` = greater than
- `lt` = less than
- `range` = inclusive range of ports (you must specify two ports for the `port` command)

port port Enter the application layer port number. Enter two port numbers if using the range logical operand. The range is from 0 to 65535.

destination Enter the IP address of the network or host to which the packets are sent.

mask Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.

count (OPTIONAL) Enter the keyword `count` to count packets processed by the filter.

byte (OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.

order (OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).

fragments Enter the keyword `fragments` to use ACLs to control packet fragments.

monitor (OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see *Flow-based Monitoring* in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.

no-drop Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the Quality of Service section of the *Dell EMC Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, see the Port Monitoring section.

The C-Series and S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule#  Data              Mask              From To #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data              Mask              From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024
```

```
Total Ports: 1024
```

Related Commands

- deny — assign a filter to deny IP traffic.
- deny tcp — assign a filter to deny TCP traffic.

ip access-list extended

Name (or select) an extended IP access list (IP ACL) based on IP addresses or protocols.

Syntax `ip access-list extended access-list-name`

To delete an access list, use the `no ip access-list extended access-list-name` command.

Parameters

access-list-name Enter a string up to 140 characters long as the access list name.

Defaults All access lists contain an implicit “deny any”; that is, if no match occurs, the packet is dropped.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information The number of entries allowed per ACL is hardware-dependent. For detailed specification about entries allowed per ACL, refer to your line card documentation.

Prior to 7.8.1.0, names are up to 16 characters long.

Example

```
DellEMC(conf)# ip access-list extended TESTListEXTEND
DellEMC(config-ext-nacl)#
```

Related Commands

- ip access-list standard — configure a standard IP access list.
- show config — display the current configuration.

permit

To pass IP packets meeting the filter criteria, configure a filter.

Syntax

```
permit {source mask | any | host ip-address} {destination mask | any | host ip-address} [ttl operator] [count [bytes]] [dscp value] [order] [fragments] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.
destination	Enter the IP address of the network or host to which the packets are sent.
ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
bytes	(OPTIONAL) Enter the keyword `bytes` to count bytes processed by the filter.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the "Quality of Service" section of the *Dell EMC Networking OS Configuration Guide*.

The software cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

Related Commands

- ip access-list extended — create an extended ACL.
-
- permit tcp — assign a permit filter for TCP packets.
- permit udp — assign a permit filter for UDP packets.

permit icmp

Configure a filter to allow all or specific ICMP messages.

Syntax

```
permit icmp {source mask | any | host ip-address} {destination mask | any |
host ip-address} [type] [dscp] [message-type] [count [byte] | log] [order]
[monitor] [fragments] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or noncontiguous.
any	Enter the keyword `any` to match and drop specific Ethernet traffic on the interface.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.

type	Enter the ICMP packet type. The following types are available:
	For IPv4:
	`echo count`
	`echo-reply count`
	`host-unreachable count`
	`host-unknown count`
	`network-unknown count`
	`net-unreachable count`
	`packet-too-big count`
	`parameter-problem count`
	`port-unreachable count`
	`source-quench count`
	`time-exceeded count`
	For IPv6:
	`echo count`
	`echo-reply count`
	`nd-ns count`
	`nd-na count`
	`packet-too-big count`
	`parameter-problem count`
	`time-exceeded count`
	`port-unreachable count`
	The ICMP packets cannot be filtered using mirroring ACL.

dscp	Enter the keyword `dscp` to deny a packet based on the DSCP value. The range is 0 to 63.
message-type	(OPTIONAL) Enter an ICMP message type, either with the type (and code, if necessary) numbers or with the name of the message type. The range is 0 to 255 for ICMP type and 0 to 255 for ICMP code.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

NOTE: For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *FTOS Configuration Guide*.

fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0)	Added the *type* parameter to filter the ICMP packets based on the type and code on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.8(1.0)	Introduced on the Z9100–ON..
9.8(0.0)	Added the no-drop parameter.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series ExaScale.
7.4.1.0	Added support for noncontiguous mask and added the `monitor` option.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *FTOS Configuration Guide*.

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

permit tcp

To pass TCP packets meeting the filter criteria, configure a filter.

Syntax

```
permit tcp {source mask | any | host ip-address} [bit] [operator port
[port]] {destination mask | any | host ip-address} [bit] [ttl operator]
[dscp] [operator port [port]] [count [byte] [order] [fragments] [monitor]
[no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.

mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
bit	Enter a flag or combination of bits: • `ack`: acknowledgement field • `fin`: finish (no more data from the user) • `psh`: push function • `rst`: reset the connection • `syn`: synchronize sequence numbers • `urg`: urgent field • `established`: datagram of established TCP session Use the `established` flag to match only ACK and RST flags of established TCP session. You cannot use `established` along with the other control flags While using the `established` flag in an ACL rule, all the other TCP control flags are masked, to avoid redundant TCP control flags configuration in a single rule. When you use any TCP control flag in an ACL rule, `established` is masked and other control flags are available.
ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
dscp	Enter the keyword `dscp` to permit a packet based on the DSCP value. The range is from 0 to 63.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the port parameter)
port port	Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP • 25 = SMTP • 169 = SNMP
destination	Enter the IP address of the network or host to which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.

count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(2.0P0)	Added the `established` parameter on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the "Quality of Service" section of the *Dell EMC Networking OS Configuration Guide*.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

The S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes increment.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, see the Port Monitoring section.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
DellEMC# Data              Mask          From To   #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
DellEMC# Data             Mask           From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

- ip access-list extended — create an extended ACL.
- permit — assign a permit filter for IP packets.
- permit udp — assign a permit filter for UDP packets.

permit udp

To pass UDP packets meeting the filter criteria, configure a filter.

Syntax

```
permit udp {source mask | any | host ip-address} [operator port [port]]
{destination mask | any | host ip-address} [ttl operator] [dscp] [operator
port [port]] [count [byte] [order] [fragments] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit udp {source mask | any | host ip-address} {destination mask | any | host ip-address` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address.
ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
dscp	Enter the keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` parameter)
port port	Enter the application layer port number. Enter two port numbers if you are using the `range` logical operand. The range is 0 to 65535.
destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
monitor	(OPTIONAL) Enter the keyword `monitor` to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter. Removed the *session–ID* option from the `monitor` parameter.
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the keyword `dscp`.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. .
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, see the "Quality of Service" section of the *Dell EMC Networking OS Configuration Guide*.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

The S-Series cannot count both packets and bytes; when you enter the `count byte` options, only bytes increment.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
DellEMC# Data              Mask          From To   #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
```

```
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
DellEMC# Data            Mask          From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

- ip access-list extended — create an extended ACL.
- permit — assign a permit filter for IP packets.
- permit tcp — assign a permit filter for TCP packets.

resequence access-list

Re-assign sequence numbers to entries of an existing access-list.

Syntax

`resequence access-list {ipv4 | mac} {access-list-name StartingSeqNum Step-to-Increment}`

Parameters

ipv4 | mac	Enter the keyword `ipv4`or `mac` to identify the access list type to resequence.
access-list-name	Enter the name of a configured IP access list, up to 140 characters.
StartingSeqNum	Enter the starting sequence number to resequence. The range is from 0 to 4294967290.
Step-to-Increment	Enter the step to increment the sequence number. The range is from 1 to 4294967290.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series (IPv4).

Version	Description
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information When all sequence numbers are exhausted, this feature permits re-assigning a new sequence number to entries of an existing access-list.

seq

Assign a sequence number to a deny or permit filter in an extended IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {ip-protocol-number | icmp | ip | tcp
| udp} {source mask | any | host ip-address} {destination mask | any |
host ip-address} [operator [portnumber | portname]] [ttl operator] [count
[byte] | log] [dscp value] [ecn value] [fragments] [monitor [session-ID]]
[no-drop] [order]
```

Parameters

sequence-number	Enter a number from 0 to 4294967290.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
ip-protocol-number	Enter a number from 0 to 255 to filter based on the protocol identified in the IP protocol header.
icmp	Enter the keyword `icmp` to configure an ICMP access list filter.
ip	Enter the keyword `ip` to configure a generic IP access list. The keyword `ip` specifies that the access list permits all IP protocols.
tcp	Enter the keyword `tcp` to configure a TCP access list filter.
udp	Enter the keyword `udp` to configure a UDP access list filter.
source	Enter an IP address in dotted decimal format of the network from which the packet was received.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address or hostname.
operator	(OPTIONAL) Enter one of the following logical operands: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` parameter.)
portnumber	(OPTIONAL) Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535.

The following list includes some common TCP port numbers:

- 23 = Telnet
- 20 and 21 = FTP-DATA and FTP
- 25 = SMTP
- 169 = SNMP

portname (OPTIONAL) Enter the logical name of the protocol.

The following logical names are supported in TCP:

```
  bgp           Border Gateway Protocol (179)
  chargen       Character generator (19)
  cmd           Remote commands (rcmd, 514)
  daytime       Daytime (13)
  discard       Discard (9)
  domain        Domain Name Service (53)
  drip          Dynamic Routing Information Protocol
(3949)
  echo          Echo (7)
  exec          Exec (512)
  finger        Finger (79)
  ftp           File Transfer Protocol (21)
  ftp-data      FTP data connections (20)
  gopher        Gopher (70)
  hostname      NIC hostname server (101)
  ident         Ident Protocol (113)
  irc           Internet Relay Chat (194)
  klogin        Kerberos login (543)
  kshell        Kerberos shell (544)
  login         Login (rlogin, 513)
  lpd           Printer service (515)
  nntp          Network News Transport Protocol (119)
  pim-rp-disc   PIM-RP-DISC(496)
  pop2          Post Office Protocol v2 (109)
  pop3          Post Office Protocol v3 (110)
  smtp          Simple Mail Transport Protocol (25)
  sunrpc        Sun Remote Procedure Call (111)
  tacacs        TAC Access Control System (49)
  talk          Talk (517)
  telnet        Telnet (23)
  time          Time (37)
  uucp          Unix-to-Unix Copy Program (540)
  whois         Nicname (43)
  www           World Wide Web (HTTP, 80)
```

The following logical names are supported in UDP:

```
  biff            Biff (mail notification, comsat, 512)
  bootpc          Bootstrap Protocol (BOOTP) client (68)
  bootps          Bootstrap Protocol (BOOTP) server (67)
  discard         Discard (9)
  dnsix           DNSIX security protocol auditing (195)
  domain          Domain Name Service (DNS, 53)
  echo            Echo (7)
  isakmp          Internet Security Association and Key
Management Protocol (500)
  mobile-ip       Mobile IP registration (434)
  nameserver      IEN116 name service (obsolete, 42)
  netbios-dgm     NetBios datagram service (138)
  netbios-ns      NetBios name service (137)
  netbios-ss      NetBios session service (139)
  non500-isakmp   Internet Security Association and Key
Management Protocol (4500)
  ntp             Network Time Protocol (123)
  pim-rp-disc     PIM-RP-DISC(496)
  rip             Routing Information Protocol (router,
in.routed, 520)
  snmp            Simple Network Management Protocol (161)
  snmptrap        SNMP Traps (162)
```

```
sunrpc          Sun Remote Procedure Call (111)
syslog          System Logger (514)
tacacs          TAC Access Control System (49)
talk            Talk (517)
tftp            Trivial File Transfer Protocol (69)
time            Time (37)
who             Who service (rwho, 513)
xdmcp           X Display Manager Control Protocol (177)
```

destination	Enter the IP address of the network or host to which the packets are sent.
ttl	Enter the keyword `ttl` to permit or deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
count	(OPTIONAL) Enter the keyword `count` to count the packets.
bytes	(OPTIONAL) Enter the keyword `bytes` to count the bytes.
log	(OPTIONAL) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DSCP values. The range is from 0 to 63.
ecn	(OPTIONAL) Enter the keyword `ecn` to match to the ECN values. The range is from 0 to 3.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` then the session–ID to describe the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. The session–ID range is from 0 to 65535. **NOTE:** For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults Not configured

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.11(2.0P0)	Included support for using logical names of a protocol to configure an IP access list in both TCP and UDP on the S6000, S6000–ON, S6100–ON, Z9100–ON.

Version	Description
9.11(0.0)	Added support for *session–ID* to the `monitor` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Add the DSCP value for ACL matching.
8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

The `order` option is relevant in the context of the Policy QoS feature only. The following applies:

- The `seq` *`sequence-number`* command is applicable only in an ACL group.
- The `order` option works across ACL groups that are applied on an interface via the QoS policy framework.
- The `order` option takes precedence over `seq` *`sequence-number`*.
- If you do not configure *`sequence-number`*, the rules with the same order value are ordered according to their configuration order.
- If you configure *`sequence-number`*, the sequence-number is used as a tie breaker for rules with the same order.

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

If you configure the *`sequence-number`*, the *`sequence-number`* is used as a tie breaker for rules with the same order.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

Common MAC Access List Commands

The following commands are available within both MAC ACL modes (Standard and Extended) and do not have mode-specific options. These commands allow you to clear, display, and assign MAC ACL configurations.

The platform supports both Ingress and Egress MAC ACLs.

The MAC ACL can be applied on Physical, Port-channel and VLAN interfaces. As per the specified rules in the ACL, the traffic on the interface/ VLAN members or Port-channel members will be permitted or denied.

clear counters mac access-group

Clear counters for all or a specific MAC ACL.

Syntax `clear counters mac access-group [mac-list-name]`

Parameters

mac-list-name (OPTIONAL) Enter the name of a configured MAC access list.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

mac access-group

Apply a MAC ACL to traffic entering or exiting an interface. You can apply a MAC ACL on a physical, port-channel, or VLAN interface.

Syntax `mac access-group access-list-name {in [vlan vlan-range] | optimized | out}`

To delete a MAC access-group, use the `no mac access-group mac-list-name` command.

Parameters

access-list-name	Enter the name of a configured MAC access list, up to 140 characters. **NOTE:** This option is available only with the keyword `in` option.
vlan *vlan-range*	(OPTIONAL) Enter the keyword `vlan` and then enter a range of VLANs. The range is from 1 to 4094 (you can use IDs 1 to 4094). **NOTE:** This option is available only with the keyword `in` option.
optimized	Enter the keyword `optimized` to enable ACL optimization.
in	Enter the keyword `in` to configure the ACL to filter incoming traffic.
out	Enter the keyword `out` to configure the ACL to filter outgoing traffic.

NOTE:

1. If the MAC ACL is applied on VLAN, none of the VLAN members should have an access list applied for that VLAN.
2. If the MAC ACL is applied on a Physical or Port Channel interface, the VLAN in which this port is associated should not have an access list applied.
3. If the MAC ACL is applied on a VLAN, then that VLAN should not belong to VLAN ACL group.
4. If the MAC ACL is applied on a VLAN ACL group, then none of the VLANs in that group should have an access list applied on it.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information	You can assign one ingress ACL and one egress ACL (standard or extended) to an interface.
Related Commands	• mac access-list standard — configure a standard MAC ACL. • mac access-list extended — configure an extended MAC ACL.

show mac access-lists

Display all of the Layer 2 ACLs configured in the system, whether or not they are applied to an interface, and the count of matches/mismatches against each ACL entry displayed.

Syntax

```
show mac access-lists [access-list-name] [interface interface] [in | out]show mac access-list {in | out | interface interface {in | out} | access-list-name {in | out | interface interface {in | out}}
```

Parameters

access-list-name	Enter the name of a configured MAC ACL, up to 140 characters.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094. • For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
in | out	Identify whether ACL is applied on ingress or egress side.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.4.1.0	Introduced.

show mac accounting access-list

Display MAC access list configurations and counters (if configured).

Syntax

```
show mac accounting access-list access-list-name interface interface in |
outshow mac accounting access-list [access-list-name [cam_count | interface
interface {in | out}]
```

Parameters

access-list-name	Enter the name of a configured MAC ACL, up to 140 characters.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
in | out	Identify whether ACL is applied on ingress or egress side.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series
6.1.1.0	Introduced on the E-Series.

Usage Information The ACL hit counters increment the counters for each matching rule, not just the first matching rule.

Example

```
DellEMC#show mac accounting access-list
Ingress Extended mac access-list acl1 on hundredGigE 1/49
Total cam count 1
 seq 5 permit host 00:00:00:00:00:aa host 00:00:00:00:00:bb
Egress Extended mac access-list acl1 on hundredGigE 1/53
Total cam count 1
 seq 5 permit host 00:00:00:00:00:aa host 00:00:00:00:00:bb
DellEMC#
```

Standard MAC ACL Commands

When you create an access control list without any rule and then apply it to an interface, the ACL behavior reflects implicit permit. These commands configure standard MAC ACLs and support both Ingress and Egress MAC ACLs.

NOTE: For more information, also refer to the Commands Common to all ACL Types and Common MAC Access List Commands sections.

deny

To drop packets with a the MAC address specified, configure a filter.

Syntax `deny {any | mac-source-address [mac-source-address-mask]} [count [byte]] [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | mac-source-address mac-source-address-mask}` command.

Parameters

any	Enter the keyword `any` to specify that all routes are subject to the filter.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.

	monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see the "Flow-based Monitoring" in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.

Defaults Not enabled.

Command Modes CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the `monitor` option.

Usage Information When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When you configure ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands
- permit — configures a MAC address filter to pass packets.
- seq — configures a MAC address filter with a specified sequence number.

mac access-list standard

To configure a standard MAC ACL, name a new or existing MAC access control list (MAC ACL) and enter MAC ACCESS LIST mode. Also refer to the Commands Common to all ACL Types section and the Common MAC Access List Commands section.

Syntax `mac access-list standard` *`mac-list-name`*

To delete a MAC access list, use the `no mac access-list standard` *`mac-list-name`* command.

Parameters

mac-list-name	Enter a text string as the name of the standard MAC access list (140 character maximum).

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information Dell EMC Networking OS supports one ingress and one egress MAC ACL per interface.

The number of entries allowed per ACL is hardware-dependent. For detailed specifications about entries allowed per ACL, see your line card documentation.

NOTE: Ingress ACLs are supported on C-Series and S-Series platforms only.

Example

```
DellEMC(conf)# mac-access-list access-list standard TestMAC
DellEMC(config-std-macl)# permit 00:00:00:00:00:00 00:00:00:00:ff:ff
count
DellEMC(config-std-macl)# deny any count
DellEMC(config-std-macl)#
```

permit

To forward packets from a specific source MAC address, configure a filter.

Syntax `permit {any | mac-source-address [mac-source-address-mask]} [count [byte]] | [log [interval minutes] [threshold-in-msgs [count]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {any | mac-source-address mac-source-address-mask}` command.

Parameters

any	Enter the keyword `any` to forward all packets received with a MAC address.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL) Enter the keyword `log` to include ACL messages in the log.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.

Defaults Not configured.

Command Modes CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When you configure the ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging inst"ad.

Related Commands

- deny — configure a MAC ACL filter to drop packets.
- seq — configure a MAC ACL filter with a specified sequence number.

seq

To a deny or permit filter in a MAC access list while creating the filter, assign a sequence number.

Syntax

```
deny {any | mac-source-address [mac-source-address-mask]} [count [byte]]
[log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | mac-source-address mac-source-address-mask}` command.

Parameters

any	Enter the keyword `any` to specify that all routes are subject to the filter.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL) Enter the keyword `log` to include ACL messages in the log.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section in the *Dell EMC Networking OS Configuration Guide*.

Defaults Not configured

Command Modes CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the `monitor` option.
6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When you configure the ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

Extended MAC ACL Commands

When an access-list is created without any rule and then applied to an interface, ACL behavior reflects implicit permit. The following commands configure Extended MAC ACLs.

The platform supports both Ingress and Egress MAC ACLs.

NOTE: For more information, also refer to the Commands Common to all ACL Types and Common MAC Access List Commands sections.

deny

To drop packets that match the filter criteria, configure a filter.

Syntax

```
deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask} [ethertype-operator] [count [byte]] [log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask}` command.

Parameters

any	Enter the keyword `any` to drop all packets.
host *mac-address*	Enter the keyword `host` and then enter a MAC address to drop packets with that host address.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.

mac-source-address-mask	Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
mac-destination-address	Enter the destination MAC address and mask in nn:nn:nn:nn:nn:nn format.
mac-destination-address-mask	Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
ethertype operator	(OPTIONAL) To filter based on protocol type, enter one of the following Ethertypes: • `ev2` - is the Ethernet II frame format • `llc` - is the IEEE 802.3 frame format • `snap` - is the IEEE 802.3 SNAP frame format
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL) Enter the keyword `log` to include ACL messages in the log.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, see "Flow-based Monitoring" in the Port Monitoring section of the *Dell EMC Networking OS Configuration Guide*.

Defaults Not configured.

Command Modes CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the `monitor` option.
6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When you configure the ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

- permit — configure a MAC address filter to pass packets.
- seq — configure a MAC address filter with a specified sequence number.

mac access-list extended

Name a new or existing extended MAC access control list (extended MAC ACL).

Syntax

`mac access-list extended` *`access-list-name`* `[cpu-qos]`

To delete a MAC access list, use the `no mac access-list extended` *`access-list-name`* command.

Parameters

access-list-name	Enter a text string as the MAC access list name, up to 140 characters.
cpu-qos	Enter the keywords `cpu-qos` to assign this ACL to control plane traffic only (CoPP).

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information

The number of entries allowed per ACL is hardware-dependent. For detailed specifications about entries allowed per ACL, refer to your line card documentation.

Prior to 7.8.1.0, names are up to 16 characters long.

Example

```
DellEMC(conf)# mac-access-list access-list extended TestMATExt
DellEMC(config-ext-macl)# remark 5 IPv4
DellEMC(config-ext-macl)# seq 10 permit any any ev2 eq 800 count bytes
DellEMC(config-ext-macl)# remark 15 ARP
DellEMC(config-ext-macl)# seq 20 permit any any ev2 eq 806 count bytes
DellEMC(config-ext-macl)# remark 25 IPv6
DellEMC(config-ext-macl)# seq 30 permit any any ev2 eq 86dd count bytes
DellEMC(config-ext-macl)# seq 40 permit any any count bytes
DellEMC(config-ext-macl)# exit
DellEMC(conf)# do show mac accounting access-list snickers interface
twentyFiveGigE 1/17 in
Extended mac access-list snickers on twentyFiveGigE 1/17
seq 10 permit any any ev2 eq 800 count bytes (559851886 packets
191402152148
bytes)
seq 20 permit any any ev2 eq 806 count bytes (74481486 packets 5031686754
bytes)
seq 30 permit any any ev2 eq 86dd count bytes (7751519 packets 797843521
bytes)
```

Related Commands

- mac access-list standard — configure a standard MAC access list.
- show mac accounting access-list — display MAC access list configurations and counters (if configured).

permit

To pass packets matching the criteria specified, configure a filter.

Syntax

`permit {any | host` *`mac-address`* `| mac-source-address mac-source-address-mask} {any | host` *`mac-address`* `| mac-destination-address mac-destination-address-mask} [ethertype operator] [count [byte]] | [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit {any | host` *`mac-address`* `| mac-source-address mac-source-address-mask} {any |` *`mac-destination-address mac-destination-address-mask`*`}` command.

Parameters

any	Enter the keyword `any` to forward all packets.
host	Enter the keyword `host` then a MAC address to forward packets with that host address.

mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
mac-destination-address	Enter the destination MAC address and mask in nn:nn:nn:nn:nn:nn format.
mac-destination-address-mask	Specify which bits in the MAC address must be matched. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
ethertype operator	(OPTIONAL) To filter based on protocol type, enter one of the following Ethertypes: • `ev2` - is the Ethernet II frame format • `llc` - is the IEEE 802.3 frame format • `snap` - is the IEEE 802.3 SNAP frame format
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, see Flow-based Monitoring in the "Port Monitoring" section of the *Dell EMC Networking OS Configuration Guide*.

Defaults Not configured.

Command Modes CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the `monitor` option.
6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When you configure the ACL logging and byte counters simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

- deny — configure a MAC ACL filter to drop packets.
- seq — configure a MAC ACL filter with a specified sequence number.

IP Prefix List Commands

When you create an access-list without any rule and then apply it to an interface, the ACL behavior reflects implicit permit.

To configure or enable IP prefix lists, use these commands.

clear ip prefix-list

Reset the number of times traffic mets the conditions ("hit" counters) of the configured prefix lists.

Syntax `clear ip prefix-list [prefix-name]`

Parameters

prefix-name	(OPTIONAL) Enter the name of the configured prefix list to clear only counters for that prefix list, up to 140 characters long.

Defaults Clears "hit" counters for all prefix lists unless a prefix list is specified.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- ip prefix-list — configure a prefix list.

deny

To drop packets meeting the criteria specified, configure a filter.

Syntax

`deny` *`ip-prefix`* `[ge` *`min-prefix-length`*`] [le` *`max-prefix-length`*`]`

To delete a drop filter, use the `no deny` *`ip-prefix`* command.

Parameters

ip-prefix	Specify an IP prefix in the network/length format. For example, 35.0.0.0/ 8 means match the first 8 bits of address 35.0.0.0.
ge *min-prefix-length*	(OPTIONAL) Enter the keyword `ge` and then enter the minimum prefix length, which is a number from zero (0) to 32.
le *max-prefix-length*	(OPTIONAL) Enter the keyword `le` and then enter the maximum prefix length, which is a number from zero (0) to 32.

Defaults Not configured.

Command Modes PREFIX-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information

Sequence numbers for this filter are automatically assigned starting at sequence number 5.

If you do not use the `ge` or `le` options, only packets with an exact match to the prefix are filtered.

ip prefix-list

Enter the PREFIX-LIST mode and configure a prefix list.

Syntax

`ip prefix-list` *`prefix-name`*

To delete a prefix list, use the `no ip prefix-list` *`prefix-name`* command.

Parameters

prefix-name	Enter a string up to 16 characters long as the name of the prefix list, up to 140 characters long.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information Prefix lists redistribute OSPF and RIP routes meeting specific criteria.

Related Commands
- show ip route list — display IP routes in an IP prefix list.
- show ip prefix-list summary — display a summary of the configured prefix lists.

seq

To a deny or permit filter in a prefix list while configuring the filter, assign a sequence number.

Syntax `seq sequence-number {deny | permit} {any} | [ip-prefix /nn {ge min-prefix-length} {le max-prefix-length}] | [bitmask number]`

To delete a specific filter, use the `no seq sequence-number {deny | permit} {any} | [ip-prefix {ge min-prefix-length} {le max-prefix-length}] | [bitmask number]`.

Parameters

sequence-number	Enter a number. The range is from 1 to 4294967294.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition..
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this condition.
any	(OPTIONAL) Enter the keyword `any` to match any packets.
ip-prefix /nn	(OPTIONAL) Specify an IP prefix in the network/length format. For example, 35.0.0.0/8 means match the first 8 bits of address 35.0.0.0.
ge *min-prefix-length*	(OPTIONAL) Enter the keyword `ge` and then enter the minimum prefix length, which is a number from zero (0) to 32.
le *max-prefix-length*	(OPTIONAL) Enter the keyword `le` and then enter the maximum prefix length, which is a number from zero (0) to 32.
bitmask *number*	Enter the keyword `bitmask` then enter a bit mask number in dotted decimal format.

Defaults Not configured.

Command Modes PREFIX-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Added the `bit mask` option.

Usage Information If you do not use the `ge` or `le` options, only packets with an exact match to the prefix are filtered.

show config

Display the current PREFIX-LIST configurations.

Syntax `show config`

Command Modes PREFIX-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-nprefixl)# show config
!
ip prefix-list snickers
DellEMC(conf-nprefixl)#
```

show ip prefix-list detail

Display details of the configured prefix lists.

Syntax `show ip prefix-list detail [prefix-name]`

Parameters

prefix-name (OPTIONAL) Enter a text string as the name of the prefix list, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip prefix-list detail
Ip Prefix-list with the last deletion/insertion: PL_OSPF_to_RIP
ip prefix-list PL_OSPF_to_RIP:
count: 3, range entries: 1, sequences: 5 - 25
   seq 5 permit 1.1.1.0/24 (hit count: 0)
   seq 10 deny 2.1.0.0/16 ge 23 (hit count: 0)
   seq 25 permit 192.0.0.0 bitmask 192.0.0.0 (hit count: 800)
DellEMC#
```

show ip prefix-list summary

Display a summary of the configured prefix lists.

Syntax `show ip prefix-list summary [prefix-name]`

Parameters

prefix-name (OPTIONAL) Enter a text string as the name of the prefix list, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip prefix-list summary
Ip Prefix-list with the last deletion/insertion: PL_OSPF_to_RIP
ip prefix-list PL_OSPF_to_RIP:
count: 3, range entries: 1, sequences: 5 - 25
DellEMC#
```

Route Map Commands

When you create an access-list without any rule and then applied to an interface, the ACL behavior reflects implicit permit.

To configure route maps and their redistribution criteria, use the following commands.

continue

To a route-map entry with a higher sequence number, configure a route-map.

Syntax `continue [sequence-number]`

Parameters

sequence-number	(OPTIONAL) Enter the route map sequence number. The range is from 1 to 65535.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information The `continue` feature allows movement from one route-map entry to a specific route-map entry (the sequence number). If you do not specify the sequence number, the `continue` feature simply moves to the next sequence number (also known as an implied continue). If a match clause exists, the `continue` feature executes only after a successful match occurs. If there are no successful matches, the `continue` feature is ignored.

Match clause with Continue clause

The `continue` feature can exist without a match clause. A continue clause without a match clause executes and jumps to the specified route-map entry.

With a match clause and a continue clause, the match clause executes first and the continue clause next in a specified route map entry. The continue clause launches only after a successful match. The behavior is:

- A successful match with a continue clause, the route map executes the set clauses and then goes to the specified route map entry upon execution of the continue clause.
- If the next route map entry contains a continue clause, the route map executes the continue clause if a successful match occurs.
- If the next route map entry does not contain a continue clause, the route map evaluates normally. If a match does not occur, the route map does not continue and falls through to the next sequence number, if one exists.

Set Clause with Continue Clause

If the route-map entry contains sets with the continue clause, set actions are performed first then the continue clause jumps to the specified route map entry.

- If a set action occurs in the first route map entry and then the same set action occurs with a different value in a subsequent route map entry, the last set of actions overrides the previous set of actions with the same `set` command.
- If `set community additive` and `set as-path prepend` are configure, the communities and AS numbers are prepended.

Related Commands

- set community — specify a COMMUNITY attribute.

- set as-path — configure a filter to modify the AS path.

description

Add a description to this route map.

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the route map (80 characters maximum).

Defaults

None

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
pre-7.7.1.0	Introduced.

Related Commands

- route-map — enable a route map.

match as-path

To match routes that have a certain AS number in their BGP path, configure a filter.

Syntax

`match as-path as-path-name`

To delete a match AS path filter, use the `no match as-path as-path-name` command.

Parameters

as-path-name	Enter the name of an established AS-PATH ACL, up to 140 characters.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set as-path — add information to the BGP AS_PATH attribute.

match community

To match routes that have a certain COMMUNITY attribute in their BGP path, configure a filter.

Syntax

```
match community community-list-name [exact]
```

To delete a community match filter, use the `no match community` command.

Parameters

community-list-name	Enter the name of a configured community list.
exact	(OPTIONAL) Enter the keywords `exact` to process only those routes with this community list name.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands
- set community — specify a COMMUNITY attribute.

match interface

To match routes whose next hop is on the interface specified, configure a filter.

Syntax
`match interface interface`

To remove a match, use the `no match interface interface` command.

Parameters

interface
Enter the following keywords and the interface information:
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Related Commands

- match ip address — redistribute routes that match an IP address.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match metric — redistribute routes that match a specific metric.
- match route-type — redistribute routes that match a route type.
- match tag — redistribute routes that match a specific tag.

match ip address

To match routes based on IP addresses specified in an access list, configure a filter.

Syntax

`match ip address` *`prefix-list-name`*

To delete a match, use the `no match ip address` *`prefix-list-name`* command.

Parameters

prefix-list-name Enter the name of configured prefix list, up to 140 characters.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match metric — redistribute routes that match a specific metric.
- match route-type — redistribute routes that match a route type.
- match tag — redistribute routes that match a specific tag.

match ip next-hop

To match based on the next-hop IP addresses specified in an IP access list or IP prefix list, configure a filter.

Syntax

`match ip next-hop {prefix-list prefix-list-name}`

To delete a match, use the `no match ip next-hop {prefix-list prefix-list-name}` command.

Parameters

prefix-list *prefix-list-name*	Enter the keywords `prefix-list` and then enter the name of configured prefix list, up 10 140 characters.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip address — redistribute routes that match an IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match metric — redistribute routes that match a specific metric.
- match route-type — redistribute routes that match a route type.
- match tag — redistribute routes that match a specific tag.

match ip route-source

To match based on the routes advertised by routes specified in IP access lists or IP prefix lists, configure a filter.

Syntax

`match ip route-source {prefix-list` *`prefix-list-name`*`}`

To delete a match, use the `no match ip route-source {prefix-list` *`prefix-list-name`*`}` command.

Parameters

prefix-list *prefix-list-name*	Enter the keywords `prefix-list` and then enter the name of configured prefix list, up to 140 characters.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip address — redistribute routes that match an IP address.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match metric — redistribute routes that match a specific metric.
- match route-type — redistribute routes that match a route type.
- match tag — redistribute routes that match a specific tag.

match metric

To match on a specified value, configure a filter.

Syntax

`match metric metric-value`

To delete a value, use the `no match metric [metric-value]` command.

Parameters

metric-value	Enter a value to match. The range is from zero (0) to 4294967295.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip address — redistribute routes that match an IP address.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match route-type — redistribute routes that match a route type.
- match tag — redistribute routes that match a specific tag.

match origin

To match routes based on the value found in the BGP path ORIGIN attribute, configure a filter.

Syntax

```
match origin {egp | igp | incomplete}
```

To disable matching filter, use the `no match origin {igp | egp | incomplete}` command.

Parameters

egp	Enter the keyword `egp` to match routes originating outside the AS.
igp	Enter the keyword `igp` to match routes originating within the same AS.
incomplete	Enter the keyword `incomplete` to match routes with incomplete routing information.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
pre-6.1.1.0	Introduced on the E-Series.

match route-type

To match routes based on the how the route is defined, configure a filter.

Syntax

```
match route-type {external [type-1 | type-2] | internal | level-1 | level-2 | local}
```

To delete a match, use the `no match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}` command.

Parameters

external [type-1| type-2]	Enter the keyword `external` then either type-1 or type-2 to match only on OSPF Type 1 routes or OSPF Type 2 routes.
internal	Enter the keyword `internal` to match only on routes generated within OSPF areas.
level-1	Enter the keyword `level-1` to match IS-IS Level 1 routes.
level-2	Enter the keyword `level-2` to match IS-IS Level 2 routes.
local	Enter the keyword `local` to match only on routes generated within the switch.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip address — redistribute routes that match an IP address.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match metric — redistribute routes that match a specific metric.
- match tag — redistribute routes that match a specific tag.

match tag

To redistribute only routes that match a specified tag value, configure a filter.

Syntax

```
match tag tag-value
```

To remove a match, use the `no match tag` command.

Parameters

tag-value	Enter a value as the tag on which to match. The range is from zero (0) to 4294967295.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.

Version	Description
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match interface — redistribute routes that match the next-hop interface.
- match ip address — redistribute routes that match an IP address.
- match ip next-hop — redistribute routes that match the next-hop IP address.
- match ip route-source — redistribute routes that match routes advertised by other routers.
- match metric — redistribute routes that match a specific metric.
- match route-type — redistribute routes that match a route type.

route-map

Enable a route map statement and configure its action and sequence number. This command also places you in ROUTE-MAP mode.

Syntax

`route-map` *`map-name`* `[permit | deny]` [*`sequence-number`*]

To delete a route map, use the `no route-map` *`map-name`* `[permit | deny]` [*`sequence-number`*] command.

Parameters

map-name	Enter a text string of up to 140 characters to name the route map for easy identification.
permit	(OPTIONAL) Enter the keyword `permit` to set the route map default as permit. If you do not specify a keyword, the default is `permit`.
deny	(OPTIONAL) Enter the keyword `deny` to set the route map default as deny.
sequence-number	(OPTIONAL) Enter a number to identify the route map for editing and sequencing with other route maps. You are prompted for a sequence number if there are multiple instances of the route map. The range is from 1 to 65535.

Defaults

Not configured.

If you do not define a keyword (`permit` or `deny`) for the route map, the `permit` action is the default.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information Use caution when you delete route maps because if you do not specify a sequence number, all route maps with the same *map-name* are deleted when you use the `no route-map map-name` command.

Example

```
DellEMC(conf)# route-map dempsey
DellEMC(config-route-map)#
```

Related Commands

- show config — display the current configuration.

set as-path

To modify the AS path for border gateway protocol (BGP) routes, configure a filter.

Syntax `set as-path prepend as-number [... as-number]`

To remove an AS-Path setting, use the `no set as-path {prepend as-number | tag}` command.

Parameters

prepend *as-number*	Enter the keyword `prepend` and then enter up to eight AS numbers to be inserted into the BGP path information. The range is from 1 to 65535.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

You can prepend up to eight AS numbers to a BGP route.

This command influences best path selection in BGP by inserting a tag or AS number into the AS_PATH attribute.

Related Commands

- match as-path — redistribute routes that match an AS-PATH attribute.

set automatic-tag

To automatically compute the tag value of the route, configure a filter.

Syntax

```
set automatic-tag
```

To return to the default, enter `no set automatic-tag`.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set level — specify the OSPF area for route redistribution.
- set metric — specify the metric value assigned to redistributed routes.
- set metric-type — specify the metric type assigned to redistributed routes.
- set tag — specify the tag assigned to redistributed routes.

set comm-list delete

To remove the specified community list from the BGP route's COMMUNITY attribute, configure a filter.

Syntax

`set comm-list` *`community-list-name`* `delete`

To insert the community list into the COMMUNITY attribute, use the `no set comm-list` *`community-list-name`* `delete` command.

Parameters

community-list-name	Enter the name of an established Community list, up to 140 characters.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The community list used in the `set comm-list delete` command must be configured so that each filter contains only one community. For example, the filter `deny 100:12` is acceptable, but the filter `deny 120:13 140:33` results in an error.

If the `set comm-list delete` command and the `set community` command are configured in the same route map sequence, the deletion command (`set comm-list delete`) is processed before the insertion command (`set community`).

Related Commands

- match community — redistribute routes that match the COMMUNITY attribute.
- set community — specify a COMMUNITY attribute.

set community

Allows you to assign a BGP COMMUNITY attribute.

Syntax

`set community {community-number | local-as | no-advertise | no-export | none} [additive]`

To delete a BGP COMMUNITY attribute assignment, use the `no set community {community-number | local-as | no-advertise | no-export | none}` command.

Parameters

community-number	Enter the community number in AA:NN format where AA is the AS number (2 bytes) and NN is a value specific to that autonomous system.
local-AS	Enter the keywords `local-AS` to drop all routes with the COMMUNITY attribute of NO_EXPORT_SUBCONFED. All routes with the NO_EXPORT_SUBCONFED (0xFFFFFF03) community attribute must not be advertised to external BGP peers.
no-advertise	Enter the keywords `no-advertise` to drop all routes containing the well-known community attribute of NO_ADVERTISE. All routes with the NO_ADVERTISE (0xFFFFFF02) community attribute must not be advertised to other BGP peers.
no-export	Enter the keywords `no-export` to drop all routes containing the well-known community attribute of NO_EXPORT. All routes with the NO_EXPORT (0xFFFFFF01) community attribute must not be advertised outside a BGP confederation boundary.
none	Enter the keyword `none` to remove the community attribute from routes meeting the route map criteria.
additive	(OPTIONAL) Enter the keyword `additive` to add the communities to already existing communities.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- match community — redistribute routes that match the COMMUNITY attribute.
- show ip bgp community — display BGP community groups.

set level

To specify the IS-IS level or OSPF area to which matched routes are redistributed, configure a filter.

Syntax

```
set level {backbone | level-1 | level-1-2 | level-2 | stub-area}
```

To remove a set level condition, use the `no set level {backbone | level-1 | level-1-2 | level-2 | stub-area}` command.

Parameters

backbone	Enter the keyword `backbone` to redistribute matched routes to the OSPF backbone area (area 0.0.0.0).
level-1	Enter the keyword `level-1` to redistribute matched routes to IS-IS Level 1.
level-1-2	Enter the keyword `level-1-2` to redistribute matched routes to IS-IS Level 1 and Level 2.
level-2	Enter the keyword `level-2` to redistribute matched routes to IS-IS Level 2.
stub-area	Enter the keyword `stub` to redistributed matched routes to OSPF stub areas.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Dell EMC Networking OS Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set automatic-tag — compute the tag value of the route.
- set metric — specify the metric value assigned to redistributed routes.
- set metric-type — specify the metric type assigned to redistributed routes.
- set tag — specify the tag assigned to redistributed routes.

set local-preference

To set the BGP LOCAL_PREF attribute for routers within the local autonomous system, configure a filter.

Syntax

```
set local-preference value
```

To delete a BGP LOCAL_PREF attribute, use the `no set local-preference` command.

Parameters

value	Enter a number as the LOCAL_PREF attribute value. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The `set local-preference` command changes the LOCAL_PREF attribute for routes meeting the route map criteria. To change the LOCAL_PREF for all routes, use the `bgp default local-preference` command.

Related Commands

- bgp default local-preference — change the default LOCAL_PREF attribute for all routes.

set metric

To assign a new metric to redistributed routes, configure a filter.

Syntax

`set metric [+ | -] metric-value`

To delete a setting, enter `no set metric`.

Parameters

+	(OPTIONAL) Enter + to add a metric-value to the redistributed routes.
-	(OPTIONAL) Enter – to subtract a metric-value from the redistributed routes.
metric-value	Enter a number as the new metric value. The range is from zero (0) to 4294967295.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set automatic-tag — compute the tag value of the route.
- set level — specify the OSPF area for route redistribution.
- set metric-type — specify the route type assigned to redistributed routes.
- set tag — specify the tag assigned to redistributed routes.

set metric-type

To assign a new route type for routes redistributed to OSPF, configure a filter.

Syntax

```
set metric-type {internal | external | type-1 | type-2}
```

To delete a setting, use the `no set metric-type` command.

Parameters

internal	Enter the keyword `internal` to assign the Interior Gateway Protocol metric of the next hop as the route's BGP MULTI_EXIT_DES (MED) value.
external	Enter the keyword `external` to assign the IS-IS external metric.
type-1	Enter the keyword `type-1` to assign the OSPF Type 1 metric.
type-2	Enter the keyword `type-2` to assign the OSPF Type 2 metric.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Implemented the keyword `internal`.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set automatic-tag — compute the tag value of the route.
- set level — specify the OSPF area for route redistribution.
- set metric — specify the metric value assigned to redistributed routes.
- set tag — specify the tag assigned to redistributed routes.

set next-hop

To specify an IP address as the next hop, configure a filter.

Syntax

```
set next-hop ip-address
```

To delete the setting, use the `no set next-hop ip-address` command.

Parameters

ip-address	Specify an IP address in dotted decimal format.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information If you configure the `set next-hop` command, its configuration takes precedence over the `neighbor next-hop-self` command in the ROUTER BGP mode.

If you configure the `set next-hop` command with the interface's IP address (either Loopback or physical), the software declares the route unreachable.

Related Commands

- match ip next-hop — redistribute routes that match the next-hop IP address.

set origin

To manipulate the BGP ORIGIN attribute, configure a filter.

Syntax `set origin {igp | egp | incomplete}`

To delete an ORIGIN attribute setting, use the `no set origin` command.

Parameters

egp	Enter the keyword `egp` to set routes originating from outside the local AS.
igp	Enter the keyword `igp` to set routes originating within the same AS.
incomplete	Enter the keyword `incomplete` to set routes with incomplete routing information.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

set tag

To specify a tag for redistributed routes, configure a filter.

Syntax `set tag tag-value`

To delete a setting, use the `no set tag` command.

Parameters

tag-value	Enter a number as the tag. The range is from zero (0) to 4294967295.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- set automatic-tag — compute the tag value of the route.
- set level — specify the OSPF area for route redistribution.
- set metric — specify the metric value assigned to redistributed routes.
- set metric-type — specify the route type assigned to redistributed routes.

set weight

To add a non-RFC compliant attribute to the BGP route to assist with route selection, configure a filter.

Syntax

`set weight weight`

To delete a weight specification, use the `no set weight weight` command.

Parameters

weight — Enter a number as the weight used by the route meeting the route map specification. The range is from 0 to 65535. The default is router-originated = **32768** and all other routes = **0**.

When there are multiple routes to the same destination, the routes with a higher weight are preferred.

Defaults

router-originated = **32768**; all other routes = **0**

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information If you do not use the `set weight` command, router-originated paths have a weight attribute of 32768 and all other paths have a weight attribute of zero.

show config

Display the current route map configuration.

Syntax `show config`

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-nprefixl)# show config
!
ip prefix-list PL_OSPF_to_RIP
 seq 5 permit 1.1.1.0/24
 seq 10 deny 2.1.0.0/16 ge 23
 seq 25 permit 192.0.0.0 bitmask 192.0.0.0
DellEMC(conf-nprefixl)#
```

show route-map

Display the current route map configurations.

Syntax `show route-map [map-name]`

Parameters

map-name	(OPTIONAL) Enter the name of a configured route map, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show route-map
route-map firpo, permit, sequence 10
 Match clauses:
 Set clauses:
  tag 34
DellEMC#
```

Related Commands

- route-map — configure a route map.

deny (for Standard IP ACLs)

To drop packets with a certain IP address, configure a filter.

Syntax

`deny {source | any | host {ip-address}}[count [byte]] [dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs [count]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source [mask] | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- ip access-list standard — configure a standard ACL.
- permit — configure a permit filter.

deny (for Extended IP ACLs)

Configure a filter that drops IP packets meeting the filter criteria.

Syntax

```
deny {ip | ip-protocol-number} {source mask | any | host ip-address}
{destination mask | any | host ip-address} [ttl operator] [count
[byte]] [dscp value] [order] [monitor] [fragments] [log [interval minutes]
[threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {ip | ip-protocol-number} {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ttl — Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.

operator — Enter one of the following logical operand:

- `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value.
- `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value.
- `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value.
- `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value.

- `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

log (OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count* (OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.

interval *minutes* (OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.

monitor (OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may

specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny tcp — assign a filter to deny TCP packets.
- deny udp — assign a filter to deny UDP packets.
- ip access-list extended — create an extended ACL.

seq (for Standard IPv4 ACLs)

Assign a sequence number to a deny or permit filter in an IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {source [mask] | any | host ip-address}} [count [bytes]] [dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

deny tcp (for Extended IP ACLs)

Configure a filter that drops transmission control protocol (TCP) packets meeting the filter criteria.

Syntax

```
deny tcp {source mask | any | host ip-address} [bit] [operator port [port]]
{destination mask | any | host ip-address} [ttl operator] [dscp] [bit]
[operator port [port]] [count [byte]] [order] [fragments] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.

monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added the support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added the support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — assign a filter to deny IP traffic.
- deny udp — assign a filter to deny UDP traffic.

deny (for Standard MAC ACLs)

To drop packets with a the MAC address specified, configure a filter.

Syntax

```
deny {any | mac-source-address [mac-source-address-mask]} [count [byte]]
[log [interval minutes] [threshold-in-msgs [count]][monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | mac-source-address mac-source-address-mask}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- permit — configure a MAC address filter to pass packets.
- seq — configure a MAC address filter with a specified sequence number.

deny (for Extended MAC ACLs)

To drop packets that match the filter criteria, configure a filter.

Syntax

```
deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask} [ethertype-operator] [count [byte]][log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- permit — configure a MAC address filter to pass packets.
- seq — configure a MAC address filter with a specified sequence number.

permit (for Standard IP ACLs)

To permit packets from a specific source IP address to leave the switch, configure a filter.

Syntax

```
permit {source [mask]| any | host ip-address} [count [byte]] [dscp value]
[order] [fragments] [log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {source [mask] | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — assign a IP ACL filter to deny IP packets.
- ip access-list standard — create a standard ACL.

permit icmp (for Extended IP ACLs)

Configure a filter to allow all or specific ICMP messages.

Syntax

```
permit icmp {source mask | any | host ip-address} {destination mask | any
| host ip-address} [ttl operator] [dscp] [count [byte]] [order] [fragments]
[log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit udp (for Extended IP ACLs)

To pass UDP packets meeting the filter criteria, configure a filter.

Syntax

```
permit udp {source mask | any | host ip-address} [operator port [port]]
{destination mask | any | host ip-address} [ttl operator] [dscp] [operator
port [port]] [count [byte]] [order] [fragments] [log [interval minutes]
[threshold-in-msgs [count]][monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit udp {source mask | any | host ip-address} {destination mask | any | host ip-address` command.

Parameters

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- ip access-list extended — create an extended ACL.
- permit — assign a permit filter for IP packets.
- permit tcp — assign a permit filter for TCP packets.

permit (for Extended IP ACLs)

To pass IP packets meeting the filter criteria, configure a filter.

Syntax `permit {source mask | any | host ip-address} {destination mask | any | host ip-address} [count [bytes]] [ttl operator] [dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs [count]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added the support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added the support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started

and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, standard and extended IPv6 ACLs, and standard and extended MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- ip access-list extended — create an extended ACL.
- permit tcp — assign a permit filter for TCP packets.
- permit udp — assign a permit filter for UDP packets.

permit (for Standard MAC ACLs)

To forward packets from a specific source MAC address, configure a filter.

Syntax

```
permit {any | mac-source-address [mac-source-address-mask]} [count [byte]]
| [log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {any | mac-source-address mac-source-address-mask}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — configure a MAC ACL filter to drop packets.
- seq —configure a MAC ACL filter with a specified sequence number.

seq (for Standard MAC ACLs)

To a deny or permit filter in a MAC access list while creating the filter, assign a sequence number.

Syntax

`seq` *`sequence-number`* `{deny | permit} {any |` *`mac-source-address`* `[`*`mac-source-address-mask`*`]} [count [byte]] [log [interval` *`minutes`*`] [threshold-in-msgs [`*`count`*`]] [monitor]`

To remove this filter, use the `no seq` *`sequence-number`* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

permit tcp (for Extended IP ACLs)

To pass TCP packets meeting the filter criteria, configure a filter.

Syntax

```
permit tcp {source mask | any | host ip-address} [bit] [operator port
[port]] {destination mask | any | host ip-address} [bit] [ttl operator]
[dscp] [operator port [port]] [count [byte]] [order] [fragments] [log
[interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.

- Use the `no permit tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- ip access-list extended — create an extended ACL.
- permit — assign a permit filter for IP packets.
- permit udp — assign a permit filter for UDP packets.

seq (for IP ACLs)

Assign a sequence number to a deny or permit filter in an extended IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {ip-protocol-number | icmp | ip | tcp
| udp} {source mask | any | host ip-address} {destination mask | any
| host ip-address} [operator port [port]] [ttl operator] [count [byte]]
[dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

Parameters

ttl — Enter the keyword `ttl` to permit or deny a packet based on the time to live value. The range is from 1 to 255.

operator — Enter one of the following logical operand:

- `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value.
- `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value.
- `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value.
- `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value.
- `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

log — (OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count* — (OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or deny commands. The threshold range is from 1 to 100..

interval *minutes* — (OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.

monitor — (OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- deny — configure a filter to drop packets.
- permit — configure a filter to forward packets.

seq (for IPv6 ACLs)

Assign a sequence number to a deny or permit the filter in an IPv6 access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {ipv6-protocol-number | icmp | ip | tcp
| udp} {source address mask | any | host ipv6-address} {destination address
| any | host ipv6-address} [operator port [portnumber | portname]] [count
[byte]] [log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 0 to 4294967290.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
ipv6-protocol-number	Enter a number to filter based on the protocol identified in the IPv6 protocol header.
icmp	Enter the keyword `icmp` to configure an ICMP access list filter.
ip	Enter the keyword `ip` to configure a generic IP access list. The keyword `ip` specifies that the access list permits all IP protocols.
tcp	Enter the keyword `tcp` to configure a TCP access list filter.
udp	Enter the keyword `udp` to configure a UDP access list filter.
source	Enter an IP address in dotted decimal format of the network from which the packet was received.
mask	(OPTIONAL) Enter a network mask in /prefix format (`/x`) .
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ipv6-address*	Enter the keyword `host` and then enter the IPv6 address to specify a host IP address or hostname.
operator	(OPTIONAL) Enter one of the following logical operands: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` parameter.)
portnumber	(OPTIONAL) Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP-DATA and FTP • 25 = SMTP • 169 = SNMP
portname	(OPTIONAL) Enter the logical name of the protocol. The following logical names are supported in TCP:

```
  bgp           Border Gateway Protocol (179)
  chargen       Character generator (19)
  cmd           Remote commands (rcmd, 514)
  daytime       Daytime (13)
  discard       Discard (9)
  domain        Domain Name Service (53)
  drip          Dynamic Routing Information Protocol
(3949)
  echo          Echo (7)
  exec          Exec (512)
  finger        Finger (79)
  ftp           File Transfer Protocol (21)
  ftp-data      FTP data connections (20)
  gopher        Gopher (70)
  hostname      NIC hostname server (101)
  ident         Ident Protocol (113)
```

```
  irc           Internet Relay Chat (194)
  klogin        Kerberos login (543)
  kshell        Kerberos shell (544)
  login         Login (rlogin, 513)
  lpd           Printer service (515)
  nntp          Network News Transport Protocol (119)
  pim-rp-disc   PIM-RP-DISC(496)
  pop2          Post Office Protocol v2 (109)
  pop3          Post Office Protocol v3 (110)
  smtp          Simple Mail Transport Protocol (25)
  sunrpc        Sun Remote Procedure Call (111)
  tacacs        TAC Access Control System (49)
  talk          Talk (517)
  telnet        Telnet (23)
  time          Time (37)
  uucp          Unix-to-Unix Copy Program (540)
  whois         Nicname (43)
  www           World Wide Web (HTTP, 80)
```

The following logical names are supported in UDP:

```
  biff            Biff (mail notification, comsat, 512)
  bootpc          Bootstrap Protocol (BOOTP) client (68)
  bootps          Bootstrap Protocol (BOOTP) server (67)
  discard         Discard (9)
  dnsix           DNSIX security protocol auditing (195)
  domain          Domain Name Service (DNS, 53)
  echo            Echo (7)
  isakmp          Internet Security Association and Key
Management Protocol (500)
  mobile-ip       Mobile IP registration (434)
  nameserver      IEN116 name service (obsolete, 42)
  netbios-dgm     NetBios datagram service (138)
  netbios-ns      NetBios name service (137)
  netbios-ss      NetBios session service (139)
  non500-isakmp   Internet Security Association and Key
Management Protocol (4500)
  ntp             Network Time Protocol (123)
  pim-rp-disc     PIM-RP-DISC(496)
  rip             Routing Information Protocol (router,
in.routed, 520)
  snmp            Simple Network Management Protocol (161)
  snmptrap        SNMP Traps (162)
  sunrpc          Sun Remote Procedure Call (111)
  syslog          System Logger (514)
  tacacs          TAC Access Control System (49)
  talk            Talk (517)
  tftp            Trivial File Transfer Protocol (69)
  time            Time (37)
  who             Who service (rwho, 513)
  xdmcp           X Display Manager Control Protocol (177)
```

destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count the packets.
bytes	(OPTIONAL) Enter the keyword `bytes` to count the bytes.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminate with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.

	monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P0)	Included support for using logical names of a protocol to configure an IP access list in both TCP and UDP on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- permit – configure a filter to forward packets.

permit udp (for IPv6 ACLs)

Configure a filter to pass UDP packets meeting the filter criteria.

Syntax

```
permit udp {source address mask | any | host ipv6-address} [operator port
[port]] {destination address | any | host ipv6-address} [operator port
```

`[port]] [ttl operator] [count [byte]] [log [interval minutes] [threshold-in-msgs [count]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit udp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.

Version	Description
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit tcp (for IPv6 ACLs)

Configure a filter to pass TCP packets that match the filter criteria.

Syntax

```
permit tcp {source address mask | any | host ipv6-address} [operator port
[port]] {destination address | any | host ipv6-address} [bit] [operator
port [port]] [ttl operator] [count [byte]] [log [interval minutes]
[threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit tcp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

source address mask	Enter a network mask in /prefix format (/x).
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ipv6-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination address	Enter the IPv6 address of the network or host to which the packets are sent.
bit	Enter a flag or combination of bits: • `ack`: acknowledgement field • `fin`: finish (no more data from the user) • `psh`: push function • `rst`: reset the connection • `syn`: synchronize sequence numbers • `urg`: urgent field • `established`: datagram of established TCP session Use the `established` flag to match only ACK and RST flags of established TCP session.

	You cannot use `established` along with the other control flags While using the `established` flag in an ACL rule, all the other TCP control flags are masked, to avoid redundant TCP control flags configuration in a single rule. When you use any TCP control flag in an ACL rule, `established` is masked and other control flags are available.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the port parameter)
port port	Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP • 25 = SMTP • 169 = SNMP
ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.11(2.0P0)	Added the `established` parameter on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

- permit – assign a permit filter for IP packets.

permit icmp (for IPv6 ACLs)

To allow all or specific internet control message protocol (ICMP) messages, configure a filter.

Syntax

```
permit icmp {source address mask | any | host ipv6-address} {destination
address | any | host ipv6-address} [type] [message-type] [ttl operator]
[count [byte]] [log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

source address mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-v6address*	Enter the keyword `host` then the IPv6 address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.

type	Enter the ICMP packet type. The following types are available:
	For IPv4:
	`echo count`
	`echo-reply count`
	`host-unreachable count`
	`host-unknown count`
	`network-unknown count`
	`net-unreachable count`
	`packet-too-big count`
	`parameter-problem count`
	`port-unreachable count`
	`source-quench count`
	`time-exceeded count`
	For IPv6:
	`echo count`
	`echo-reply count`
	`nd-ns count`
	`nd-na count`
	`packet-too-big count`
	`parameter-problem count`
	`time-exceeded count`
	`port-unreachable count`
	The ICMP packets cannot be filtered using mirroring ACL.

ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.

interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.11(2.0P1)	Added the *`type`* parameter to filter the ICMP packets based on the type and code on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit (for IPv6 ACLs)

To configure a filter that matches the filter criteria, select an IPv6 protocol number, ICMP, IPv6, TCP, or UDP.

Syntax

```
permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp} [count [byte]]
[dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs
[count]] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny udp (for IPv6 ACLs)

Configure a filter to drop user datagram protocol (UDP) packets meeting the filter criteria.

Syntax

`deny udp {`*`source address mask`* `| any | host` *`ipv6-address`*`} [`*`operator port [port]`*`] {`*`destination address`* `| any | host` *`ipv6-address`*`} [`*`operator port [port]`*`] [ttl` *`operator`*`] [count [byte]] [log [interval` *`minutes`*`] [threshold-in-msgs [`*`count`*`]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no deny udp {`*`source address mask`* `| any | host` *`ipv6-address`*`} {`*`destination address`* `| any | host` *`ipv6-address`*`}` command

Parameters

ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, Z9000, and MXL 10/40GbE Switch IO Module platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, Z9000, and MXL 10/40GbE Switch IO Module platforms.

Usage Information When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs.

You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny tcp (for IPv6 ACLs)

Configure a filter that drops TCP packets that match the filter criteria.

Syntax

```
deny tcp {source address mask | any | host ipv6-address} [operator port
[port]] {destination address | any | host ipv6-address} [bit] [operator
port [port]] [ttl operator] [count [byte]] [log [interval minutes]
[threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number

- Use the `no deny tcp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command

Parameters

source address mask	Enter a network mask in /prefix format (/x).
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ipv6-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination address	Enter the IPv6 address of the network or host to which the packets are sent.
bit	Enter a flag or combination of bits: • `ack`: acknowledgement field • `fin`: finish (no more data from the user) • `psh`: push function • `rst`: reset the connection • `syn`: synchronize sequence numbers • `urg`: urgent field • `established`: datagram of established TCP session Use the `established` flag to match only ACK and RST flags of established TCP session. You cannot use `established` along with the other control flags While using the `established` flag in an ACL rule, all the other TCP control flags are masked, to avoid redundant TCP control flags configuration in a single rule. When you use any TCP control flag in an ACL rule, `established` is masked and other control flags are available.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the port parameter)
port port	Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP • 25 = SMTP • 169 = SNMP
ttl	Enter the keyword `ttl` to permit a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.

count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.11(2.0P0)	Added the `established` parameter on the on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows

that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny icmp (for Extended IPv6 ACLs)

Configure a filter to drop all or specific ICMP messages.

NOTE: Only the options that have been newly introduced in Release 9.3(0.0) and Release 9.4(0.0) are described here. For a complete description on all of the keywords and variables that are available with this command, refer the topic of this command discussed earlier in this guide.

Syntax

```
deny icmp {source address mask | any | host ipv6-address} {destination
address | any | host ipv6-address} [type] [message-type] [ttl operator]
[count [byte]] | [log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no deny icmp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command

Parameters

source address mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-v6address*	Enter the keyword `host` then the IPv6 address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.

type	Enter the ICMP packet type. The following types are available:
	For IPv4:
	`echo count`
	`echo-reply count`
	`host-unreachable count`
	`host-unknown count`
	`network-unknown count`
	`net-unreachable count`
	`packet-too-big count`
	`parameter-problem count`
	`port-unreachable count`
	`source-quench count`
	`time-exceeded count`
	For IPv6:
	`echo count`
	`echo-reply count`
	`nd-ns count`
	`nd-na count`
	`packet-too-big count`
	`parameter-problem count`
	`time-exceeded count`

```
port-unreachable count
```

The ICMP packets cannot be filtered using mirroring ACL.

ttl	Enter the keyword `ttl` to deny a packet based on the time to live value. The range is from 1 to 255.
operator	Enter one of the following logical operand: • `eq`(equal to) — matches packets that contain a ttl value that is equal to the specified ttl value. • `neq`(not equal to) — matches packets that contain a ttl value that is not equal to the specified ttl value. • `gt`(greater than) — matches packets that contain a ttl value that is greater than the specified ttl value. • `lt` (less than) — matches packets that contain a ttl value that is less than the specified ttl value. • `range`(inclusive range of values) — matches packets that contain a ttl value that falls between the specified range of ttl values.
log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. You can enter a threshold in the range of 1-100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. You can enter an interval in the range of 1-10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `ttl` parameter.
9.11(2.0P0)	Added the *`type`* parameter to filter the ICMP packets based on the type and code on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.5(0.1)	Introduced on the Z9500.
9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny (for IPv6 ACLs)

Configure a filter that drops IPv6 packets that match the filter criteria.

Syntax

```
deny {ipv6-protocol-number | icmp | ipv6 | tcp | udp} [count [byte]]
[dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs
[count]]] [monitor] [no-drop]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no deny {ipv6-protocol-number | icmp | ipv6 | tcp | udp}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.
no-drop	Enter the keywords `no-drop` to match only the forwarded packets.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the no-drop parameter.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

7

Bidirectional Forwarding Detection (BFD)

Bidirectional forwarding detection (BFD) is a detection protocol that provides fast forwarding path failure detection.

The Dell EMC Networking OS implementation is based on the standards specified in the IETF Draft draft-ietf-bfd-base-03, and supports BFD on all Layer 3 physical interfaces including VLAN interfaces and port-channels

Topics:

- ipv6 router ospf
- bfd all-neighbors
- bfd disable
- bfd enable (Configuration)
- bfd enable (Interface)
- bfd interval
- bfd neighbor
- bfd protocol-liveness
- ip route bfd
- ip ospf bfd all-neighbors
- ipv6 ospf bfd all-neighbors
- isis bfd all-neighbors
- neighbor bfd
- neighbor bfd disable
- show bfd neighbors
- vrrp bfd neighbor

ipv6 router ospf

Enable OSPF for IPv6 router configuration.

Syntax

`ipv6 router ospf process-id [vrf vrf-name]`

To exit OSPF for IPv6, use the `no ipv6 router ospf process-id` command.

Parameters

process-id	Enter the process identification number. The range is from 1 to 65535.
vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to install IPv6 routes in that VRF.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

bfd all-neighbors

Enable BFD sessions with all neighbors discovered by Layer 3 protocols virtual router redundancy protocol (VRRP), intermediate system to intermediate system (IS-IS), open shortest path first (OSPF), OSPFv3, or border gateway protocol (BGP) on router interfaces, and (optionally) reconfigure the default timer values.

Syntax

```
bfd all-neighbors [interval interval min_rx min_rx multiplier value role
{active | passive}]
```

Parameters

interval *milliseconds*	(OPTIONAL) Enter the keyword `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**. Dell EMC recommends using more than 100 milliseconds.
min_rx *milliseconds*	Enter the keyword `min_rx` to specify the minimum rate at which the local system would like to receive control packets from the remote system. The range is from 50 to 1000. The default is **200**. Dell EMC recommends using more than 100 milliseconds.
multiplier *value*	Enter the keyword `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — The active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — The passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **active**.

Defaults See *Parameters*.

Command Modes

ROUTER OSPF

ROUTER OSPFv3

ROUTER BGP

ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Introduced support for enabling BFD on non-default VRFs for IPv4 BGP, default, and non-default VRFs for IPv6 BGP on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, C9010, Z9500, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.1P1)	Introduced support for enabling BFD on non-default VRFs for OSPFv2 on all the remaining Dell EMC Networking OS platforms. Introduced support for enabling BFD on non-default VRFs for OSPFv3 on all the Dell EMC Networking OS platforms.
9.10(0.2)	Introduced support for enabling BFD on non-default VRFs for OSPFv2 on the S3048–ON, S4048–ON, S4048T-ON, S6010–ON, Z9100–ON, and S6100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Introduced BFD for VRRP and OSPFv3 on Z9000, S4810, and S4820T.
9.0.0.0	Introduced BFD for BGP on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced BFD for BGP on the S4810.
8.4.1.3	Introduced BFD for BGP on the E-Series.
8.2.1.0	Introduced BFD for OSPF and ISIS on the E-Series.
7.6.1.0	Introduced BFD for OSPF on the C-Series.
7.5.1.0	Introduced BFD for ISIS on the E-Series.
7.4.1.0	Introduced BFD for OSPF on the E-Series.

Usage Information

All neighbors inherit the timer values configured with the `bfd neighbor` command except in the following cases:

- Timer values configured with the `isis bfd all-neighbors` or `ip ospf bfd all-neighbors` commands in INTERFACE mode override timer values configured with the `bfd neighbor` command. Likewise, using the `no bfd neighbor` command does not disable BFD on an interface if you explicitly enable BFD using the `isis bfd all-neighbors` command.
- Neighbors that have been explicitly enabled or disabled for a BFD session with the `bfd neighbor` or `neighbor bfd disable` commands in ROUTER BGP mode do not inherit the global BFD enable/disable values configured with the `bfd neighbor` command or configured for the peer group to which a neighbor belongs. The neighbors inherit only the global timer values (configured with the `bfd neighbor` command).

You can only enable BFD for VRRP in INTERFACE command mode (`vrrp bfd all-neighbors`).

You can enable BFD on both default and nondefault VRFs for OSPF and BGP protocols for both IPv4 and IPv6 neighbors.

NOTE: The `bfd all-neighbors` command is applicable for both IPv4 and IPv6 BGP sessions.

bfd disable

Disable BFD on an interface.

Syntax

```
bfd disable
```

Re-enable BFD using the `no bfd disable` command.

Defaults BFD is disabled by default.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.2)	Introduced on S4810.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

bfd enable (Configuration)

Enable BFD on all interfaces.

Syntax

```
bfd enable
```

Disable BFD using the `no bfd enable` command.

Defaults BFD is disabled by default.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

bfd enable (Interface)

Enable BFD on an interface.

Syntax `bfd enable`

Defaults BFD is enabled on all interfaces when you enable BFD from CONFIGURATION mode.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

bfd interval

Specify non-default BFD session parameters beginning with the transmission interval.

Syntax `bfd interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}`

Parameters

interval *milliseconds*	Enter the keywords `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**. Dell EMC recommends using more than 100 milliseconds.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system would like to receive control packets from the remote system. The range is from 50 to 1000. The default is **200**. Dell EMC recommends using more than 100 milliseconds.
multiplier *value*	Enter the keywords `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — The active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — The passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults Refer to *Parameters*.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-if-tf-1/3)# bfd interval 250 min_rx 300 multiplier 4 role
passive
DellEMC(conf-if-tf-1/3)#
```

bfd neighbor

Establish a BFD session with a neighbor.

Syntax `bfd neighbor` *ip-address*

To remove the BFD session with the neighbor, use the `no bfd neighbor` *ip-address* command.

Parameters ***ip-address*** Enter the IP address of the neighbor in dotted decimal format (A.B.C.D).

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.5.1.0	Added support for VLAN and port-channel interfaces on the E-Series.

Related Commands

- show bfd neighbors — display the BFD neighbor information on all interfaces or a specified interface.

bfd protocol-liveness

Enable the BFD protocol liveness feature.

Syntax `bfd protocol-liveness`

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

Version	Description
7.4.1.0	Introduced on the E-Series.

Usage Information

Protocol Liveness is a feature that notifies the BFD Manager when a client protocol (for example, OSPF and ISIS) is disabled. When a client is disabled, all BFD sessions for that protocol are torn down. Neighbors on the remote system receive an Admin Down control packet and are placed in the Down state. Peer routers might take corrective action by choosing alternative paths for the routes that originally pointed to this router.

ip route bfd

Enable BFD for all neighbors configured through static routes.

Syntax

`ip route bfd [prefix-list` *`prefix-list-name`*`] [interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}]`

To disable BFD for all neighbors configured through static routes, use the `no ip route bfd [vrf` *`vrf-name`*`] [prefix-list` *`prefix-list-name`*`] [interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}]` command.

Parameters

prefix-list *prefix-list-name*	(Optional) Enter the keyword `prefix-list` followed by the name of the prefix list to enable or disable BFD on specific neighbors.
interval *milliseconds*	(OPTIONAL) Enter the keywords `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system receives control packets from the remote system. The range is from 50 to 1000. The default is **200**.
multiplier *value*	Enter the keywords `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults See *Parameters*.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Introduced the `vrf` keyword on S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, C9010, Z9500, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.5)	Introduced the `vrf` keyword on the Z9100–ON.
9.11(0.0)	Introduced the `prefix-list` keyword.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.3.(0.0)	Introduced on S6000.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Introduced on Z9000, S4810, and S4820T.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

ip ospf bfd all-neighbors

Establish BFD sessions with all OSPF neighbors on a single interface or use non-default BFD session parameters.

Syntax

`ip ospf bfd all-neighbors [disable | [interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}]]`

To disable all BFD sessions on an OSPF interface implicitly, use the `no ip ospf bfd all-neighbors disable` command in interface mode..

Parameters

disable	(OPTIONAL) Enter the keyword `disable` to disable BFD on this interface.
interval *milliseconds*	(OPTIONAL) Enter the keyword `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system receives control packets from the remote system. The range is from 50 to 1000. The default is **200**.
multiplier *value*	Enter the keyword `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults See *Parameters*.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.2)	Introduced support for enabling BFD on non-default VRFs for OSPFv2.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2.0.0	Introduced on the Z9000, S4820T, and S4810.

Usage Information

This command provides the flexibility to fine-tune the timer values based on individual interface needs when you configure `ip ospf bfd` in CONFIGURATION mode. Any timer values specified with this command overrides timers set using the `bfd all-neighbors` command. Using the `no` form of this command does not disable BFD if you configure BFD in CONFIGURATION mode.

To disable BFD on a specific interface while you configure BFD in CONFIGURATION mode, use the keyword `disable`.

ipv6 ospf bfd all-neighbors

Establish BFD sessions with all OSPFv3 neighbors on a single interface or use non-default BFD session parameters.

Syntax

```
ipv6 ospf bfd all-neighbors [disable | [interval interval min_rx min_rx
multiplier value role {active | passive}]]
```

To disable all BFD sessions on an OSPFv3 interface implicitly, use the `no ipv6 ospf bfd all-neighbors disable` command in interface mode..

Parameters

disable	(OPTIONAL) Enter the keyword `disable` to disable BFD on this interface.
interval *milliseconds*	(OPTIONAL) Enter the keyword `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system receives control packets from the remote system. The range is from 50 to 1000. The default is **200**.
multiplier *value*	Enter the keyword `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults See *Parameters*.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2.0.0	Introduced on the Z9000, S4820T, and S4810.

Usage Information

This command provides the flexibility to fine-tune the timer values based on individual interface needs when you configure ipv6 ospf BFD in CONFIGURATION mode. Any timer values specified with this command overrides timers set using the `bfd all-neighbors` command. Using the `no` form of this command does not disable BFD if you configure BFD in CONFIGURATION mode.

To disable BFD on a specific interface while you configure BFD in CONFIGURATION mode, use the keyword `disable`.

isis bfd all-neighbors

Enable BFD on all IS-IS neighbors discovered on an interface.

Syntax

```
isis bfd all-neighbors [disable | [interval interval min_rx min_rx
multiplier value role {active | passive}]]
```

To remove all BFD sessions with IS-IS neighbors discovered on this interface, use the `no isis bfd all-neighbors [disable | [interval interval min_rx min_rx multiplier value role {active | passive}]]` command.

Parameters

disable	(OPTIONAL) Enter the keyword `disable` to disable BFD on this interface.
interval *milliseconds*	(OPTIONAL) Enter the keywords `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **200**.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system would like to receive control packets from the remote system. The range is from 50 to 1000. The default is **200**.
multiplier *value*	Enter the keywords `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults See *Parameters*.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.0.0.0	Introduced on Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on S4810.
8.2.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the E-Series.

Usage Information

This command provides the flexibility to fine-tune the timer values based on individual interface needs when ISIS BFD is configured in CONFIGURATION mode. Any timer values specified with this command overrides timers set using the `bfd all-neighbors` command. Using the `no` form of this command does not disable BFD if BFD is configured in CONFIGURATION mode.

To disable BFD on a specific interface while BFD is configured in CONFIGURATION mode, use the keyword `disable`.

neighbor bfd

Explicitly enable or disable a BFD session with a BGP neighbor or a BGP peer group.

Syntax `neighbor {ip-address | ipv6-address | peer-group-name} bfd`

Parameters

ip-address	Enter the IP address of the BGP neighbor that you want to explicitly enable for BFD sessions in dotted decimal format (A.B.C.D).
peer-group-name	Enter the name of the peer group that you want to explicitly enable for BFD sessions.

Defaults None

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Introduced support for enabling BFD on non-default VRFs for IPv4 BGP, default, and non-default VRFs for IPv6 BGP on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, C9010, Z9500, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.
8.4.1.3	Introduced on the E-Series.

Usage Information

When you enable a BFD session with a specified BGP neighbor or peer group using the `bfd neighbor` command, the default BFD session parameters are used (interval: **200** milliseconds, min_rx: **200** milliseconds, multiplier: **3** packets, and role: **active**) if you have not specified parameters with the `bfd neighbor` command.

When you explicitly enable a BGP neighbor for a BFD session with the `bfd neighbor` command:

- The neighbor does not inherit the global BFD enable values configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.
- The neighbor only inherits the global timer values configured with the `bfd neighbor` command: interval, min_rx, and multiplier.

Related Commands

- neighbor bfd disable — disable a BFD session explicitly with a BGP neighbor or a BGP peer group.

neighbor bfd disable

Explicitly disable a BFD session with a BGP neighbor or a BGP peer group.

Syntax

```
neighbor {ip-address | ipv6-address | peer-group-name} bfd disable
```

Parameters

ip-address	Enter the IP address of the BGP neighbor that you want to explicitly disable for BFD sessions in dotted decimal format (A.B.C.D).
peer-group-name	Enter the name of the peer group that you want to explicitly disable for BFD sessions.

Defaults

None

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Introduced support for enabling BFD on non-default VRFs for IPv4 BGP, default, and non-default VRFs for IPv6 BGP on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, C9010, Z9500, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.
8.4.1.3	Introduced on the E-Series.

Usage Information

When you explicitly disable a BGP neighbor for a BFD session with the `neighbor bfd disable` command:

- The neighbor does not inherit the global BFD disable values configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.
- The neighbor only inherits the global timer values configured with the `bfd neighbor` command: interval, min_rx, and multiplier.

When you remove the Disabled state of a BFD for a BGP session with a specified neighbor by entering the `no neighbor bfd disable` command, the BGP link with the neighbor returns to normal operation and uses the BFD session parameters globally configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.

show bfd neighbors

Display BFD neighbor information on all interfaces or a specified interface.

Syntax `show bfd neighbors [interface] [detail]`

Parameters

vrf *vrf name* (Optional) Enter the keyword `vrf` and then the name of the VRF to display the BFD sessions with all neighbors within the VRF.

interface (OPTIONAL) Enter one of the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port/subport information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

detail (OPTIONAL) Enter the keyword `detail` to view detailed information about BFD neighbors.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.1P1)	Introduced the `vrf` keyword on all the remaining Dell EMC Networking OS platforms.
9.10(0.2)	Introduced the `vrf` keyword on the S3048–ON, S4048–ON, S4048T-ON, S6010–ON, Z9100–ON, and S6100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Added support for BFD for BGP on the S4810.
8.4.1.3	Added support for BFD for BGP on the E-Series.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series.
7.5.1.0	Added support for BFD for VLAN and port-channel interfaces on the E-Series.
7.4.1.0	Introduced BFD on physical ports on the E-Series.

Example

The following example shows the `show bfd neighbors` command output for the default VRF.

```
show bfd neighbors

*       - Active session role
Ad Dn   - Admin Down
B       - BGP
C       - CLI
I       - ISIS
O       - OSPF
O3      - OSPFv3
R       - Static Route (RTM)
M       - MPLS
V       - VRRP
VT      - Vxlan Tunnel

LocalAddr    RemoteAddr  Interface  State Rx-int Tx-int Mult   Clients
* 5.1.1.1    5.1.1.2     Po 30      Up    200    200    3        O
* 6.1.1.1    6.1.1.2     Vl 30      Up    200    200    3        O
* 7.1.1.1    7.1.1.2     Tf 1/21    Up    200    200    3        O
```

The following example shows the `show bfd vrf neighbors` command output showing the nondefault VRF.

```
DellEMC(conf)#do sho bfd vrf vrf2 neighbors

*       - Active session role
Ad Dn   - Admin Down
B       - BGP
C       - CLI
I       - ISIS
O       - OSPF
O3      - OSPFv3
R       - Static Route (RTM)
M       - MPLS
```

```
V       - VRRP
VT      - Vxlan Tunnel


  LocalAddr       RemoteAddr Interface       State Rx-int Tx-int Mult
VRF Clients
* 13.1.1.1        13.1.1.2        Tf 1/2     Up    200    200    3    2
    O

* 23.1.1.1        23.1.1.2        Vl 300     Up    200    200    3    2
    O

* 33.1.1.1        33.1.1.2        Vl 301     Up    200    200    3    2
    O
```

Example (Detail) The following example shows the `show bfd vrf neighbors detail` command output showing the nondefault VRF called “VRF_blue”.

```
DellEMC# show bfd vrf VRF_blue neighbors detail

Session Discriminator: 5
Neighbor Discriminator: 3
Local Addr: 5.1.1.1
Local MAC Addr: 00:a0:c9:00:00:02
Remote Addr: 5.1.1.2
Remote MAC Addr: 34:17:98:34:00:12
Int: Port-channel 30
State: Up
Configured parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Neighbor parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Actual parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Role: Active
Delete session on Down: True
VRF: VRF_blue
Client Registered: OSPF
Uptime: 00:00:15
Statistics:
Number of packets received from neighbor: 78
Number of packets sent to neighbor: 78
Number of state changes: 1
Number of messages from IFA about port state change: 0
Number of messages communicated b/w Manager and Agent: 4

Session Discriminator: 7
Neighbor Discriminator: 2
Local Addr: 6.1.1.1
Local MAC Addr: 00:a0:c9:00:00:02
Remote Addr: 6.1.1.2
Remote MAC Addr: 34:17:98:34:00:12
Int: Vlan 30
State: Up
Configured parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Neighbor parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Actual parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Role: Active
Delete session on Down: True
VRF: VRF_blue
Client Registered: OSPF
Uptime: 00:00:15
Statistics:
Number of packets received from neighbor: 78
Number of packets sent to neighbor: 78
Number of state changes: 1
Number of messages from IFA about port state change: 0
```

```
Number of messages communicated b/w Manager and Agent: 4

Session Discriminator: 6
Neighbor Discriminator: 1
Local Addr: 7.1.1.1
Local MAC Addr: 00:a0:c9:00:00:02
Remote Addr: 7.1.1.2
Remote MAC Addr: 34:17:98:34:00:12
Int: TwentyFiveGigE 1/21
State: Up
Configured parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Neighbor parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Actual parameters:
TX:  200ms, RX:  200ms, Multiplier: 3
Role: Active
Delete session on Down: True
VRF: VRF_blue
Client Registered: OSPF
Uptime: 00:00:14
Statistics:
Number of packets received from neighbor: 73
Number of packets sent to neighbor: 73
Number of state changes: 1
Number of messages from IFA about port state change: 0
Number of messages communicated b/w Manager and Agent: 4
```

Related Commands

- bfd all-neighbors — establish BFD sessions with all neighbors discovered by the IS-IS protocol or OSPF protocol out of all interfaces.

vrrp bfd neighbor

Establish a BFD for VRRP session with a neighbor.

Syntax `vrrp bfd neighbor ip-address`

To remove the BFD session with the neighbor, use the `no vrrp bfd neighbor ip-address` command.

Parameters

ip-address Enter the IP address of the neighbor in dotted decimal format (A.B.C.D).

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.

Version	Description
7.6.1.0	Introduced on the C-Series.
7.5.1.0	Added support for VLAN and port-channel interfaces on the E-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- show bfd neighbors — display the BFD neighbor information on all interfaces or a specified interface.

8

Boot Command Line Interface

To access this BOOT_USER mode, first boot your Dell EMC Networking platform. When you see the “Press ESC to stop auto-boot”, `press the ESC key to log into BCLI`

You enter `BOOT_USER` mode immediately, as indicated by the `BOOT_USER#` prompt.

NOTE: All commands in this chapter are in `Boot_User` mode. These commands are supported on the Dell EMC Networking platform.

You cannot use the Tab key to complete commands in this mode.

Topics:

- boot change
- boot message
- boot show net config retries
- boot write net config retries
- boot zero
- default-gateway
- etheraddr <macaddr>
- ignore enable-password
- ignore startup-config
- interface management ethernet ip address
- NVRAM erase
- reload
- serial console
- show bootvar
- show default-gateway
- show interface management ethernet
- show serial console baud rate
- watchdog <string>

boot change

Change the primary, secondary, or default Dell EMC Networking OS boot configuration.

Syntax	**boot change** {*primary* | *secondary* | *default*}	
Parameters	***primary***	Enter the keyword **primary** to configure the boot parameters used in the first attempt to boot Dell EMC Networking OS.
	secondary	Enter the keyword **secondary** to configure boot parameters used if the primary operating system boot selection is not available.
	default	Enter the keyword **default** to configure boot parameters used if the secondary operating system boot parameter selection is not available. You can configure this option to any of the available type, for example flash/usb/ftp/tftp.
Defaults	None	
Command Modes	BOOT_USER	

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information

After entering the `boot change` command and selecting the parameters, press **Enter**. The software prompts you to enter the following:

- The boot device (flash, ftp, tftp, or usbflash), image file name, IP address of the server containing the image, username, and password (only for ftp).

Note When you enter a new parameter that extends beyond 80 characters, you cannot use the **Backspace** key to correct any mistakes. If you make a mistake, you must re-enter the parameter.

Note: You must set the IP address of the designated download port before you execute this command. Otherwise, an second statement message alerts you that the configuration cannot proceed.

shows the first field after you enter **boot change primary**. At this point:

- Press **Enter** to accept the information already configured, or
- Change that information. To do so, press the . (period) key and enter new information. After you enter the information, press **Enter**.

Example

```
BOOT_USER # boot change primary
boot device : ftp
```

shows the completed command:

```
BOOT_USER # boot change primary
'.' = clear field; '-' = go to previous field
boot device : ftp
file name : tt/latestlabel
Server IP address : 10.16.1.200
username : amsterdam
password : ******
BOOT_USER #
```

To view the current boot configuration, use the **show bootvar** command.

Related Commands

show_bootvar — Display boot configuration information.boot_zero — Remove the primary, secondary, or default boot image configuration.

boot message

Use this command to enable/disable boot logs during reload.

Syntax **boot message *on* / *off***

Parameters

on	Enter the keyword **on** to turn on boot logs during reload.
off	Enter the keyword **off** to suppress the boot logs during reload.

NOTE: By default, watchdog is disabled.

Defaults None

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER #boot message
boot messages off
BOOT_USER #
```

boot show net config retries

Show the number of retries for network boot configuration failure.

Syntax **boot show net config retries**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER #boot show net config retries
Number of Network Boot Config Retries is : 0
BOOT_USER #
```

boot write net config retries

Set the number of retries for network boot configuration failure.

Syntax **boot write net config retries** <int>

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # boot write net config retries 2
Updated number of Network Boot Config retries to 2
BOOT_USER #
```

boot zero

Erase the configured primary, secondary, or default boot image parameters. If you erase all three parameters, the S6000 switch boots from its internal Flash.

Syntax **boot zero** {*primary* | *secondary* | *default*}

Parameters

primary	Enter the keyword **primary** to remove the primary boot parameter.
secondary	Enter the keyword **secondary** to remove the secondary boot parameter.
default	Enter the keyword **default** to remove the default boot parameter.

Defaults None

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information This command reverses changes made with the **boot change** command.

```
BOOT_USER # boot zero primary
BOOT_USER # boot zero secondary
BOOT_USER # boot zero default
BOOT_USER # show bootvar
PRIMARY OPERATING SYSTEM BOOT PARAMETERS:
========================================
No Operating System boot parameters specified!
SECONDARY OPERATING SYSTEM BOOT PARAMETERS:
========================================
No Operating System boot parameters specified!
DEFAULT OPERATING SYSTEM BOOT PARAMETERS:
========================================
No Operating System boot parameters specified!
BOOT_USER #
```

Related Commands boot_change— Change the primary, secondary, or default boot image configuration.

default-gateway

Assign an IP address as the default gateway for the system.

Syntax [**no**] **default-gateway** *ip-address*

Parameters

ip-address Enter the **IP address** of the gateway router in dotted decimal format (A.B.C.D).

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information Use the **show default-gateway** command to view the current default gateway.

Related Commands show_default-gateway— Change the primary, secondary, or default boot image configuration.

etheraddr <macaddr>

Assign the management port MAC address.

Syntax **etheraddr <macaddr>**

Parameters

mac-address Enter a **MAC address** in standard format.

Command Modes BOOT_ADMIN

Command History

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information Use this command to assign a MAC address if FTOS cannot find a default MAC address.

Example

```
BOOT_ADMIN # etheraddr aa:aa:aa:aa:aa:aa
```

<Macaddr> XX:xx:xx:xx:xx:xx

No defaults for this

ignore enable-password

Reload the system software without the enable password configured.

Syntax **ignore enable-password**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information

When you enter the **reload** command and the system reboots, you will not be prompted for a password to enter the EXEC Privilege mode (normally you are required to enter the enable command).

If your console or Telnet session expires after you used the **ignore enable-password** command, you are prompted for an **enable** password when you re-establish the session

Related Commands

reload — Exit from this mode and reload FTOS.

ignore startup-config

During a reload, do not load the startup-config file.

Syntax **ignore startup-config**

Defaults disabled

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information

Use this command if you have authentication procedures in the startup-config other than the enable-password setting.

interface management ethernet ip address

Assign an IP address to the Management Ethernet interface.

Syntax **[no] interface management ethernet ip address** *ip-address mask*

To delete the IP address, enter **no interface management ethernet ip address**.

Defaults Not configured.

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information	In the runtime CLI, use the **ip address** command in INTERFACE mode to change the Management interface's IP address. To view the current IP address configured on the Management interface, enter the show interfaces **management ethernet** command
Related Commands	show_default-gateway — Display the IP address configured for the default gateway. show_interface_mangement_ethernet— Display the IP address configured for the Management interface.

NVRAM erase

Erase all NVRAM contents alone.

Syntax	**nvram erase**	
Parameters	***mac-address***	Enter a **MAC address** in standard format.
Command Modes	BOOT_ADMIN	

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Usage Information Use this command to assign a MAC address if FTOS cannot find a default MAC address.

Example

```
BOOT_USER # BOOT_ADMIN # nvram erase
Are you sure (y/n)? : yes
Erasing NVRAM sectors....Erasing NvRam of size 1024 KB ... DONE
```

reload

Exit from this mode and reload Dell EMC Networking OS.

Syntax	**reload**
Command Modes	BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

serial console

Use the serial console to set the serial console baud rate.

Syntax **serial console <int> <int>**

Parameters

serial console [unit] [baud] Enter the keyword to set the serial port baud rate. The supported values for serial console:

- Unit - 0
- Baud rate -9600,115200

No defaults.

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example Serial

```
BOOT_USER # serial console 0 9600
BOOT_USER # BOOT_USER #
```

show bootvar

Display boot configuration information.

Syntax **show bootvar**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # show bootvar
PRIMARY OPERATING SYSTEM BOOT PARAMETERS:
=========================================
No Operating System boot parameters specified!
SECONDARY OPERATING SYSTEM BOOT PARAMETERS:
=========================================
boot device : flash
```

file name : systema (FTOS system://A Partition)

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:

==========

boot device : tftp

file name : PS-SI-9-0-0-566.bin

Management Etherenet IP address : 10.16.133.17

Mask : 255.255.0.0

Server IP address : 10.16.1.200

Default Gateway IP address : 10.16.1.254

BOOT_USER #

Related Commands

boot_change— Change the primary, secondary, or default boot image configuration.

boot_zero — Erase the configured primary, secondary, or default boot image parameters.

show default-gateway

Display the IP address configured for the default gateway.

Syntax **show default-gateway**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # show default-gateway
```

Gateway IP address: 10.16.100.254

BOOT_USER #

Related Commands

default-gateway— Configure the IP address for the default gateway.

interface_management_ethernet_ip_address — Assign an IP address to the Management Ethernet interface.

show interface management ethernet

Display the IP address configured for the Management interface.

Syntax **show interface management ethernet**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # show interfaces management ethernet
Management ethernet IP address: 10.16.133.17/24
BOOT_ADMIN #
```

On the S6000, the output of this command includes the MAC address and port number of the assigned management port.

Example

```
BOOT_ADMIN # show int man eth
Management ethernet IP address: 10.16.132.4/16
BOOT_ADMIN #
```

Related Commands

interface_management_ethernet_ip_address — Assign an IP address to the Management Ethernet interface.

reload — Configure speed, duplex, and negotiation settings for the management interface.

show serial console baud rate

Use the show serial console to show the values of the serial console baud rate.

Syntax **show serial console baudrate**

Command Modes BOOT_USER

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # show serial console baudrate
Serial console baudrate = 9600
```

watchdog <string>

Enable the watchdog timer, when the enabled watchdog timer is set to 60 seconds.

Syntax **<string>** *enable* | *disable* | *status* | *timeout* | *settimeout* watchdog timer

Parameters

enable	Enter the keyword **enable** to enable the watchdog.
disable	Enter the keyword **disable** to disable the watchdog.

status	Enter the keyword **status** to see the watchdog status.
timeout	Enter the keyword **timeout** to see the timeout configured for the watchdog.
settimeout	Enter the keyword **set timeout** to set timeout.

NOTE: By default, watchdog is disabled.

Command Modes BOOT_ADMIN

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.

Example

```
Boot_user#BOOT_ADMIN # watchdog status
WATCHDOG DISABLED
BOOT_ADMIN # watchdog enable
WATCHDOG ENABLED
BOOT_ADMIN # watchdog status
WATCHDOG ENABLED
BOOT_ADMIN # watchdog timeout
WATCHDOG TIMEOUT: 60
```

9

Border Gateway Protocol

BGP is an external gateway protocol that transmits interdomain routing information within and between autonomous systems (AS). BGP version 4 (BGPv4) supports classless inter-domain routing (CIDR) and the aggregation of routes and AS paths. Basically, two routers (called neighbors or peers) exchange information including full routing tables and periodically sent messages to update those routing tables.

NOTE: For more information about configuring the border gateway protocol (BGP), see the *BGP* section in the *Dell EMC Networking OS Configuration Guide*.

Topics:

- BGP IPv4 Commands
- MBGP Commands

BGP IPv4 Commands

Border Gateway Protocol (BGP) is an external gateway protocol that transmits interdomain routing information within and between Autonomous Systems (AS). BGP supports classless interdomain routing (CIDR) and the aggregation of routes and AS paths. Basically, two routers (called neighbors or peers) exchange information including full routing tables and periodically send messages to update those routing tables.

NOTE: Dell EMC Networking OS supports 2-byte (16-bit) and 4-byte (32-bit) format for autonomous system numbers (ASNs), where the 2-byte format is 1 to 65535 and the 4-byte format is 1 to 4294967295.

NOTE: Dell EMC Networking OS supports dotted format as well as the traditional plain format for AS numbers. The dot format is displayed when using the `show ip bgp` commands. To determine the comparable dot format for an ASN from a traditional format, use ASN/65536. ASN%65536. For more information about using the 2– or 4-byte format, refer to the *Dell EMC Networking OS Configuration Guide*.

address-family

Enable the IPv4 multicast or the IPv6 address family.

Syntax `address-family {ipv4 multicast | ipv6 unicast} [vrf vrf-name]`

Parameters

ipv4 multicast	Enter the keyword `ipv4` followed by the keyword `multicast` to enable BGPv4 multicast mode.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to enable VRF mode. **NOTE:** It is not be possible to enable VRF mode for IPv6 unicast without configuring the corresponding IPv4 unicast mode for the same VRF. While deletion, whenever the IPv4 VRF mode is deleted for the VRF, Dell EMC Networking OS automatically deletes the IPv6 VRF configurations as well.
ipv6 unicast	Enter the keyword `ipv6` followed by the keyword `unicast` to enable BGPv6 mode.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for IPv6 VRF.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.5.1.0	Introduced

aggregate-address

To minimize the number of entries in the routing table, summarize a range of prefixes.

Syntax

```
aggregate-address ip-address mask [advertise-map map-name] [as-set]
[attribute-map map-name] [summary-only] [suppress-map map-name]
```

Parameters

ip-address mask	Enter the IP address and mask of the route to be the aggregate address. Enter the IP address in dotted decimal format (A.B.C.D) and mask in /prefix format (/x).
advertise-map *map-name*	(OPTIONAL) Enter the keywords `advertise-map` then the name of a configured route map to set filters for advertising an aggregate route.
as-set	(OPTIONAL) Enter the keyword `as-set` to generate path attribute information and include it in the aggregate. AS_SET includes AS_PATH and community information from the routes included in the aggregated route.
attribute-map *map-name*	(OPTIONAL) Enter the keywords `attribute-map` then the name of a configured route map to modify attributes of the aggregate, excluding AS_PATH and NEXT_HOP attributes.
summary-only	(OPTIONAL) Enter the keyword `summary-only` to advertise only the aggregate address. Specific routes are not advertised.
suppress-map *map-name*	(OPTIONAL) Enter the keywords `suppress-map` then the name of a configured route map to identify which more-specific routes in the aggregate are suppressed.

Defaults Not configured.

Command Modes

- ROUTER BGP ADDRESS FAMILY
- ROUTER BGP ADDRESS FAMILY IPv6

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

At least one of the routes included in the aggregate address must be in the BGP routing table for the configured aggregate to become active.

If routes within the aggregate are constantly changing, do not add the `as-set` parameter to the aggregate as the aggregate flaps to keep track of the changes in the AS_PATH.

In route maps used in the `suppress-map` parameter, routes meeting the `deny` clause are not suppress; in other words, they are allowed. The opposite is also true: routes meeting the `permit` clause are suppressed.

If the route is injected via the `network` command, that route still appears in the routing table if the `summary-only` parameter is configured in the `aggregate-address` command.

The `summary-only` parameter suppresses all advertisements. If you want to suppress advertisements to only specific neighbors, use the `neighbor distribute-list` command.

In the `show ip bgp` command, aggregates contain an 'a' in the first column and routes suppressed by the aggregate contain an 's' in the first column.

When an aggregate address is denied using a peer's outbound route-map, individual routes suppressed by the aggregate address are advertised to that peer.

The attribute-map corresponding to an aggregate address is applied during the outbound update creation time; the value set in that attribute-map will not be shown in the output of the `show ip bgp aggregate route` command.

bgp add-path

Allow the advertisement of multiple paths for the same address prefix without the new paths replacing any previous ones.

Syntax `bgp add-path [send | receive | both | enable] path-count`

Parameters

send	Enter the keyword `send` to indicate that the system sends multiple paths to peers.
receive	Enter the keyword `receive` to indicate that the system accepts multiple paths from peers.
both	Enter the keyword `both` to indicate that the system sends and accepts multiple paths from peers.
enable	Enter the keyword `enable` to enable add-path support support for the node.

	path-count	Enter the number paths supported. The range is from 2 to 64.

Defaults Disabled

Command Modes
- ROUTER BGP
- ROUTER BGP-address-family

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information Using this command recycles all current sessions.

Related Commands
- neighbor add-path — specify that this neighbor/peer group can send/receive multiple path advertisements.

bgp always-compare-med

Allows you to enable comparison of the MULTI_EXIT_DISC (MED) attributes in the paths from different external ASs.

Syntax `bgp always-compare-med`

To disable comparison of MED, enter `no bgp always-compare-med`.

Defaults Disabled (that is, the software only compares MEDs from neighbors within the same AS).

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced command.
7.7.1.0	Introduced on the C-Series.

Usage Information

Any update without a MED attribute is the least preferred route.

If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp asnotation

Allows you to implement a method for AS number representation in the command line interface (CLI).

Syntax

`bgp asnotation [asplain | asdot+ | asdot]`

To disable a dot or dot+ representation and return to ASPLAIN, enter the `no bgp asnotation` command.

Defaults

asplain

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced the dynamic application of AS notation changes.
8.2.1.0	Introduced.

Usage Information

Before enabling this feature, enable the `enable bgp four-octet-as-support`command. If you disable the `four-octect-support` command after using dot or dot+ format, the AS numbers revert to asplain text.

When you apply an asnotation, it is reflected in the running-configuration. If you change the notation type, the running-config updates dynamically and the new notation shows.

Example

```
DellEMC(conf)# router bgp 1
DellEMC(conf-router_bgp)#bgp asnotation asdot
DellEMC(conf-router_bgp)# ex
DellEMC(conf)#do show run | grep bgp

router bgp 1
  bgp four-octet-as-support
  bgp asnotation asdot

DellEMC(conf)#router bgp 1
DellEMC(conf-router_bgp)# bgp asnotation asdot+
DellEMC(conf-router_bgp)# ex

DellEMC(conf)#do show run | grep bgp
router bgp 1
  bgp four-octet-as-support
  bgp asnotation asdot+

DellEMC(conf)#router bgp 1
DellEMC(conf-router_bgp)# bgp asnotation asplain
DellEMC(conf-router_bgp)# ex
DellEMC(conf)#do show run |grep bgp
router bgp 1
  bgp four-octet-as-support

DellEMC(conf)#
```

Related Commands

- bgp four-octet-as-support — enable 4-byte support for the BGP process.

bgp bestpath as-path ignore

Ignore the AS PATH in BGP best path calculations.

Syntax

`bgp bestpath as-path ignore`

To return to the default, enter the `no bgp bestpath as-path ignore` command.

Defaults

Disabled (that is, the software considers the AS_PATH when choosing a route as best).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp bestpath as-path multipath-relax

Include prefixes received from different AS paths during multipath calculation.

Syntax `bgp bestpath as-path multipath-relax`

To return to the default BGP routing process, use the `no bgp bestpath as-path multipath-relax` command.

Defaults Disabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.4	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information The `bestpath router bgp configuration mode` command changes the default bestpath selection algorithm. The `multipath-relax` option allows load-sharing across providers with different (but equal-length) autonomous system paths. Without this option, ECMP expects the AS paths to be identical for load-sharing.

bgp bestpath med confed

Enable MULTI_EXIT_DISC (MED) attribute comparison on paths learned from BGP confederations.

Syntax `bgp bestpath med confed`

To disable MED comparison on BGP confederation paths, enter the `no bgp bestpath med confed` command.

Defaults Disabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information The software compares the MEDs only if the path contains no external autonomous system numbers. If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp bestpath med missing-as-best

During path selection, indicate preference to paths with missing MED (MULTI_EXIT_DISC) over paths with an advertised MED attribute.

Syntax `bgp bestpath med missing-as-best`

To return to the default selection, use the `no bgp bestpath med missing-as-best` command.

Defaults Disabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
6.3.1.0	Introduced

Usage Information The MED is a 4-byte unsigned integer value and the default behavior is to assume a missing MED as 4294967295. This command causes a missing MED to be treated as 0. During path selection, paths with a lower MED are preferred over paths with a higher MED.

bgp bestpath router-id ignore

Do not compare router-id information for external paths during best path selection.

Syntax `bgp bestpath router-id ignore`

To return to the default selection, use the `no bgp bestpath router-id ignore` command.

Defaults Disabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced

Usage Information Configuring this option retains the current best-path. When sessions are then reset, the oldest received path is chosen as the best-path.

bgp client-to-client reflection

Allows you to enable route reflection between clients in a cluster.

Syntax

```
bgp client-to-client reflection
```

To disable client-to-client reflection, use the `no bgp client-to-client reflection` command.

Defaults Enabled when a route reflector is configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information Route reflection to clients is not necessary if all client routers are fully meshed.

Related Commands

- bgp cluster-id — assign an ID to a BGP cluster with two or more route reflectors.
- neighbor route-reflector-client — configure a route reflector and clients.

bgp cluster-id

Assign a cluster ID to a BGP cluster with more than one route reflector.

Syntax

```
bgp cluster-id {ip-address | number}
```

To delete a cluster ID, use the `no bgp cluster-id {ip-address | number}` command.

Parameters

ip-address	Enter an IP address as the route reflector cluster ID.
number	Enter a route reflector cluster ID as a number from 1 to 4294967295.

Defaults Not configured.

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

When a BGP cluster contains only one route reflector, the cluster ID is the route reflector's router ID. For redundancy, a BGP cluster may contain two or more route reflectors. Assign a cluster ID with the `bgp cluster-id` command. Without a cluster ID, the route reflector cannot recognize route updates from the other route reflectors within the cluster.

The default format for displaying the cluster-id is dotted decimal, but if you enter the cluster-id as an integer, it is displayed as an integer.

This command automatically restarts the BGP instance for the configuration to take effect.

Related Commands

- bgp client-to-client reflection — enable route reflection between the route reflector and clients.
- neighbor route-reflector-client — configure a route reflector and clients.
- show ip bgp cluster-list — view paths with a cluster ID.

bgp confederation identifier

Configure an identifier for a BGP confederation.

Syntax

`bgp confederation identifier` *`as-number`*

To delete a BGP confederation identifier, use the `no bgp confederation identifier as-number` command.

Parameters

as-number	Enter the AS number. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series. Added support for the 4-byte format

Usage Information

To accept 4-byte formats before entering a 4-byte AS number, configure your system. All the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

The autonomous systems configured in this command are visible to the EBGP neighbors. Each autonomous system is fully meshed and contains a few connections to other autonomous systems. The next hop, MED, and local preference information is preserved throughout the confederation.

Dell EMC Networking OS accepts confederation EBGP peers without a LOCAL_PREF attribute. The software sends AS_CONFED_SET and accepts AS_CONFED_SET and AS_CONF_SEQ.

If a local-as is configured, BGP does not allow for the configuration of BGP confederation. Similarly, if BGP confederation is configured, then BGP does not allow the configuration of local-as.

If the neighbor is an eBGP neighbor, then BGP performs a check on the first AS number. In this scenario, it is mandatory that the first sequence in the AS path is of type AS_SEQUENCE or AS_CONFED_SEQUENCE (in the case of confederations). If the first entry appears as an AS_CONFED_SET and the neighbor is not in the local AS, then this is strictly a problem with the neighbor node.

This command automatically restarts the BGP instance for the configuration to take effect.

Related Commands

- bgp four-octet-as-support — enable 4-byte support for the BGP process.

bgp confederation peers

Specify the autonomous systems (ASs) that belong to the BGP confederation.

Syntax

```
bgp confederation peers as-number [...as-number]
```

To return to the default, use the `no bgp confederation peers` command.

Parameters

as-number	Enter the AS number. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).
...as-number	(OPTIONAL) Enter up to 16 confederation numbers. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series. Added support for the 4-byte format.

Usage Information

All the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

The autonomous systems configured in this command are visible to the EBGP neighbors. Each autonomous system is fully meshed and contains a few connections to other autonomous systems.

After specifying autonomous systems numbers for the BGP confederation, recycle the peers to update their configuration.

Related Commands

- bgp confederation identifier — configure a confederation ID.
- bgp four-octet-as-support — enable 4-byte support for the BGP process.

bgp dampening

Enable BGP route dampening and configure the dampening parameters.

Syntax

```
bgp dampening [half-life reuse suppress max-suppress-time] [route-map map-name]
```

To disable route dampening, use the `no bgp dampening [half-life reuse suppress max-suppress-time] [route-map map-name]` command.

Parameters

half-life	(OPTIONAL) Enter the number of minutes after which the Penalty is decreased. After the router assigns a Penalty of 1024 to a route, the Penalty is decreased by half after the half-life period expires. The range is from 1 to 45. The default is **15 minutes**.
reuse	(OPTIONAL) Enter a number as the reuse value, which is compared to the flapping route's Penalty value. If the Penalty value is less than the reuse value, the flapping route is once again advertised (or no longer suppressed). The range is from 1 to 20000. The default is **750**.
suppress	(OPTIONAL) Enter a number as the suppress value, which is compared to the flapping route's Penalty value. If the Penalty value is greater than the suppress value, the flapping route is no longer advertised (that is, it is suppressed). The range is from 1 to 20000. The default is **2000**.
max-suppress-time	(OPTIONAL) Enter the maximum number of minutes a route can be suppressed. The default is four times the half-life value. The range is from 1 to 255. The default is **60 minutes**.

	route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of a configured route map. Only `match` commands in the configured route map are supported.

Defaults Disabled.

Command Modes
- ROUTER BGP
- ROUTER BGP-address-family

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information If you enter the `bgp dampening` command, the default values for *`half-life`*, *`reuse`*, *`suppress`*, and *`max-suppress-time`* are applied. The parameters are position-dependent; therefore, if you configure one parameter, configure the parameters in the order they appear in the CLI.

Route refresh is sent when you enable BGP dampening.

Related Commands
- show ip bgp dampened-paths — view the BGP paths.

bgp default local-preference

Change the default local preference value for routes exchanged between internal BGP peers.

Syntax `bgp default local-preference value`

To return to the default value, use the `no bgp default local-preference` command.

Parameters	***value***	Enter a number to assign to routes as the degree of preference for those routes. When routes are compared, the higher the degree of preference or local preference value, the more the route is preferred. The range is from 0 to 4294967295. The default is **100**.

Defaults **100**

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

All routers apply the `bgp default local-preference` command setting within the AS. To set the local preference for a specific route, use the `set local-preference` command in ROUTE-MAP mode.

Related Commands

- set local-preference — assign a local preference value for a specific route.

bgp dmzlink-bw

Enables BGP Link Bandwidth.

Syntax

`bgp dmzlink-bw`

To disable BGP Link Bandwidth, enter the `no bgp dmzlink-bw` command.

Parameters

dmzlink-bw	Enter the keyword `dmzlink-bw` to enable BGP Link Bandwidth in BGP multipath.

Defaults

N/A

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.
9.2(1.0)	Introduced on the Z9500.

Usage Information

Configuring or un-configuring the command brings down and brings up the BGP Route Manager, this results in tear down and re-establishment of all active sessions.

Link Bandwidth has to be configured on the router to tell it to associate Link Bandwidth with prefixes (paths) and/or to use Link Bandwidth in BGP Multipath route selection.

This is done under BGP configuration and is supported per address family – for IPv4 and IPv6 address families.

The configuration for a particular address family applies across all VRFs configured.

This command must be performed on the router which is attaching link bandwidth to prefixes (typically a border router) as well as the router which is expected to load share traffic proportional to the bandwidth of the external links.

bgp enforce-first-as

Disable (or enable) enforce-first-as check for updates received from EBGP peers.

Syntax

```
bgp enforce-first-as
```

To turn off the default, use the `no bgp enforce-first-as` command.

Defaults

Enabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information

This command is enabled by default, that is for all updates received from EBGP peers, BGP ensures that the first AS of the first AS segment is always the AS of the peer. If not, the update is dropped and a counter is increments. Use the `show ip bgp neighbors` command to view the "failed enforce-first-as check" counter.

If you disable the `enforce-first-as` command, it can be viewed using the `show ip protocols` command.

In the event of an enfore-first-as check failure, the existing BGP session is flapped.

Related Commands

- show ip bgp neighbors — view the information the BGP neighbors exchange.
- show ip protocols — view information on routing protocols.

bgp fast-external-fallover

Enable the fast external fallover feature, which immediately resets the BGP session if a link to a directly connected external peer fails.

Syntax

`bgp fast-external-fallover`

To disable fast external fallover, use the `no bgp fast-external-fallover` command.

Defaults

Enabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The `bgp fast-external-fallover` command appears in the `show config` command output.

The fast external fallover configuration is applied only after you manually reset all the existing BGP sessions. As a result, after you execute this command, you must also manually execute the `clear ip bgp` command in order for the configuration to take effect.

bgp four-octet-as-support

Enable 4-byte support for the BGP process.

Syntax

`bgp four-octet-as-support`

To disable fast external failover, use the `no bgp four-octet-as-support` command.

Defaults

Disabled (supports 2–byte format)

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

Routers supporting 4-byte ASNs advertise that function in the OPEN message. The behavior of a 4-byte router is slightly different depending on whether it is speaking to a 2-byte router or a 4-byte router.

When creating Confederations, all the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

Where the 2-byte format is from 1 to 65535, the 4-byte format is from 1 to 4294967295. Both formats are accepted and the advertisements reflect the entered format.

For more information about using the 2 byte or 4-byte format, refer to the *Dell EMC Networking OS Configuration Guide*.

This command automatically restarts the BGP instance for the configuration to take effect.

bgp graceful-restart

To support graceful restart as a receiver only, enable graceful restart on a BGP neighbor, a BGP node, or designate a local router.

Syntax

`bgp graceful-restart [restart-time seconds] [stale-path-time seconds] [role receiver-only]`

To return to the default, use the `no bgp graceful-restart` command.

Parameters

restart-time *seconds*	Enter the keyword `restart-time` then the maximum number of seconds to restart and bring-up all the peers. The range is from 1 to 3600 seconds. The default is **120 seconds**.
stale-path-time *seconds*	Enter the keyword `stale-path-time` then the maximum number of seconds to wait before restarting a peer's stale paths. The default is **360 seconds**.
role receiver-only	Enter the keyword `role receiver-only` to designate the local router to support graceful restart as a receiver only.

Defaults as above

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

This feature is advertised to BGP neighbors through a capability advertisement. In Receiver Only mode, BGP saves the advertised routes of peers that support this capability when they restart.

BGP graceful restart is active only when the neighbor becomes established. Otherwise it is disabled. Graceful-restart applies to all neighbors with established adjacency.

This command automatically restarts the BGP instance for the configuration to take effect.

bgp non-deterministic-med

Compare MEDs of paths from different autonomous systems.

Syntax

```
bgp non-deterministic-med
```

To return to the default, use the `no bgp non-deterministic-med` command.

Defaults

Disabled (that is, paths/routes for the same destination but from different ASs do not have their MEDs compared).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

In Non-Deterministic mode, paths are compared in the order in which they arrive. This method can lead to Dell EMC Networking OS choosing different best paths from a set of paths, depending on the order in which they are received from the neighbors because MED may or may not get compared between adjacent paths. In Deterministic mode (`no bgp non-deterministic-med`), Dell EMC Networking OS compares MED between adjacent paths within an AS group because all paths in the AS group are from the same AS.

When you change the path selection from Deterministic to Non-Deterministic, the path selection for the existing paths remains Deterministic until you enter the `clear ip bgp` command to clear existing paths.

bgp outbound-optimization

Enables outbound optimization for IBGP peer-group members.

Syntax

```
bgp outbound-optimization
```

To disable outbound optimization, enter the `no bgp outbound-optimization` command.

Defaults Enabled.

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.4.(0.0)	Introduced on the S4810.
9.2(1.0)	Introduced on the Z9500.

Usage Information

The updates are sent to all the neighbors in the peer-group and all the neighbors have the same attributes including next-hop.

Enabling or disabling outbound optimization dynamically resets all neighbor sessions.

When you enable outbound optimization, all peers receive the same update packets. Also, the next-hop address, which is chosen as one of the addresses of the neighbor's reachable interface, is the same for all peers.

bgp recursive-bgp-next-hop

Enable next-hop resolution through other routes learned by BGP.

Syntax

```
bgp recursive-bgp-next-hop
```

To disable next-hop resolution, use the `no bgp recursive-bgp-next-hop` command.

Defaults Enabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.2.1.0	Introduced.

Usage Information This command is a *knob* to disable BGP next-hop resolution using BGP learned routes. During the next-hop resolution, only the first route that the next-hop resolves through is verified for the route's protocol source and is checked if the route is learned from BGP or not.

The `clear ip bgp` command is required for this command to take effect and to keep the BGP database consistent. Execute the `clear ip bgp` command right after executing this command.

Related Commands

- clear ip bgp — clear the ip bgp.

bgp regex-eval-optz-disable

Disables the Regex Performance engine that optimizes complex regular expression with BGP.

Syntax `bgp regex-eval-optz-disable`

To re-enable optimization engine, use the `no bgp regex-eval-optz-disable` command.

Defaults Enabled

Command Modes ROUTER BGP (conf-router_bgp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced

Usage Information

BGP uses regular expressions (regex) to filter route information. In particular, the use of regular expressions to filter routes based on AS-PATHs and communities is common. In a large-scale configuration, filtering millions of routes based on regular expressions can be quite CPU intensive, as a regular expression evaluation involves generation and evaluation of complex finite state machines.

BGP policies, containing regular expressions to match as-path and communities, tend to use much CPU processing time, which in turn affects the BGP routing convergence. Additionally, the `show bgp` commands, which are filtered through regular expressions, use up CPU cycles particularly with large databases. The Regex Engine Performance Enhancement feature optimizes the CPU usage by caching and reusing regular expression evaluation results. This caching and reuse may be at the expensive of RP1 processor memory.

Examples

```
DellEMC(conf-router_bgp)# no bgp regex-eval-optz-disable
DellEMC(conf-router_bgp)# do show ip protocols
Routing Protocol is "ospf 22222"
  Router ID is 2.2.2.2
  Area              Routing for Networks
  51                10.10.10.0/00

Routing Protocol is "bgp 1"
  Cluster Id is set to 10.10.10.0
  Router Id is set to 10.10.10.0
  Fast-external-fallover enabled
Regular expression evaluation optimization enabled
  Capable of ROUTE_REFRESH
  For Address Family IPv4 Unicast
    BGP table version is 0, main routing table version 0
    Distance: external 20 internal 200 local 200

DellEMC(conf-router_bgp)#
```

Related Commands

- show ip protocols — view information on all routing protocols enabled and active on the E-Series.

bgp router-id

Assign a user-given ID to a BGP router.

Syntax

```
bgp router-id ip-address
```

To delete a user-assigned IP address, use the `no bgp router-id` command.

Parameters

ip-address Enter an IP address in dotted decimal format to reset only that BGP neighbor.

Defaults

The router ID is the highest IP address of the Loopback interface or, if no Loopback interfaces are configured, the highest IP address of a physical interface on the router.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

Peering sessions are reset when you change the router ID of a BGP router.

This command automatically restarts the BGP instance for the configuration to take effect.

clear ip bgp

Reset BGP sessions. The soft parameter (BGP Soft Reconfiguration) clears the policies without resetting the TCP connection.

Syntax

```
clear ip bgp [vrf vrf-name] [* | <1-4294967295> | <0.1-65535.65535> |
A.B.C.D {soft {in | out}} | X:X:X:X::X {soft {in | out}} | dampening |
flap-statistics | ipv4 | ipv6 | peer-group]
```

Parameters

`*` Enter an asterisk (*) to reset all BGP sessions.

<1-4294967295> Enter <1-4294967295> to clear peers with the AS number.

<0.1-65535.65535>	Enter <0.1-65535.65535> to clear peers with the AS number in dot format.
A.B.C.D	Enter the BGP neighbor address in the A.B.C.D format to clear.
X:X:X:X::X	Enter the BGP neighbor address in the X:X:X:X::X format to clear.
soft	(OPTIONAL) Enter the keyword `soft` to configure and activate policies without resetting the BGP TCP session, that is, BGP Soft Reconfiguration. **NOTE:** If you enter the `clear ip bgp ip-address soft` command, both inbound and outbound policies are reset.
in	(OPTIONAL) Enter the keyword `in` to activate only inbound policies.
out	(OPTIONAL) Enter the keyword `out` to activate only outbound policies. **NOTE:** You must execute the `clear ip bgp soft out` command when ever there is a change in the local policy. If you do not run this command after a local policy change, then these policy changes are not reflected in the responses to the peer's route refresh messages.
dampening	Enter the keyword `dampening` to clear the flap dampening information.
flap-statistics	Enter the keywords `flap-statistics` to clear the flap statistics information.
ipv4	Enter the ipv4 address family to clear.
ipv6	Enter the ipv6 address family to clear.
peer-group	Enter the peer-group to clear all members of the peer-group.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
6.5.1.0	Expanded to include the `as-number` option.

Related Commands

- bgp recursive-bgp-next-hop — disable next-hop resolution through other routes learned by the BGP.

clear ip bgp dampening

Clear information on route dampening and return the suppressed route to the Active state.

Syntax

```
clear ip bgp [vrf vrf-name] [ipv4 [multicast | unicast] | ipv6 unicast]
[dampening [ipv4-address mask | ipv6-address mask]
```

Parameters

ipv4-address mask	(OPTIONAL) Enter an IPv4 address in dotted decimal format and the prefix mask in slash format (`/x`) to clear dampening information only that BGP neighbor.
ipv6–address mask	(OPTIONAL) Enter the IPv6 address and the network mask to clear information on IPv6 route dampening.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

After you enter this command, the software deletes the history routes and returns the suppressed routes to the Active state.

The `clear ip bgp dampening` command does not clear the history paths.

clear ip bgp flap-statistics

Clear BGP flap statistics, which includes number of flaps and the time of the last flap.

Syntax

```
clear ip bgp [vrf vrf-name] [ipv4 [multicast | unicast] | ipv6 unicast]
[flap-statistics [ipv4-address mask | ipv6-address mask] | filter-list as-
path-name | regexp regular-expression]
```

Parameters

ipv4-address mask	(OPTIONAL) Enter an IPv4 address in dotted decimal format and the prefix mask in slash format (/x) to reset only that prefix.
ipv6–address mask	(OPTIONAL) Enter the IPv6 address followed by the network mask to reset only that prefix.
filter-list *as-path-name*	(OPTIONAL) Enter the keywords `filter-list` then the name of a configured AS-PATH list.
regexp *regular-expression*	(OPTIONAL) Enter the keyword `regexp` then regular expressions. Use one or a combination of the following: • `.` = (period) any single character (including a white space). • `*` = (asterisk) the sequences in a pattern (0 or more sequences). • `+` = (plus) the sequences in a pattern (1 or more sequences). • `?` = (question mark) sequences in a pattern (either 0 or 1 sequences). **NOTE:** Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression. • `[ ]` = (brackets) a range of single-character patterns. • `( )` = (parenthesis) groups a series of pattern elements to a single element. • `{ }` = (braces) minimum and the maximum match count. • `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified. • `$` = (dollar sign) the end of the output string.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

If you enter the `clear ip bgp flap-statistics` command without any parameters, all statistics are cleared.

Related Commands

- show debugging — view the enabled debugging operations.
- show ip bgp flap-statistics — view the BGP flap statistics.
- undebug all — disable all debugging operations.

clear ip bgp peer-group

Reset a peer-group's BGP sessions.

Syntax

```
clear ip bgp [vrf vrf-name] peer-group peer-group-name [ipv4 [multicast | unicast] | ipv6 unicast] [soft {in | out}]
```

Parameters

peer-group-name	Enter the peer group name to reset the BGP sessions within that peer group.
ipv4 multicast	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to reset ipv4 multicast routes.
ipv4 unicast	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to reset ipv4 unicast routes.
ipv6 unicast	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to reset ipv6 unicast routes.
soft	(OPTIONAL) Enter the keyword `soft` to reset soft configuration.
in	Enter the keyword in to re-configure soft inbound updates.
out	Enter the keyword out to re-configure soft outbound updates.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

debug ip bgp

Display all information on BGP, including BGP events, keepalives, notifications, and updates.

Syntax

`debug ip bgp [ vrf vrf-name | A.B.C.D | X:X:X:X::X | peer-group peer-group-name] [in | out]`

To disable all BGP debugging, use the `no debug ip bgp` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to debug BGP information corresponding to that VRF. **NOTE:** Use this attribute to debug BGP protocol operations corresponding to either a default or non-default VRF.
A.B.C.D	Enter the IPv4 address of the neighbor in dotted decimal format.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group *peer-group-name*	Enter the keywords `peer-group` then the name of the peer group to debug.
in	(OPTIONAL) Enter the keyword `in` to view only information on inbound BGP routes.
out	(OPTIONAL) Enter the keyword `out` to view only information on outbound BGP routes.
A.B.C.D	Enter the IP address of peer in the A.B.C.D format.
X:X:X:X::X	Enter the IPv6 IP address of peer in the X:X:X:X::X format.
dampening	Enter the keyword `dampening` to view BGP dampening.
events	Enter the keyword `events` to view BGP protocol events.
ipv4	Enter the ipv4 IP address to view the IPV4 route information.
ipv6	Enter the ipv6 IP address to view the IPV6 route information.
keepalives	Enter the keyword `keepalives` to view BGP keepalives.
notifications	Enter the keyword `notifications` to view BGP notifications.
soft-reconfiguration	Enter the keywords `soft-reconfiguration` to view only information on inbound BGP soft reconfiguration.
updates	Enter the keyword `updates` to view BGP updates.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.4.(0.0)	Added support for VRF.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To view information on both incoming and outgoing routes, do not include the `in` and `out` parameters in the debugging command. The `in` and `out` parameters cancel each other; for example, if you enter the `debug ip bgp in` command and then enter the `debug ip bgp out` command, you do not see information on the incoming routes.

Entering a `no debug ip bgp` command removes all configured debug commands for BGP.

Related Commands

- debug ip bgp events — view information about BGP events.
- debug ip bgp keepalives — view information about BGP keepalives.
- debug ip bgp notifications — view information about BGP notifications.
- debug ip bgp updates — view information about BGP updates.
- show debugging — view enabled debugging operations.

debug ip bgp dampening

View information on routes being dampened.

Syntax

```
debug ip bgp [vrf vrf-name] [ipv4 {unicast | multicast} | ipv6 unicast]
dampening
```

To disable debugging, use the `no debug ip bgp dampening` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on dampened routes corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view dampened-route information related only to ipv4 multicast routes.
ipv4 unicast	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view dampened-route information related only to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view dampened-route information related only to ipv6 unicast routes.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced IPv6 MGBP support for the E-Series.

debug ip bgp events

Display information on local BGP state changes and other BGP events.

Syntax

`debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] events [in | out]`

To disable debugging, use the `no debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] events [in | out]` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to display BGP state changes corresponding to that VRF.
A.B.C.D	(OPTIONAL) Enter the IPv4 address of the neighbor.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view only events on inbound BGP messages.
out	(OPTIONAL) Enter the keyword `out` to view only events on outbound BGP messages.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp keepalives

Display information about BGP keepalive messages.

Syntax `debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] keepalives [in | out]`

To disable debugging, use the `no debug ip bgp [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] keepalives [in | out]` command.

Parameters

A.B.C.D	(OPTIONAL) Enter the IPv4 address of the neighbor.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view only inbound keepalive messages.
out	(OPTIONAL) Enter the keyword `out` to view only outbound keepalive messages.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp notifications

Allows you to view information about BGP notifications received from neighbors.

Syntax

```
debug ip bgp [A.B.C.D | X:X:X:X::X | peer-group peer-group-name]
notifications [in | out]
```

To disable debugging, use the `no debug ip bgp [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] notifications [in | out]` command.

Parameters

A.B.C.D	(OPTIONAL) Enter the IPv4 address of the neighbor.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view BGP notifications received from neighbors.
out	(OPTIONAL) Enter the keyword `out` to view BGP notifications sent to neighbors

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added ipv6 support.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp soft-reconfiguration

Enable soft-reconfiguration debug.

Syntax `debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group-name] soft-reconfiguration`

To disable, use the `debug ip bgp [A.B.C.D | X:X:X:X::X | peer-group-name] soft-reconfiguration` command.

Parameters

A.B.C.D	(OPTIONAL) Enter the IPv4 address of the neighbor in dotted decimal format.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group-name	(OPTIONAL) Enter the name of the peer group to disable or enable all routers within the peer group..

Defaults Disabled

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.2.1.0	Introduced.

Usage Information This command turns on BGP soft-reconfiguration inbound debugging. If no neighbor is specified, debug turns on for all neighbors.

debug ip bgp updates

Allows you to view information about BGP updates.

Syntax

```
debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] updates [in | out | prefix-list prefix-list-name]
```

To disable debugging, use the `no debug ip bgp [vrf vrf-name] [A.B.C.D | X:X:X:X::X | peer-group peer-group-name] updates [in | out | prefix-list prefix-list-name]` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to view BGP updates information corresponding to that VRF.
A.B.C.D	(OPTIONAL) Enter an IPv4 address of the neighbor.
X:X:X:X::X	(OPTIONAL) Enter an IPv6 address.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` followed by the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view only BGP updates received from neighbors.
out	(OPTIONAL) Enter the keyword `out` to view only BGP updates sent to neighbors.
prefix-list *prefix-list-name*	(OPTIONAL) Enter the keyword `prefix-list` then the name of an established prefix list. If the prefix list is not configured, the default is **permit** (to allow all routes).
ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group to disable or enable all routers within the peer group.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

default-metric

Allows you to change the metric of redistributed routes to locally originated routes. Use this command with the `redistribute` command.

Syntax `default-metric` *number*

To return to the default setting, use the `no default-metric` command.

Parameters

number	Enter a number as the metric to be assigned to routes from other protocols. The range is from 1 to 4294967295.

Defaults **0**

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The `default-metric` command in BGP sets the value of the BGP MULTI_EXIT_DISC (MED) attribute for redistributed routes only.

Related Commands

- bgp always-compare-med — enable comparison of all BGP MED attributes.
- redistribute — redistribute routes from other routing protocols into BGP.

deny bandwidth

Enables you to specify link band width extended-community attribute as the matching criteria to deny incoming or outgoing traffic.

Syntax

```
deny bandwidth
```

To disable this setting, enter the `no deny bandwidth` command.

Parameters

bandwidth	Enter the keyword bandwidth to specify extended-community attribute as the matching criteria for denying traffic. The range is from 0 to 102400.

Defaults N/A

Command Modes EXTENDED COMMUNITY LIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series and Z9500.

Related Commands

- permit bandwidth – specify link band width extended-community attribute as the matching criteria to permitting incoming or outgoing traffic.

description

Enter a description of the BGP routing protocol.

Syntax

```
description {description}
```

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the BGP protocol (80 characters maximum).

Defaults none

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
pre-7.7.1.0	Introduced.

Related Commands
- router bgp — enter ROUTER mode on the switch.

maximum-paths

Configure the maximum number of parallel routes (multipath support) BGP supports.

Syntax `maximum-paths {ebgp | ibgp} number`

To return to the default values, enter the `no maximum-paths` command.

Parameters

ebgp	Enter the keyword `ebgp` to enable multipath support for External BGP routes.
ibgp	Enter the keyword `ibgp` to enable multipath support for Internal BGP routes.
number	Enter a number as the maximum number of parallel paths.

Defaults none

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Support from 2 to 64 paths on the S4810. Command syntax changed to `max-path` (was maximum-paths).
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information If you enable this command, use the `clear ip bgp *` command to recompute the best path.

neighbor activate

This command allows the specified neighbor/peer group to be enabled for the current AFI/SAFI (Address Family Identifier/ Subsequent Address Family Identifier).

Syntax `neighbor [ip-address | peer-group-name] activate`

To disable, use the `no neighbor [ip-address | peer-group-name] activate` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group.
activate	Enter the keyword `activate` to enable the neighbor/peer group in the new AFI/ SAFI.

Defaults IPv4 Unicast – Enabled.

IPv6 Unicast – Disabled.

Command Modes CONFIGURATION-ROUTER-BGP-ADDRESS FAMILY

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

By default, when you create a neighbor/peer group configuration in the Router BGP context, this enables IPv4/Unicast AFI/SAFI. When you use `activate` in the new context, the neighbor/peer group enables for AFI/SAFI. It is possible to activate or de-activate a peer from the IPv4/IPv6 unicast address family.

NOTE: The `no neighbor peer ip-address activate` command takes precedence over the `no neighbor peer-group-name activate` command.

The following tables list the neighbor activation and its expected results for IPv4 and IPv6 address families:

Table 1. Neighbor activation and update status for peers activated for IPv4 address family

S.No	Peer – IPv4 address family	Peer group	Update status for IPv4 prefixes
1.	Activate	Activate	Send Updates
2.	Activate	No-Activate	Send Updates
3.	No-Activate	Activate	Stop Updates
4.	No-Activate	No-Activate	Stop Updates

Table 2. Neighbor activation and update status for peers activated for IPv6 unicast address family

S.No	Peer– IPv6 unicast address family	Peer group	Update status for IPv6 prefixes
1.	Activate	Activate	Send Updates
2.	Activate	No-Activate	Send Updates
3.	No-Activate	Activate	Send Updates
4.	No-Activate	No-Activate	Stop Updates

neighbor add-path

This command allows the specified neighbor/peer group to send/receive multiple path advertisements.

Syntax

```
neighbor [ip-address | peer-group-name] add-path [send | receive | both]
path-count
```

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group.
send	Enter the keyword `send` to indicate that the system sends multiple paths to peers.
receive	Enter the keyword `receive` to indicate that the system accepts multiple paths from peers.
both	Enter the keyword `both` to indicate that the system sends and accepts multiple paths from peers.
path-count	Enter the number paths supported. The range is from 2 to 64.

Defaults none

Command Modes CONFIGURATION-ROUTER-BGP-ADDRESS FAMILY

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Related Commands

- bgp add-path — allow the advertisement of multiple paths for the same address prefix without the new paths implicitly replacing any previous ones.

neighbor advertisement-interval

Set the advertisement interval between BGP neighbors or within a BGP peer group.

Syntax `neighbor {ip-address | peer-group-name} advertisement-interval seconds`

To return to the default value, use the `no neighbor {ip-address | peer-group-name} advertisement-interval` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
seconds	Enter a number as the time interval, in seconds, between BGP advertisements. The range is from 0 to 600 seconds. The default is **5 seconds** for internal BGP peers and **30 seconds** for external BGP peers.

Defaults
- seconds = **5 seconds** (internal peers)
- seconds = **30 seconds** (external peers)

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

neighbor advertisement-start

To send BGP routing updates, set the minimum interval before starting.

Syntax `neighbor {ip-address} advertisement-start seconds`

To return to the default value, use the `no neighbor {ip-address} advertisement-start` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
seconds	Enter a number as the time interval, in seconds, before BGP route updates are sent. The range is from 0 to 3600 seconds.

Defaults none

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

neighbor allowas-in

Set the number of times an AS number can occur in the AS path.

Syntax `neighbor {ip-address | peer-group-name} allowas-in number`

To return to the default value, use the `no neighbor {ip-address | peer-group-name} allowas-in` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
number	Enter a number of times to allow this neighbor ID to use the AS path. The range is from 1 to 10.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

Related Commands

- bgp four-octet-as-support — enable 4-byte support for the BGP process.

neighbor default-originate

Inject the default route to a BGP peer or neighbor.

Syntax

`neighbor {ip-address | peer-group-name} default-originate [route-map map-name]`

To remove a default route, use the `no neighbor {ip-address | peer-group-name} default-originate` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the default route of all routers in that peer group.
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of a configured route map.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Version	Description
7.7.1.0	Introduced on the C-Series.

Usage Information

If you apply a route map to a BGP peer or neighbor with the `neighbor default-originate` command configured, the software does not apply the set filters in the route map to that BGP peer or neighbor.

When you configure a route-map for a BGP peer or peer group with the `neighbor default-originate` command, the command checks for the existence of the route in BGP RIB.

Route-map configuration on a BGP peer or peer group works only when the LOC-RIB contains at least one route.

When you apply a default route to a BGP peer or peer group using the `neighbor default-originate` command, changes to the configured default route-map are applied to the BGP peer or peer group only after a delay of 15 seconds. As a result, you must wait for a period of 15 seconds before manually resetting BGP using the `clear ip bgp` command.

In case of eBGP, the `neighbor default-originate` command does not support *extended-community* as a non-transtive route-map attribute.

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

In order that settings corresponding to the `neighbor default-originate` command take effect, you must execute the `clear ip bgp` command immediately after you execute the `neighbor default-originate` command.

neighbor description

Assign a character string describing the neighbor or group of neighbors (peer group).

Syntax

`neighbor {`*`ip-address`* `|` *`peer-group-name`*`} description` *`text`*

To delete a description, use the `no neighbor {`*`ip-address`* `|` *`peer-group-name`*`} description` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
text	Enter a continuous text string up to 80 characters.

Defaults Not configured.

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

neighbor distribute-list

Distribute BGP information via an established prefix list.

Syntax

`neighbor {`*`ip-address`* `|` *`peer-group-name`*`} distribute-list` *`prefix-list-name`* `{in | out}`

To delete a neighbor distribution list, use the `no neighbor {`*`ip-address`* `|` *`peer-group-name`*`} distribute-list` *`prefix-list-name`* `{in | out}` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to apply the distribute list filter to all routers in the peer group.
prefix-list-name	Enter the name of an established prefix list. If the prefix list is not configured, the default is **permit** (to allow all routes).
in	Enter the keyword `in` to distribute only inbound traffic.
out	Enter the keyword `out` to distribute only outbound traffic.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information Other BGP filtering commands include: `neighbor filter-list`, `ip as-path access-list`, and `neighbor route-map`.

Related Commands
- neighbor route-map — assign a route map to a neighbor or peer group.

neighbor ebgp-multihop

Attempt and accept BGP connections to external peers on networks that are not directly connected.

Syntax `neighbor {ip-address | peer-group-name} ebgp-multihop [ttl]`

To disallow and disconnect connections, use the `no neighbor {ip-address | peer-group-name} ebgp-multihop` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
ttl	(OPTIONAL) Enter the number of hops as the Time to Live (ttl) value. The range is from 1 to 255. The default is **255**.

Defaults Disabled.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information To prevent loops, the `neighbor ebgp-multihop` command does not install the default routes of the multihop peer. Networks not directly connected are not considered valid for best-path selection.

neighbor fall-over

Enable or disable fast fall-over for BGP neighbors.

Syntax

`neighbor {ipv4-address | peer-group-name} fall-over`

To disable, use the `no neighbor {ipv4-address | peer-group-name} fall-over` command.

Parameters

ipv4-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.

Defaults

Disabled.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048–ON and S4048–ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.4.1.0	Introduced

Usage Information

When you enable failover, BGP keeps track of IP or IPv6 ability to reach the peer remote address and the peer local address. Whenever either address becomes unreachable (for example, no active route exists in the routing table for the peer IP or IPv6 destination/local address), BGP brings down the session with the peer.

Related Commands

- show ip bgp neighbors — display information on the BGP neighbors.

neighbor local-as

To accept external routes from neighbors with a local AS number in the AS number path, configure Internal BGP (IBGP) routers.

Syntax

`neighbor {ip-address | peer-group-name} local-as as-number [no-prepend]`

To return to the default value, use the `no neighbor {ip-address | peer-group-name} local-as` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
as-number	Enter the AS number to reset all neighbors belonging to that AS. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte) or from 0.1 to 65535.65535 (dotted format).
no prepend	Specifies that local AS values do not prepend to announcements from the neighbor.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information If a local-as is configured, BGP does not allow for the configuration of BGP confederation. Similarly, if BGP confederation is configured, then BGP does not allow the configuration of local-as.

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

- bgp four-octet-as-support — enable 4-byte support for the BGP process.

neighbor maximum-prefix

Control the number of network prefixes received.

Syntax `neighbor {ip-address | peer-group-name} maximum-prefix maximum [threshold] [warning-only]`

To return to the default values, use the `no neighbor {ip-address | peer-group-name} maximum-prefix maximum` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.

peer-group-name	Enter the name of the peer group.
maximum	Enter a number as the maximum number of prefixes allowed for this BGP router. The range is from 1 to 4294967295.
threshold	(OPTIONAL) Enter a number to be used as a percentage of the maximum value. When the number of prefixes reaches this percentage of the maximum value, the E-Series software sends a message. The range is from 1 to 100 percent. The default is **75**.
warning-only	(OPTIONAL) Enter the keyword `warning-only` to set the router to send a log message when the maximum value is reached. If this parameter is not set, the router stops peering when the maximum number of prefixes is reached. **NOTE:** When you set this option, the router accepts BGP prefixes only until the maximum configured value. After the maximum number is reached, the router drops any additional prefixes that it receives.

Defaults threshold = **75**

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information If you configure the `neighbor maximum-prefix` command and the neighbor receives more prefixes than the `neighbor maximum-prefix` command configuration allows, the neighbor goes down and the `show ip bgp summary` command displays (prfxd) in the State/PfxRcd column for that neighbor. The neighbor remains down until you enter the `clear ip bgp` command for the neighbor or the peer group to which the neighbor belongs or you enter the `neighbor shutdown` and `neighbor no shutdown` commands.

Related Commands

- show ip bgp summary — display the current BGP configuration.

neighbor password

Enable message digest 5 (MD5) authentication on the TCP connection between two neighbors.

Syntax

`neighbor {ip-address | peer-group-name} password [encryption-type] password`

To delete a password, use the `no neighbor {ip-address | peer-group-name} password` command.

Parameters

ip-address	Enter the IP address of the router to be included in the peer group.
peer-group-name	Enter the name of a configured peer group.
encryption-type	(OPTIONAL) Enter `7` as the encryption type for the password entered. `7` means that the password is encrypted and hidden.
password	Enter a text string up to 80 characters long. The first character of the password must be a letter. You cannot use spaces in the password.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

This command automatically restarts the neighbor session for the configuration to take effect.

Configure the same password on both BGP peers or a connection does not occur. When you configure MD5 authentication between two BGP peers, each segment of the TCP connection between them is verified and the MD5 digest is checked on every segment sent on the TCP connection.

Configuring a password for a neighbor causes an existing session to be torn down and a new one established.

If you specify a BGP peer group by using the `peer-group-name` parameter, all the members of the peer group inherit the characteristic configured with this command.

If you configure a password on one neighbor, but you have not configured a password for the neighboring router, the following message appears on the console while the routers attempt to establish a BGP session between them:

```
%RPM0-P:RP1 %KERN-6-INT: No BGP MD5 from [peer's IP address]
:179 to [local router's IP address]:65524
```

Also, if you configure different passwords on the two routers, the following message appears on the console:

```
%RPM0-P:RP1 %KERN-6-INT: BGP MD5 password mismatch from
[peer's IP address] : 11502 to [local router's IP address] :179
```

neighbor peer-group (assigning peers)

Allows you to assign one peer to an existing peer group.

Syntax

`neighbor {`*`ip-address`* `| peer-group` *`peer-group-name`*`} dmzlink-bw`

To delete a peer from a peer group, use the `no neighbor {`*`ip-address`* `| peer-group` *`peer-group-name`*`}` command.

To disable dmzlink-dw for the peer group, use the `no neighbor` *`ip-address`* `dmzlink-dw` command.

Parameters

ip-address	Enter the IP address of the router to be included in the peer group.
peer-group-name	Enter the name of a configured peer group.
dmzlink-bw	Enter the keyword `dmzlink-bw` to attach a link bandwidth to received routes. **NOTE:** If dmzlink-bw is configured for a peer, in order for the BGP peer to advertise the prefixes with dmzlink-bw attached to it, you must reset the the peer or peer-group using the `clear ip bgp` *`session`* command.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the dmzlink-bw parameter.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

You can assign up to 256 peers to one peer group.

When you add a peer to a peer group, it inherits all the peer group's configured parameters. A peer cannot become part of a peer group if any of the following commands are configured on the peer:

- neighbor advertisement-interval
- neighbor distribute-list
- neighbor route-map
- neighbor route-reflector-client

if a neighbor's configuration is more specific than its peer group's configuration, the neighbor may retain its configuration after it is added to the peer group. The neighbor's configuration does not affect outgoing updates.

A peer group must exist (be enabled) before you add a peer to it. If the peer group is disabled (shutdown), the peers within that group are also disabled (shutdown).

In BGP, you cannot associate a peer to a peer-group without configuring the remote-as for Internal BGP (IBGP) or External BGP (EBGP).

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

- clear ip bgp — reset BGP sessions.
- neighbor peer-group (creating group) — create a peer group.
- show ip bgp peer-group — view BGP peers.
- show ip bgp neighbors — view BGP neighbors configurations.

neighbor peer-group (creating group)

Allows you to create a peer group and assign it a name.

Syntax

`neighbor peer-group-name peer-group`

To delete a peer group, use the `no neighbor peer-group-name peer-group` command.

Parameters

peer-group-name Enter a text string up to 16 characters long as the name of the peer group.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information When you create a peer group, it is disabled (Shut mode).

Related Commands

- neighbor peer-group (assigning peers) — assign routers to a peer group.
- neighbor remote-as — assign a indirectly connected AS to a neighbor or peer group.
- neighbor shutdown — disable a peer or peer group.

neighbor peer-group passive

Enable passive peering on a BGP peer group, that is, the peer group does not send an OPEN message, but responds to one.

Syntax `neighbor peer-group-name peer-group passive [ sessions]`

To delete a passive peer-group, use the `no neighbor peer-group-name peer-group passive` command.

Parameters

peer-group-name Enter a text string up to 16 characters long as the name of the peer group.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced the `limit` keyword on the S4810.

Version	Description
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

After you configure a peer group as passive, assign it a subnet using the `neighbor soft-reconfiguration inbound` command.

For passive eBGP limits, the Remote AS must be different from the AS for this neighbor.

Related Commands

- neighbor soft-reconfiguration inbound — assign a subnet to a dynamically configured BGP neighbor.
- neighbor remote-as — assign an indirectly connected AS to a neighbor or peer group.

neighbor remote-as

Create and specify the remote peer to the BGP neighbor.

Syntax

`neighbor {ip-address | peer-group-name} remote-as number`

To delete a remote AS entry, use the `no neighbor {ip-address | peer-group-name} remote-as number` command.

Parameters

ip-address	Enter the IP address of the neighbor to enter the remote AS in its routing table.
peer-group-name	Enter the name of the peer group to enter the remote AS into routing tables of all routers within the peer group.
number	Enter a number of the AS. The range is from 0 to 65535 (2 byte) or from 1 to 4294967295 (4 byte).

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series. Added 4-byte support.

Usage Information

To accept 4-byte formats before entering a 4 byte AS Number, configure your system. If the `number` parameter is the same as the AS number used in the `router bgp` command, the remote AS entry in the neighbor is considered an internal BGP peer entry.

This command creates a peer and the newly created peer is disabled (Shutdown).

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

- router bgp — enter ROUTER BGP mode and configures routes in an AS.
- bgp four-octet-as-support — enable 4-byte support for the BGP process.

neighbor remove-private-as

Remove private AS numbers from the AS-PATH of outgoing updates.

Syntax

```
neighbor {ip-address | peer-group-name} remove-private-as
```

To return to the default, use the `no neighbor {ip-address | peer-group-name} remove-private-as` command.

Parameters

ip-address	Enter the IP address of the neighbor to remove the private AS numbers.
peer-group-name	Enter the name of the peer group to remove the private AS numbers.

Defaults

Disabled (that is, private AS number are not removed).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series. Added 4-byte support.

Usage Information

Applies to EBGP neighbors only.

Configure your system to accept 4-byte formats before entering a 4 byte AS Number.

If the AS-PATH contains both public and private AS number or contains AS numbers of an EBGP neighbor, the private AS numbers are not removed.

If a confederation contains private AS numbers in its AS-PATH, the software removes the private AS numbers only if they follow the confederation numbers in the AS path.

Private AS numbers are from 64512 to 65535 (2 byte).

neighbor route-map

Apply an established route map to either incoming or outbound routes of a BGP neighbor or peer group.

Syntax

`neighbor {ip-address | peer-group-name} route-map map-name {in | out}`

To remove the route map, use the `no neighbor {ip-address | peer-group-name} route-map map-name {in | out}` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
map-name	Enter the name of an established route map. If the Route map is not configured, the default is **deny** (to drop all routes).
in	Enter the keyword `in` to filter inbound routes.
out	Enter the keyword `out` to filter outbound routes. **NOTE:** This command sends routes to peers only if an outbound policy is configured and if there is a change in the existing outbound policy.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

When you apply a route map to outbound routes, only routes that match at least one section of the route map are permitted.

If you identify a peer group by name, the peers in that peer group inherit the characteristics in the Route map used in this command. If you identify a peer by IP address, the Route map overwrites either the inbound or outbound policies on that peer.

neighbor route-reflector-client

Configure the router as a route reflector and the specified neighbors as members of the cluster.

Syntax

```
neighbor {ip-address | peer-group-name} route-reflector-client
```

To remove one or more neighbors from a cluster, use the `no neighbor {ip-address | peer-group-name} route-reflector-client` command. If you delete all members of a cluster, you also delete the route-reflector configuration on the router.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group. All routers in the peer group receive routes from a route reflector.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

A route reflector reflects routes to the neighbors assigned to the cluster. Neighbors in the cluster do not need not to be fully meshed. By default, when you use `no route reflector`, the internal BGP (IBGP) speakers in the network must be fully meshed.

The first time you enter this command, the router configures as a route reflector and the specified BGP neighbors configure as clients in the route-reflector cluster.

When you remove all clients of a route reflector using the `no neighbor route-reflector-client` command, the router no longer functions as a route reflector.

If the clients of a route reflector are fully meshed, you can configure the route reflector to not reflect routes to specified clients by using the `no bgp client-to-client reflection` command.

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

- bgp client-to-client reflection — enable route reflection between the route reflector and the clients.

neighbor send-community

Send a COMMUNITY attribute to a BGP neighbor or peer group. A COMMUNITY attribute indicates that all routes with that attribute belong to the same community grouping.

Syntax

`neighbor {ip-address | peer-group-name} send-community [extended | standard]`

To disable sending a COMMUNITY attribute, use the `no neighbor {ip-address | peer-group-name} send-community` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to send a COMMUNITY attribute to all routers within the peer group.
extended	(OPTIONAL) Enter the keyword `extended` to send extended community attribute.
standard	(OPTIONAL) Enter the keyword `standard` to send standard community attribute.

Defaults

Not configured and COMMUNITY attributes are not sent to neighbors.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To configure a COMMUNITY attribute, use the `set community` command in ROUTE-MAP mode.

In order that settings corresponding to the `neighbor send-community` command take effect, you must execute the `clear ip bgp` command immediately after you execute the `neighbor send-community` command.

If you do not set any of the optional parameters (standard or extended), then both standard as well as extended attributes are sent. If you set either the standard or extended parameter, only the attribute that is specified is sent.

neighbor shutdown

Disable a BGP neighbor or peer group.

Syntax

`neighbor {ip-address | peer-group-name} shutdown`

To enable a disabled neighbor or peer group, use the `neighbor {ip-address | peer-group-name}no shutdown` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable or enable all routers within the peer group.

Defaults

Enabled (that is, BGP neighbors and peer groups are disabled.)

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

Peers that are enabled within a peer group are disabled when their peer group is disabled.

The `neighbor shutdown` command terminates all BGP sessions on the BGP neighbor or BGP peer group. Use this command with caution as it terminates the specified BGP sessions. When a neighbor or peer group is shut down, use the `show ip bgp summary` command to confirm its status.

Related Commands

- show ip bgp summary — display the current BGP configuration.
- show ip bgp neighbors — display the current BGP neighbors.

neighbor soft-reconfiguration inbound

Enable soft-reconfiguration for BGP.

Syntax

`neighbor {ip-address | peer-group-name} soft-reconfiguration inbound`

To disable, use the `no neighbor {ip-address | peer-group-name} soft-reconfiguration inbound` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable or enable all routers within the peer group.

Defaults

Disabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information

This command enables soft-reconfiguration for the BGP neighbor specified. BGP stores all the updates the neighbor receives but does not reset the peer-session.

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

CAUTION: Inbound update storage is a memory-intensive operation. The entire BGP update database from the neighbor is stored in memory regardless of the inbound policy results applied on the neighbor.

Related Commands

- show ip bgp neighbors — display routes received by a neighbor.

neighbor timers

Set keepalive and hold time timers for a BGP neighbor or a peer group.

Syntax

`neighbor {ip-address | peer-group-name} timers keepalive holdtime`

To return to the default values, use the `no neighbor {ip-address | peer-group-name} timers` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the timers for all routers within the peer group.
keepalive	Enter a number for the time interval, in seconds, between keepalive messages sent to the neighbor routers. The range is from 1 to 65535. The default is **60 seconds**.
holdtime	Enter a number for the time interval, in seconds, between the last keepalive message and declaring the router dead. The range is from 3 to 65535. The default is **180 seconds**.

Defaults

- keepalive = **60 seconds**
- holdtime = **180 seconds**

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

Timer values configured with the `neighbor timers` command override the timer values configured with any other command.

When two neighbors, configured with different `keepalive` and `holdtime` values, negotiate for new values, the resulting values are as follows:

- the lower of the `holdtime` value is the new `holdtime` value, and
- whichever is the lower value; one-third of the new `holdtime` value, or the configured `keepalive` value, is the new keepalive value.

neighbor timers extended

Set idle hold time for a BGP neighbor or a peer group.

Syntax

`neighbor {ip-address | ipv6-address | peer-group-name} timers extended idle holdtime`

To return to the default values, use the `no neighbor {ip-address | ipv6-address | peer-group-name} timers extended idle holdtime` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
ipv6-address	Enter the IPv6 address of the peer router in X:X:X:X::X format.
peer-group-name	Enter the name of the peer group to set the timers for all routers within the peer group.
timers extended *idle holdtime*	Enter a number for the time interval, in seconds, for the peer to be idle state. The range is from 1 to 32767. The default is **15 seconds**.

Defaults

The default idle holdtime is **15 seconds**.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the C9010, MXL, FN IOM, S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6010–ON, S6100–ON, Z9100–ON, and S6000–ON.

Usage Information

The peer remains in idle state based on the configured `idle holdtime`. The less the `idle holdtime`, less the peer in idle state.

For the new *idle holdtime* to take effect, you need to shutdown the respective peer manually using `neighbor shutdown` command and enable the peer again.

neighbor update-source

Enable the E-Series software to use Loopback interfaces for TCP connections for BGP sessions.

Syntax

`neighbor {ip-address | peer-group-name} update-source interface`

To use the closest interface, use the `no neighbor {ip-address | peer-group-name} update-source interface` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable all routers within the peer group.
interface	Enter the keyword `loopback` then a number of the Loopback interface. The range is from 0 to 16383.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

Loopback interfaces are up constantly and the BGP session may need one interface constantly up to stabilize the session. The `neighbor update-source` command is not necessary for directly connected internal BGP sessions.

Neighbors are sorted according to the source and destination ip addresses. If an update-source ip address exists, then the source ip address determines the order in which the neighbors are displayed.

neighbor weight

Assign a weight to the neighbor connection, which is used to determine the best path.

Syntax

`neighbor {`*`ip-address`* `|` *`peer-group-name`*`} weight` *`weight`*

To remove a weight value, use the `no neighbor {`*`ip-address`* `|` *`peer-group-name`*`} weight` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable all routers within the peer group.
weight	Enter a number as the weight. The range is from 0 to 65535. The default is **0**.

Defaults

0

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

In the Dell EMC Networking OS best path selection process, the path with the highest weight value is preferred.

NOTE: In the Dell EMC Networking OS best-path selection process, the path with the highest weight value is preferred.

If you configure the `set weight` command in a route map applied to this neighbor, the weight set in that command overrides the weight set in the `neighbor weight` command.

Related Commands

- set weight — assign a weight to all paths meeting the route map criteria.

network

Specify the networks for the BGP process and enter them in the BGP routing table.

Syntax

`network` *`ip-address mask`* `[route-map` *`map-name`*`]`

To remove a network, use the `no network` *`ip-address mask`* `[route-map` *`map-name`*`]` command.

Parameters

ip-address	Enter an IP address in dotted decimal format of the network.
mask	Enter the mask of the IP address in the slash prefix length format (for example, /24). The mask appears in command outputs in dotted decimal format (A.B.C.D).
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of an established route map. Only the following ROUTE-MAP mode commands are supported: • match ip address • set community • set local-preference • set metric • set next-hop • set origin • set weight If the route map is not configured, the default is **deny** (to drop all routes).

Defaults

Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information Dell EMC Networking OS software resolves the network address the `network` command configures with the routes in the main routing table to ensure that the networks are reachable using non-BGP routes and non-default routes.

As BGP does not query next-hop information corresponding to locally originated routes, a local route with an unreachable next-hop is chosen as the best route.

When a combination of locally originated and peer originated routes occurs, both these routes will exist in the RTM. However, only the best route is kept active in the RTM and the remaining route is rendered in-active.

It is possible to keep only one locally originated route in the BGP database. Network command has preference over the re-distributed routes. When the locally originated route is no longer present in the database the other route is automatically installed.

In BGP, the next-hop for the route is calculated from the information that is acquired through IGP or static routes.

Related Commands

- redistribute — redistribute routes into BGP.

network backdoor

Specify this IGP route as the preferred route.

Syntax `network ip-address mask backdoor`

To remove a network, use the `no network ip-address mask backdoor` command.

Parameters

ip-address	Enter an IP address in dotted decimal format of the network.
mask	Enter the mask of the IP address in the slash prefix length format (for example, /24).

The mask appears in command outputs in dotted decimal format (A.B.C.D).

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information Although Dell EMC Networking OS does not generate a route due to the backdoor config, there is an option for injecting/sourcing a local route in the presence of network backdoor config on a learned route.

permit bandwidth

Enables you to specify link band width extended-community attribute as the matching criteria to permit incoming or outgoing traffic.

Syntax `permit bandwidth`

To disable this setting, enter the `no permit bandwidth` command.

Parameters

bandwidth Enter the keyword bandwidth to specify extended-community attribute as the matching criteria for permitting traffic. The range is from 0 to 102400.

Defaults N/A

Command Modes EXTENDED COMMUNITY LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Related Commands

- deny bandwidth – link band width extended-community attribute as the matching criteria to deny incoming or outgoing traffic.

redistribute

Redistribute routes into BGP.

Syntax

`redistribute {connected | static} [route-map map-name]`

To disable redistribution, use the `no redistribution {connected | static}` command.

Parameters

connected	Enter the keyword `connected` to redistribute routes from physically connected interfaces.
static	Enter the keyword `static` to redistribute manually configured routes. These routes are treated as incomplete routes.
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of an established route map. Only the following ROUTE-MAP mode commands are supported: • match ip address • set community • set local-preference • set metric • set next-hop • set origin • set weight If the route map is not configured, the default is **deny** (to drop all routes).

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced the ability to substitute IGP cost for MED when a peer/peer-group outbound route-map is set as **internal**.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

You can use the `redistribute` command to advertise the IGP cost as the MED on redistributed routes. When you set the route-map with metric-type internal and applied outbound to an EBGP peer/peer-group, the advertised routes corresponding to those peer/peer-groups have the IGP cost set as **MED**.

If you do not configure the `default-metric` command, in addition to the `redistribute` command, or there is no route map to set the metric, the metric for redistributed static and connected is "0".

To redistribute the default route (0.0.0.0/0), configure the `neighbor default-originate` command.

As BGP does not query next-hop information corresponding to locally originated routes, a local route with an unreachable next-hop is chosen as the best route.

When a combination of locally originated and peer originated routes occurs, both these routes will exist in the RTM. However, only the best route is kept active in the RTM and the remaining route is rendered in-active.

It is possible to keep only one locally originated route in the BGP database. Network command has preference over the re-distributed routes. When the locally originated route is no longer present in the database the other route is automatically installed.

Related Commands

- neighbor default-originate — inject the default route.

redistribute ospf

Redistribute OSPF routes into BGP.

Syntax

`redistribute ospf` *`process-id`* `[[match external {1 | 2}] [match internal]] [route-map` *`map-name`*`]`

To stop redistribution of OSPF routes, use the `no redistribute ospf` *`process-id`* command.

Parameters

process-id	Enter the number of the OSPF process. The range is from 1 to 65535.
match external {1 | 2}	(OPTIONAL) Enter the keywords `match external` to redistribute OSPF external routes. You can specify `1` or `2` to redistribute those routes only.
match internal	(OPTIONAL) Enter the keywords `match internal` to redistribute OSPF internal routes only.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults Not configured.

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced the ability to substitute IGP cost for MED when a peer/peer-group outbound route-map is set as **internal**.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information You can use the `redistribute` command to advertise the IGP cost as the MED on redistributed routes. When you set the route-map with metric-type internal and apply outbound to an EBGP peer/peer-group, the advertised routes corresponding to those peer/peer-groups have the IGP cost set as **MED**.

When you enter the `redistribute isis` *`process-id`* command without any other parameters, Dell EMC Networking OS redistributes all OSPF internal routes, external type 1 routes, and external type 2 routes. RFC does not support this feature.

router bgp

To configure and enable BGP, enter ROUTER BGP mode.

Syntax `router bgp` *`as-number`*

To disable BGP, use the `no router bgp` *`as-number`* command.

Parameters

as-number Enter the AS number. The range is from 1 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults Not enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

At least one interface must be in Layer 3 mode for the `router bgp` command to be accepted. If all interfaces are configured under VRF, at least one interface should be in the default VRF for the `router bgp` command to be accepted. If no interfaces are enabled for Layer 3, an error message appears:

```
% Error: No router id
configured
```

BGP does not allow 23456 (AS-TRANS) as a configured AS number.

Example

```
DellEMC(conf)# router bgp 3
DellEMC(conf-router_bgp)#
```

shutdown all

Disables all the BGP neighbors.

Syntax

`shutdown all`

Use the `no shutdown all` command to enable all the configured BGP neighbors.

Command Modes

ROUTER BGP

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S-Series, Z-Series, MXL, and IOM.

Usage Information

You can use this command to disable all the configured BGP neighbors.

This command is global for all VRFs.

shutdown address-family-ipv4–multicast

Disables all the BGP neighbors corresponding to the multicast IPv4 address families.

Syntax

`shutdown address-family-ipv4-unicast`

Use the `no shutdown address-family-ipv4-unicast` command to enable all the configured BGP neighbors corresponding to the multicast IPv4 address families.

Command Modes

ROUTER BGP

CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S-Series, Z-Series, MXL, and IOM.

Usage Information

You can use this command to disable all the configured BGP neighbors corresponding to the multicast IPv4 address families.

This command is global for all VRFs.

shutdown address-family-ipv4–unicast

Disables all the BGP neighbors corresponding to the unicast IPv4 address families.

Syntax

`shutdown address-family-ipv4-unicast`

Use the `no shutdown address-family-ipv4-unicast` command to enable all the configured BGP neighbors corresponding to the unicast IPv4 address families.

Command Modes

ROUTER BGP

CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S-Series, Z-Series, MXL, and IOM.

Usage Information

You can use this command to disable all the configured BGP neighbors corresponding to the unicast IPv4 address families.

This command is global for all VRFs.

shutdown address-family-ipv6–unicast

Disables all the BGP neighbors corresponding to the unicast IPv6 address families.

Syntax

`shutdown address-family-ipv6-unicast`

Use the `no shutdown address-family-ipv6-unicast` command to enable all the configured BGP neighbors corresponding to the unicast IPv6 address families.

Command Modes

ROUTER BGP

CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

	9.11.0.0	Introduced on the S-Series, Z-Series, MXL, and IOM.

Usage Information

You can use this command to disable all the configured BGP neighbors corresponding to the unicast IPv6 address families.

This command is global for all VRFs.

set extcommunity bandwidth

Enables you to set extended community bandwidth.

Syntax `set extcommunity bandwidth`

To disable extended community bandwidth, enter the `no set extcommunity bandwidth` command.

Parameters

bandwidth	Enter the keyword `bandwidth` to enable extended community bandwidth. The range is from 0 to 102400.

Defaults N/A

Command Modes ROUTER MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Usage Information

A new policy command is introduced in order to attach the Link Bandwidth extended community only to the prefixes that are received from a neighbor that satisfy the desired conditions. This command is relevant for both inbound as well as outbound policy handling (for received prefixes). Also, there is no change to the set of supported conditions or filters.

During configuration, the bandwidth is specified in Mbps, not in bytes/second. While creating the actual LB extended community, the system will attach the AS number and encode the bandwidth in floating point format.

show capture bgp-pdu neighbor

Display BGP packet capture information for an IPv4 address on the system.

Syntax `show capture bgp-pdu neighbor` *`ipv4-address`*

Parameters

ipv4-address	Enter the IPv4 address (in dotted decimal format) of the BGP address to display packet information for that address.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced.

Example

```
DellEMC(conf-router_bgp)# show capture bgp-pdu neighbor 20.20.20.2

Incoming packet capture enabled for BGP neighbor 20.20.20.2
Available buffer size 40958758, 26 packet(s) captured using 680 bytes
  PDU[1] : len 101, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00650100 00000013 00000000
00000000 419ef06c 00000000
    00000000 00000000 00000000 00000000 0181a1e4 0181a25c 41af92c0
00000000 00000000 00000000
    00000000 00000001 0181a1e4 0181a25c 41af9400 00000000
  PDU[2] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
  PDU[3] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
 [. . .]

Outgoing packet capture enabled for BGP neighbor 20.20.20.2
Available buffer size 40958758, 27 packet(s) captured using 562 bytes
  PDU[1] : len 41, captured 00:34:52 ago
    ffffffff ffffffff ffffffff ffffffff 00290104 000100b4 14141401
0c020a01 04000100 01020080
    00000000
  PDU[2] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
  PDU[3] : len 19, captured 00:34:50 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
 [. . .]
DellEMC#
```

show config

View the current ROUTER BGP configuration.

Syntax `show config`

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Example

```
DellEMC(conf-router_bgp)# show config
!
router bgp 100
 network 1.1.11.1/32
 network 1.1.12.1/32
 network 1.1.13.1/32
 neighbor 10.1.1.2 remote-as 200
 neighbor 10.1.1.2 no shutdown
DellEMC(conf-router_bgp)#
```

show ip bgp

View the current BGP IPv4 routing table for the system.

Syntax `show ip bgp [vrf vrf-name] [ipv4 {unicast | multicast} | ipv6 {unicast}] [network [network-mask] [longer-prefixes]] [cluster-list cluster-id] [community community-number] [community-list community-list-name] [dampened-paths] [extcommunity-list list name] [filter-list as-path-name] [flap-statistics [ip-address [mask]]] [neighbors [all {received-routes}] [network[network-mask]]] [next-hop] [paths] [peer-group peer-group-name] [regexp regular-expression] [summary]`

Parameters

ipv4 unicast (OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

ipv4 multicast	(OPTIONAL) Enter the keywords `ipv4 multicast` to view information only related to ipv4 multicast routes.
ipv6 unicast	(OPTIONAL) Enter the keywords `ipv6 unicast` to view information only related to ipv6 unicast routes.
network	(OPTIONAL) Enter the network address (in dotted decimal format) of the BGP network to view information only on that network.
network-mask	(OPTIONAL) Enter the network mask (in slash prefix format) of the BGP network address.
longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.
cluster-list *cluster-id*	(OPTIONAL) Enter the keyword `cluster-list` then the cluster-ID to display the routes matching the cluster.
community *community-number*	(OPTIONAL) Enter the keyword `community` then the community–number to display the routes matching the communities.
community-list *community-list-name*	(OPTIONAL) Enter the keyword `community-list` then the community–list–name to display the routes matching the community–list.
dampened-paths	(OPTIONAL) Enter the keyword `dampened-paths` to display the paths suppressed due to dampening.
extcommunity-list *list name*	(OPTIONAL) Enter the keyword `extcommunity-list` then the list name to display the routes matching the extended community-list.
filter-list *as-path-name*	(OPTIONAL) Enter the keyword `filter-list` then the as-path-name to display the routes conforming to the filter–list.
flap–statistics	(OPTIONAL) Enter the keyword `flap-statistics` to display flap statistics of the routes.
neighbors	(OPTIONAL) Enter the keyword `neighbors` to display the detailed information on TCP and BGP neighbor connections.
neighbors [all {received-routes}]	(OPTIONAL) Enter the keyword `neighbors [all {received-routes}]` to display all the received routes both accepted and rejected from all the IPv4 or IPv6 neighbors.
next-hop	(OPTIONAL) Enter the keyword `next-hop` to view all the next-hop information on the learnt routes.
paths	(OPTIONAL) Enter the keyword `paths` to view the BGP path attributes in the BGP database.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the peer–group–name to view the information on the BGP peers in a peer group.
regexp *regular-expression*	(OPTIONAL) Enter the keyword `regexp` then the regular expressions to display BGP information based on a regular expression.
summary	(OPTIONAL) Enter the keyword `summary` to display the summary of BGP neighbor status.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced the `[all {received-routes}]` option for IPv4 and IPv6 neighbors on S4810 and S4820T.

Version	Description
9.14(0.0)	Introduced the `[all {received-routes}]` option for IPv4 and IPv6 neighbors.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

When you enable the `bgp non-deterministic-med` command, the `show ip bgp` command output for a BGP route does not list the INACTIVE reason.

In BGP, this command displays the exact reason why the route is discarded.

The following describes the `show ip bgp` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the AS the route passed through to reach the destination network.

The `show ip bgp` command displays the dmzlink-dw details only if dmzlink-bw is enabled using the `bgp dmzlink-dw` command.

Example

```
DellEMC# show ip bgp
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, >
best
Path source: I - internal, a - aggregate, c - confed-external, r -
redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete
```

```
    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 i
*>  66.0.0.0/24        172.16.0.2                               0 200 i
```

All the `show` and `debugs` commands display the link band width extended-community prefixed with DMZ-Link-bw along with other extended communities.

```
DellEMC# show ip bgp 3.3.3.0/24
BGP routing table entry for 3.3.3.0/24
Paths: (1 available, table Default-IP-Routing-Table.)
Not advertised to any peer
Received from :
 1.1.1.2 (3.3.3.1)   Best
  AS_PATH :
  Next-Hop : 1.1.1.2, Cost : 0
  Origin IGP, Metric  0, LocalPref  100, Weight  0, internal
 Extended Communities :
  DMZ-Link Bw: 2000 kbytes*
```

Following is the example for displaying all the received routes from all IPv4 neighbors:

```
DellEMC# show ip bgp vrf test ipv4 unicast neighbors all received-routes
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 1.1.1.1
Status codes: s suppressed, S stale, d dampened, h history, * valid, >
best
Path source: I - internal, a - aggregate, c - confed-external, r -
redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
 ID 110.1.1.0/24       11.1.1.2                 0        100      0 ?
*>I 111.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 112.1.1.0/24       11.1.1.2                 0        100      0 ?
*>I 113.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 114.1.1.0/24       11.1.1.2                 0        100      0 ?
*>I 115.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 116.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 117.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 118.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 119.1.1.0/24       11.1.1.2                 0        100      0 ?
 ID 120.1.1.0/24       11.1.1.2                 0        100      0 ?
```

Following is the example for displaying all the received routes from all IPv6 neighbors:

```
DellEMC# show ip bgp ipv6 unicast neighbors all received-routes
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 11.1.1.1
Status codes: s suppressed, S stale, d dampened, h history, * valid, >
best
Path source: I - internal, a - aggregate, c - confed-external, r -
redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>I 200::/64           12::2                                    0      0 i
*>I 200:0:0:1::/64     12::2                                    0      0 i
*>I 200:0:0:2::/64     12::2                                    0      0 i
*>I 200:0:0:3::/64     12::2                                    0      0 i
*>I 200:0:0:4::/64     12::2                                    0      0 i
*>I 200:0:0:5::/64     12::2                                    0      0 i
*>I 200:0:0:6::/64     12::2                                    0      0 i
*>I 200:0:0:7::/64     12::2                                    0      0 i
*>I 200:0:0:8::/64     12::2                                    0      0 i
*>I 200:0:0:9::/64     12::2                                    0      0 i
```

```
*>I 200:0:0:a::/64      12::2                                   0       0 i
*>I 200:0:0:b::/64      12::2                                   0       0 i
*>I 200:0:0:c::/64      12::2                                   0       0 i
*>I 200:0:0:d::/64      12::2                                   0       0 i
*>I 200:0:0:e::/64      12::2                                   0       0 i
*>I 200:0:0:f::/64      12::2                                   0       0 i
*>I 200:0:0:10::/64     12::2                                   0       0 i
*>I 200:0:0:11::/64     12::2                                   0       0 i
*>I 200:0:0:12::/64     12::2                                   0       0 i
*>I 200:0:0:13::/64     12::2                                   0       0 i
```

Related Commands

- show ip bgp community — view the BGP communities.
- neighbor maximum-prefix — control the number of network prefixes received.
- show ip bgp cluster-list — view BGP neighbors in a specific cluster.
- show ip bgp community — view information on all routes with Community attributes or view specific BGP community groups.
- show ip bgp community-list — view routes that a specific community list affects.
- show ip bgp dampened-paths — view BGP routes that are dampened (non-active).
- show ip bgp extcommunity-list — view information on all routes with Extended Community attributes.
- show ip bgp filter-list — view the routes that match the filter lists.
- show ip bgp flap-statistics — view flap statistics on BGP routes.
- show ip bgp neighbors — allow you to view the information BGP neighbors exchange.
- show ip bgp next-hop — view all next hops (using learned routes only) with current reachability and flap status. This command only displays one path, even if the next hop is reachable by multiple paths.
- show ip bgp paths — view all the BGP path attributes in the BGP database.
- show ip bgp peer-group — allow you to view information on the BGP peers in a peer group.
- show ip bgp regexp — display the subset of the BGP routing tables matching the regular expressions specified.
- show ip bgp summary — allow you to view the status of all BGP connections.

show ip bgp cluster-list

View BGP neighbors in a specific cluster.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
cluster-list [cluster-id]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view cluster information of BGP neighbors corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keywords `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 unicast	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 multicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related to only to the ipv6 unicast routes.
cluster-id	(OPTIONAL) Enter the cluster id in dotted decimal format. The range is 1 — 4294967295.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp cluster-list` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp cluster-list
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.6
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>I 55.0.0.0/24        172.16.0.2                           0      0 400 500 600 i
*>I 66.0.0.0/24        172.16.0.2                           0      0 500 i
*>I 77.0.0.0/24        172.16.0.2                           0      0 i

DellEMC# show ip bgp cluster-list 4.4.4.4
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.6
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>I 55.0.0.0/24        172.16.0.2                           0      0 400 500 600 i
*>I 66.0.0.0/24        172.16.0.2                           0      0 500 i
*>I 77.0.0.0/24        172.16.0.2                           0      0 i
DellEMC#
```

show ip bgp community

View information on all routes with Community attributes or view specific BGP community groups.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
community [community-number] [local-as] [no-export] [no-advertise]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view information either on all routes with community attributes or specific BGP community routes corresponding to that VRF.
ipv4 *unicast*	(OPTIONAL) Enter the keywords `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
community-number	Enter the community number in AA:NN format where AA is the AS number (2 bytes) and NN is a value specific to that autonomous system. You can specify up to eight community numbers to view information on those community groups.
local-AS	Enter the keywords `local-AS` to view all routes with the COMMUNITY attribute of NO_EXPORT_SUBCONFED. All routes with the NO_EXPORT_SUBCONFED (0xFFFFFF03) community attribute must not be advertised to external BGP peers.
no-advertise	Enter the keywords `no-advertise` to view all routes containing the well-known community attribute of NO_ADVERTISE. All routes with the NO_ADVERTISE (0xFFFFFF02) community attribute must not be advertised to other BGP peers.
no-export	Enter the keywords `no-export` to view all routes containing the well-known community attribute of NO_EXPORT. All routes with the NO_EXPORT (0xFFFFFF01) community attribute must not be advertised outside a BGP confederation boundary.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To view the total number of COMMUNITY attributes found, use the `show ip bgp summary` command. The text line above the route table states the number of COMMUNITY attributes found.

The `show ip bgp community` command without any parameters lists BGP routes with at least one BGP community attribute and the output is the same as for the `show ip bgp` command output.

The following describes the `show ip bgp community` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp community ?
local-AS                Do not export outside local AS (well-known community)
no-advertise            Do not advertise to any peer (well-known community)
no-export               Do not export to next AS (well-known community)
aa:nn                   Community number in aa:nn format
|                       Pipe through a command

DellEMC# show ip bgp community
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 i
*>  66.0.0.0/24        172.16.0.2                               0 200 i

DellEMC# show ip bgp community no-advertise
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  66.0.0.0/24        172.16.0.2                               0 200 i
DellEMC#
```

show ip bgp community-list

View routes that a specific community list affects.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {unicast | multicast} | ipv6 unicast]
community-list community-list-name [exact-match]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes affected by a specific community list corresponding to that VRF.
ipv4 *unicast*	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
community-list-name	Enter the name of a configured IP community list (maximum 140 characters).
exact-match	Enter the keyword for an exact match of the communities.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The `show ip bgp community-list` command without any parameters lists BGP routes matching the Community List and the output is the same as for the `show ip bgp` command output.

The following describes the `show ip bgp community-list pass` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
DellEMC# conf t
DellEMC(conf)# ip community-list cl1
DellEMC(config-community-list)# permit 1000:1
DellEMC(config-community-list)# end
DellEMC# show ip bgp community-list cl1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 i
DellEMC# show ip bgp 55.0.0.0/24
BGP routing table entry for 55.0.0.0/24
Paths: (1 available, table Default-IP-Routing-Table.)
Not advertised to any peer

Received from :
 172.16.0.2 (172.16.0.2)   Best
  AS_PATH : 200

  Next-Hop : 172.16.0.2, Cost : 0
  Origin IGP, Metric  4294967295 (Default), LocalPref  100, Weight  0, external


 Communities :
  200:1        1000:1       3000:1
DellEMC#
```

show ip bgp dampened-paths

View BGP routes that are dampened (non-active).

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
dampened-paths
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes that are affected by a specific community list corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keywords `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 unicast	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To determine a BGP session flap, both a route-down event and a subsequent route-up event corresponding to a single route are considered. As a result, a flap event is penalized only one time during the route-down event. The subsequent route-up event corresponding to the same route is not considered as a flap and is not penalized.

The history paths that the `show ip bgp` command displays contain only the prefix and the next-hop information. The next-hop information shows the ip address of the neighbor. It does not show the actual next-hop details.

The following describes the `show ip bgp damp` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is dampened.
From	Displays the IP address of the neighbor advertising the dampened route.
Reuse	Displays the hour:minutes:seconds until the dampened route is available.
Path	Lists all the ASs the dampened route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp dampened-paths
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, >
best
Path source: I - internal, a - aggregate, c - confed-external, r -
redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            From            Reuse     Path

d   55.0.0.0/24      172.16.0.2             00:36:23      200

DellEMC#
```

show ip bgp detail

Display BGP internal information for the IPv4 Unicast address family.

Syntax `show ip bgp [ipv4 unicast] detail`

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced.

Example

```
DellEMC# show ip bgp detail
Detail information for BGP Node
bgpNdP 0x41a17000 : NdTmrP 0x41a17000 : NdKATmrP 0x41a17014 : NdTics 74857 :
NhLocAS 1 : NdState 2 : NdRPMPrim 1 : NdListSoc 13
NdAuto 1 : NdEqCost 1 : NdSync 0 : NdDefOrg 0
NdV6ListSoc 14 NdDefDid 0 : NdConfedId 0 : NdMedConfed 0 : NdMedMissVal -1 :
NdIgnrIllId 0 : NdRRC2C 1 : NdClstId 33686273 : NdPaTblP 0x41a19088
NdASPTblP 0x41a19090 : NdCommTblP 0x41a19098 : NhOptTransTblP 0x41a190a0 :
NdRRClsTblP 0x41a190a8
NdPktPA 0 : NdLocCBP 0x41a6f000 : NdTmpPAP 0x419efc80 : NdTmpASPAP 0x41a25000 :
NdTmpCommP 0x41a25800
NdTmpRRClP 0x41a4b000 : NdTmpOptP 0x41a4b800 : NdTmpNHP : NdOrigPAP 0
NdOrgNHP 0 : NdModPathP 0x419efcc0 : NdModASPAP 0x41a4c000 : NdModCommP 0x41a4c800
NdModOptP 0x41a4d000 : NdModNHP : NdComSortBufP 0x41a19110 : NdComSortHdP
0x41a19d04 : NdUpdAFMsk 0 : AFRstSet 0x41a1a298 : NHopDfrdHdP 0x41a1a3e0 :

NumNhDfrd 0 : CfgHdrAFMsk 1
AFChkNetTmrP 0x41ee705c : AFRtDamp 0 : AlwysCmpMed 0 : LocrHld 10 : LocrRem 10 :
softReconfig 0x41a1a58c
DefMet 0 : AutoSumm 1 : NhopsP 0x41a0d100 : Starts 0 : Stops 0 : Opens 0
Closes 0 : Fails 0 : Fatals 0 : ConnExps 0 : HldExps 0 : KeepExps 0
RxOpens 0 : RxKeeps 0 : RxUpds 0 : RxNotifs 0 : TxUpds 0 : TxNotifs 0
BadEvts 0 : SynFails 0 : RxeCodeP 0x41a1b6b8 : RxHdrCodeP 0x41a1b6d4 : RxOpCodeP
0x41a1b6e4
RxUpdCodeP 0x41a1b704 : TxEcodeP 0x41a1b734 : TxHdrcodeP 0x41a1b750 : TxOpCodeP
0x41a1b760
TxUpdCodeP 0x41a1b780 : TrEvt 0 : LocPref 100 : tmpPathP 0x41a1b7b8 : LogNbrChgs 1
RecursiveNH 1 : PgCfgId 0 : KeepAlive 0 : HldTime 0 : DioHdl 0 : AggrValTmrP
0x41ee7024
UpdNetTmrP 0 : RedistTmrP 0x41ee7094 : PeerChgTmrP 0 : CleanRibTmrP 0x41ee7104
```

```
PeerUpdTmrP 0x41ee70cc : DfrdNHTmrP 0x41ee7174 : DfrdRtselTmrP 0x41ee713c :
FastExtFallover 1 : FastIntFallover 0 : EnforcelstAS 1
PeerIdBitsP 0x41967120 : softOutSz 16 : RibUpdCtxCBP 0
UpdPeerCtxCBP 0 : UpdPeerCtxAFI 0 : TcpioCtxCB 0 : RedistBlk 1
NextCBPurg 1101119536 : NumPeerToPurge 0 : PeerIBGPCnt 0 : NonDet 0 : DfrdPathSel 0
BGPRst 0 : NumGrCfg 1 : DfrdTmestmp 0 : SnmpTrps 0 : IgnrBestPthASP 0
RstOn 1 : RstMod 1 : RstRole 2 : AFFalgs 7 : RstInt 120 : MaxeorExtInt 361
FixedPartCrt 1 : VarParCrt 1
Packet Capture max allowed length 40960000 : current length 0

Peer Grp List
Nbr List
Confed Peer List
Address Family specific Information
AFIndex 0
NdSpFlag 0x41a190b0 : AFRttP 0x41a0d200 : NdRTMMkrP 0x41a19d28 : NdRTMAFTblVer 0 :
NdRibCtxAddr 1101110688
NdRibCtxAddrLen 255 : NdAFPrefix 0 : NdAfNLRIP 0 : NdAFNLRILen 0 : NdAFWPtrP 0
NdAFWLen 0 : NdAfNH : NdAFRedRttP 0x41a0d400 : NdRecCtxAdd 1101110868
NdRedCtxAddrLen 255 : NdAfRedMkrP 0x41a19e88 : AFAggRttP 0x41a0d600 : AfAggCtxAddr
1101111028 : AfAggrCtxAddrLen 255
AfNumAggrPfx 0 : AfNumAggrASSet 0 : AfNumSuppmap 0 : AfNumAggrValidPfx 0 :
AfMPathRttP 0x41a0d700
MpathCtxAddr 1101111140 : MpathCtxAddrlen 255 : AfEorSet 0x41a19f98 : NumDfrdPfx 0
AfActPeerHd 0x41a1a3a4 : AfExtDist 1101112312 : AfIntDist 200 : AfLocDist 200
AfNumRRc 0 : AfRR 0 : AfNetRttP 0x41a0d300 : AfNetCtxAddr 1101112392 :
AfNetCtxAddrlen 255
AfNwCtxAddr 1101112443 : AfNwCtxAddrlen 255 : AfNetBKDrRttP 0x41a0d500 :
AfNetBKDRCnt 0 : AfDampHLife 0
AfDampReuse 0 : AfDampSupp 0 : AfDampMaxHld 0 : AfDampCeiling 0 : AfDampRmapP
DellEMC#
```

show ip bgp extcommunity-list

View information on all routes with Extended Community attributes.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
extcommunity-list [list name]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view information on all routes with extended community attributes corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
list name	Enter the extended community list name you wish to view. The range is 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To view the total number of COMMUNITY attributes found, use the `show ip bgp summary` command. The text line above the route table states the number of COMMUNITY attributes found.

The `show ip bgp community` command without any parameters lists BGP routes with at least one BGP community attribute and the output is the same as for the `show ip bgp` command output.

Example

```
DellEMC# show run extcommunity-list
!
ip extcommunity-list ecl1
 permit rt 100:4
 permit soo 40:4
DellEMC#show ip bgp extcommunity-list ecl1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 i
*>  77.0.0.0/24        172.16.0.2                               0 200 i
DellEMC#show ip bgp extcommunity-list ec
% Error: Extended community list does not exist.
DellEMC#
```

show ip bgp filter-list

View the routes that match the filter lists.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
filter-list as-path-name
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view route information that matches the filter lists corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.

as-path-name	Enter an AS-PATH access list name. The range is 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp filter-list hello` command shown in the following example.

Field	Description
Path source codes	Lists the path sources shown to the right of the last AS number in the Path column: • i = internal route entry • a = aggregate route entry • c = external confederation route entry • n = network route entry • r = redistributed route entry
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
DellEMC# show run as-path a1
!
ip as-path access-list a1
 permit 500
DellEMC#
```

```
DellEMC# show ip bgp filter-list a1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 400 500 600 i
*>  66.0.0.0/24        172.16.0.2                               0 200 500 i
DellEMC#
```

show ip bgp flap-statistics

View flap statistics on BGP routes.

Syntax

`show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast] flap-statistics [ip-address [mask]] [filter-list as-path-name] [regexp regular-expression]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view flap statistics on BGP routes corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
ip-address	(OPTIONAL) Enter the IP address (in dotted decimal format) of the BGP network to view information only on that network.
mask	(OPTIONAL) Enter the network mask (in slash prefix (`/x`) format) of the BGP network address.
filter-list *as-path-name*	(OPTIONAL) Enter the keyword `filter-list` then the name of a configured AS-PATH ACL. The range is 140 characters.
regexp *regular-expression*	Enter a regular expression then use one or a combination of the following characters to match. The range is 256 characters. • `.` = (period) any single character (including a white space). • `*` = (asterisk) the sequences in a pattern (zero or more sequences). • `+` = (plus) the sequences in a pattern (one or more sequences). • `?` = (question mark) sequences in a pattern (either zero or one sequences). **NOTE:** Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression. • `[ ]` = (brackets) a range of single-character patterns. • `( )` = (parenthesis) groups a series of pattern elements to a single element. • `{ }` = (braces) minimum and the maximum match count. • `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified. • `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp flap` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is flapping.
From	Displays the IP address of the neighbor advertising the flapping route.
Flaps	Displays the number of times the route flapped.
Duration	Displays the hours:minutes:seconds since the route first flapped.
Reuse	Displays the hours:minutes:seconds until the flapped route is available.
Path	Lists all the ASs the flapping route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp flap-statistics
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

     Network            From                 Flaps       Duration          Reuse    Path
h    77.0.0.0/24        172.16.0.2               1    00:00:03          00:00:00
d    55.0.0.0/24        172.16.0.2               3    00:00:25          00:30:44 200 i
*>   66.0.0.0/24        172.16.0.2               1    00:00:23          00:00:00 200 i
*>n 66.66.77.77/32   0.0.0.0        0          32768 i
DellEMC#
```

show ip bgp inconsistent-as

View routes with inconsistent originating autonomous system (AS) numbers; that is, prefixes that are announced from the same neighbor AS but with a different AS-Path.

Syntax `show ip bgp [vrf vrf-name] [ipv4 unicast] inconsistent-as`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view routes corresponding to the VRF that contain inconsistent originating AS numbers.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp inconsistent-as` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp inconsistent-as
BGP table version is 280852, local router ID is 10.1.2.100
Status codes: s suppressed, d damped, h history, * valid, > best
Path source: I - internal, c - confed-external, r - redistributed, n - network
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network Next  Hop         Metric LocPrf Weight Path
*  3.0.0.0/8     63.114.8.33               0 18508 209 7018 80 i
*                63.114.8.34               0 18508 209 7018 80 i
```

```
*                63.114.8.60                0 18508 209 7018 80 i
*>               63.114.8.33                0 18508 701 80 i
*> 3.18.135.0/24 63.114.8.60                0 18508 209 7018 ?
*                63.114.8.34                0 18508 209 7018 ?
*                63.114.8.33                0 18508 701 7018 ?
*                63.114.8.33                0 18508 209 7018 ?
*> 4.0.0.0/8     63.114.8.60                0 18508 209 1 i
*                63.114.8.34                0 18508 209 1 i
*                63.114.8.33                0 18508 701 1 i
*                63.114.8.33                0 18508 209 1 i
*  6.0.0.0/20    63.114.8.60                0 18508 209 3549 i
*                63.114.8.34                0 18508 209 3549 i
*>               63.114.8.33      0         0 18508 ?
*                63.114.8.33                0 18508 209 3549 i
*  9.2.0.0/16    63.114.8.60                0 18508 209 701 i
*                63.114.8.34                0 18508 209 701 i
--More--

DellEMC# show ip bgp vrf testinconsistent-as
BGP table version is 11, local router ID is 66.66.77.77
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

Network          Next Hop  Metric  LocPrf Weight Path
*>n 11.11.11.11/32   0.0.0.0         0          32768 i
*>n 22.22.22.22/32   0.0.0.0         0          32768 i
I 32.32.32.32/32   60.0.0.2              100      0 400 500 i
  I 32.32.33.33/32   60.0.0.2              100      0 400 500 i
*>n 33.33.33.33/32   0.0.0.0         0          32768 i
*>n 33.33.44.55/32   0.0.0.0         0          32768 i
*>n 44.44.44.44/32   0.0.0.0         0          32768 i
*>I 55.55.0.0/16     72.1.1.2              100      0 i
*>I 55.55.55.55/32   72.1.1.2        0     100      0 i
*>I 55.55.66.66/32   72.1.1.2        0     100      0 i
*>a 66.66.0.0/16     0.0.0.0                  32768 i
*>n 66.66.66.77/32   0.0.0.0         0          32768 i
*>n 66.66.77.77/32   0.0.0.0         0          32768 i
DellEMC#
```

show ip bgp neighbors

Allows you to view the information BGP neighbors exchange.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
neighbors [ip-address [advertised-routes | dampened-routes | detail | flap-
statistics | routes | all {received-routes [network [network-mask]]} |
{denied-routes [network [network-mask]]}]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view information exchanged by BGP neighbors corresponding to that VRF. **NOTE:** You can use this attribute to view information exchanged by BGP neighbors that correspond to either a default or a non-default VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 unicast	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
ip-address	(OPTIONAL) Enter the IP address of the neighbor to view only BGP information exchanged with that neighbor.
advertised-routes	(OPTIONAL) Enter the keywords `advertised-routes` to view only the routes the neighbor sent.

dampened-routes	(OPTIONAL) Enter the keywords `dampened-routes` to view information on dampened routes from the BGP neighbor.
detail	(OPTIONAL) Enter the keyword `detail` to view neighbor-specific internal information for the IPv4 Unicast address family.
flap-statistics	(OPTIONAL) Enter the keywords `flap-statistics` to view flap statistics on the neighbor's routes.
routes	(OPTIONAL) Enter the keyword `routes` to view only the neighbor's feasible routes.
all {received-routes [*network* [*network-mask*]}	(OPTIONAL) Enter the keywords `all {received-routes}` then either the network address alone (in dotted decimal format) or the network address along with the network mask (in slash prefix format) to view all the information received from neighbors. **NOTE:** Configure the `neighbor soft-reconfiguration inbound` command prior to viewing all the information received from the neighbors.
denied-routes [*network* [*network-mask*]	(OPTIONAL) Enter the keywords `denied-routes` then either the network address (in dotted decimal format) or the network mask (in slash prefix format) to view all information on routes denied via neighbor inbound filters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced the `[all]` option for IPv4 and IPv6 neighbors.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Added the `detail` option. Output now displays the default MED value.
7.2.1.0	Added the `received` and `denied route` options.
6.3.10	The output is changed to display the total number of advertised prefixes.

Usage Information

After a peer reset, the contents of the notification log messages is displayed in hex values for debugging.

The neighbor information that this command displays does not include counts corresponding to ignored prefixes and updates. However, the martian case is an exception where neighbor information corresponding to ignored updates is displayed.

BGP shows the exact information that is exchanged between the BGP peers. It also indicates whether or not this information is received by the BGP peer.

The following describes the `show ip bgp neighbors` command shown in the following examples.

The Lines Beginning with:	Description
BGP neighbor	Displays the BGP neighbor address and its AS number. The last phrase in the line indicates whether the link between the BGP router and its neighbor is an external or internal one. If they are located in the same AS, the link is internal; otherwise the link is external.
BGP version	Displays the BGP version (always version 4) and the remote router ID.
BGP state	Displays the neighbor's BGP state and the amount of time in hours:minutes:seconds it has been in that state.
Last read	This line displays the following information: • last read is the time (hours:minutes:seconds) the router read a message from its neighbor • hold time is the number of seconds configured between messages from its neighbor • keepalive interval is the number of seconds between keepalive messages to help ensure that the TCP session is still alive.
Received messages	This line displays the number of BGP messages received, the number of notifications (error messages), and the number of messages waiting in a queue for processing.
Sent messages	The line displays the number of BGP messages sent, the number of notifications (error messages), and the number of messages waiting in a queue for processing.
Received updates	This line displays the number of BGP updates received and sent.
Soft reconfiguration	This line indicates that soft reconfiguration inbound is configured.
Minimum time	Displays the minimum time, in seconds, between advertisements.
(list of inbound and outbound policies)	Displays the policy commands configured and the names of the Route map, AS-PATH ACL, or Prefix list configured for the policy.
For address family:	Displays the IPv4 Unicast as the address family.
BGP table version	Displays which version of the primary BGP routing table the router and the neighbor are using.
accepted prefixes	Displays the number of network prefixes the router accepts and the amount of memory used to process those prefixes.
Prefix advertised	Displays the number of network prefixes advertised, the number rejected, and the number withdrawn from the BGP routing table.
Connections established	Displays the number of TCP connections established and dropped between the two peers to exchange BGP information.
Last reset	Displays the amount of time since the peering session was last reset. Also states if the peer resets the peering session. If the peering session was never reset, the word never is displayed.
Local host:	Displays the peering address of the local router and the TCP port number.

The Lines Beginning with:	Description
Foreign host:	Displays the peering address of the neighbor and the TCP port number.

Example

```
DellEMC# show ip bgp neighbors 172.16.0.2
BGP neighbor is 172.16.0.2, remote AS 200, external link
  Member of peer-group port0 for session parameters
  BGP remote router ID 172.16.0.2
  BGP state ESTABLISHED, in this state for 00:13:55
  Last read 00:00:03, Last write 00:00:55
  Hold time is 180, keepalive interval is 60 seconds
  Received 50 messages, 0 in queue
     1 opens, 0 notifications, 34 updates
     15 keepalives, 0 route refresh requests
  Sent 18 messages, 0 in queue
     1 opens, 0 notifications, 0 updates
     16 keepalives, 0 route refresh requests

  Route refresh request: received 0, sent messages 1
  Minimum time between advertisement runs is 30 seconds
  Minimum time before advertisements start is 0 seconds

  Capabilities received from neighbor for IPv4 Unicast :
    MULTIPROTO_EXT(1)
    ROUTE_REFRESH(2)



  Capabilities advertised to neighbor for IPv4 Unicast :
    MULTIPROTO_EXT(1)
    ROUTE_REFRESH(2)
    ADD_PATH(69)
    CISCO_ROUTE_REFRESH(128)



  For address family: IPv4 Unicast
  BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
  InQ : Added 0, Replaced 0, Withdrawn 0
  OutQ : Added 0, Withdrawn 0
  Allow local AS number 0 times in AS-PATH attribute
  Prefixes accepted 2, withdrawn 15 by peer, martian prefixes ignored 0
  Prefixes advertised 0, denied 0, withdrawn 0 from peer

  Connections established 1; dropped 0
  Last reset never
Local host: 172.16.0.1, Local port: 58145
Foreign host: 172.16.0.2, Foreign port: 179

DellEMC#
```

Related Commands

- show ip bgp — view the current BGP routing table.

show ip bgp next-hop

View all next hops (using learned routes only) with current reachability and flap status. This command only displays one path, even if the next hop is reachable by multiple paths.

Syntax `show ip bgp [vrf vrf-name] next-hop`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp next-hop` command shown in the following example.

Field	Description
Next-hop	Displays the next-hop IP address.
Via	Displays the IP address and interface used to reach the next hop.
RefCount	Displays the number of BGP routes using this next hop.
Cost	Displays the cost associated with using this next hop.
Flaps	Displays the number of times the next hop has flapped.
Flaps	Displays the number of times the next hop has flapped.

Example

```
DellEMC# show ip bgp next-hop
     Next-hop            Resolved
    172.16.0.2             YES
DellEMC#
```

show ip bgp paths

View all the BGP path attributes in the BGP database.

Syntax `show ip bgp[vrf vrf-name] paths [regexp regular-expression]`

Parameters

regexp *regular-expression*	Enter a regular expression then use one or a combination of the following characters to match:

- `.` = (period) any single character (including a white space).
- `*` = (asterisk) the sequences in a pattern (zero or more sequences).
- `+` = (plus) the sequences in a pattern (one or more sequences).
- `?` = (question mark) sequences in a pattern (either zero or one sequences).

  NOTE: Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression.
- `[ ]` = (brackets) a range of single-character patterns.
- `( )` = (parenthesis) groups a series of pattern elements to a single element.
- `{ }` = (braces) minimum and the maximum match count.
- `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified.
- `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF for the S4810, S4820T, and S6000.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp path` command shown in the following example.

Field	Description
Total	Displays the total number of BGP path attributes.
Address	Displays the internal address where the path attribute is stored.
Hash	Displays the hash bucket where the path attribute is stored.
Refcount	Displays the number of BGP routes using this path attribute.
Metric	Displays the MED attribute for this path attribute.

Field	Description
Path	Displays the AS path for the route, with the origin code for the route listed last. Numbers listed between braces {} are AS_SET information.

Example

```
DellEMC# show ip bgp paths ?
community               Display community information
extcommunity            Display extended community information
regexp                  Display path information based on a regular
expression
|                       Pipe through a command


DellEMC#show ip bgp paths
Total 2 Paths
Refcount Metric Path
1        0           200 i
1        0           200 i
DellEMC#
```

show ip bgp paths community

View all unique COMMUNITY numbers in the BGP database.

Syntax `show ip bgp [vrf vrf-name] paths community`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp paths community` command shown in the following example.

Field	Description
Address	Displays the internal address where the path attribute is stored.
Hash	Displays the hash bucket where the path attribute is stored.
Refcount	Displays the number of BGP routes using these communities.
Community	Displays the community attributes in this BGP path.

Example

```
DellEMC# show ip bgp paths community
Total 2 communities
Refcount   Community
1          NO-ADVERTISE
1          200:1        1000:1       3000:1
DellEMC#
```

show ip bgp peer-group

Allows you to view information on the BGP peers in a peer group.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
peer-group [peer-group-name [detail | summary]]
```

Parameters

ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 unicast	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.
peer-group-name	(OPTIONAL) Enter the name of a peer group to view information about that peer group only.
detail	(OPTIONAL) Enter the keyword `detail` to view detailed status information of the peers in that peer group.
summary	(OPTIONAL) Enter the keyword `summary` to view status information of the peers in that peer group. The output is the same as that found in the `show ip bgp summary` command.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters. Introduced on S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp peer-group` command shown in the following example.

Line beginning with:	Description
Peer-group	Displays the peer group's name.
Administratively shut	Displays the peer group's status if the peer group is not enabled. If you enable the peer group, this line is not displayed.
BGP version	Displays the BGP version supported.
Minimum time	Displays the time interval between BGP advertisements.
For address family	Displays IPv4 Unicast as the address family.
BGP neighbor	Displays the name of the BGP neighbor.
Number of peers	Displays the number of peers currently configured for this peer group.
Peer-group members:	Lists the IP addresses of the peers in the peer group. If the address is outbound optimized, an * is displayed next to the IP address.

Example

```
DellEMC# show ip bgp peer-group
Peer-group port0, remote AS 200
BGP version 4
Minimum time between advertisement runs is 30 seconds
For address family: IPv4 Unicast
BGP neighbor is port0, peer-group external
Update packing has 4_OCTET_AS support enabled

Number of peers in this group 1
Maximum limit on the accepted connections 256


 Peer-group members (* - outbound optimized):
172.16.0.2
DellEMC#
```

Related Commands

- neighbor peer-group (assigning peers) — assign a peer to a peer-group.
- neighbor peer-group (creating group) — create a peer group.

show ip bgp regexp

Display the subset of the BGP routing tables matching the regular expressions specified.

Syntax

```
show ip bgp [vrf vrf-name] regexp regular-expression [character]
```

Parameters

vrf *vrf-name*

Enter the keyword `vrf` and then the name of the VRF to view the subset of BGP routing tables that match the regular expression specified on that VRF.

NOTE: You can use this attribute to view the subset of BGP routing tables that match the regular expression that is specified on either a default or a non-default VRF.

***regular-expression* [*character*]**

Enter a regular expression then use one or a combination of the following characters to match:

- `.` = (period) any single character (including a white space).
- `*` = (asterisk) the sequences in a pattern (zero or more sequences).
- `+` = (plus) the sequences in a pattern (one or more sequences).
- `?` = (question mark) sequences in a pattern (either zero or one sequences).

  NOTE: Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression.
- `[ ]` = (brackets) a range of single-character patterns.
- `( )` = (parenthesis) groups a series of pattern elements to a single element.
- `{ }` = (braces) minimum and the maximum match count.
- `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified.
- `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp regexp` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then non-BGP routes exist in the router's routing table.
Metric	Displays the BGP router's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight
Path	Lists all the AS paths the route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp regexp ^200
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, > best
Path source: I - internal, a - aggregate, c - confed-external, r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf Weight Path
*>  55.0.0.0/24        172.16.0.2                               0 200 i
*>  66.0.0.0/24        172.16.0.2                               0 200 i
DellEMC#
```

show ip bgp summary

Allows you to view the status of all BGP connections.

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
summary
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view the status of all BGP connections corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

In BGP, route attributes are maintained at different locations. When attributes that correspond to multiple routes change, then attribute counts that the `show ip bgp summary` command displays are calculated as summations of attributes corresponding to all the associated routes. For example, if cluster_id is an attribute associated with thousand routes that contain exactly the same set of attributes, then the cluster_id count is 1. If these thousand routes are set with different attribute values with the same cluster_id, then the cluster_id count is 1000, since the same value is stored for thousand different attribute records.

The attribute next-hop is a part of the BGP attribute data structure.

If two peers send the same route that contains similar path attributes, then two entries are maintained in the back-end, as both these entries have different next-hops. If this same route is sent to a different peer, an entry for each peer is created, as the next-hop is different. As a result, the BGP attributes count in the summary output will differ accordingly.

The following describes the `show ip bgp summary` command shown in the following example.

Field	Description
BGP router identifier	Displays the local router ID and the AS number.
BGP table version	Displays the BGP table version and the main routing table version.
network entries	Displays the number of network entries, route paths, and the amount of memory used to process those entries.
paths	Displays the number of paths and the amount of memory used.
denied paths	Displays the number of denied paths and the amount of memory used.
BGP path attribute entries	Displays the number of BGP path attributes and the amount of memory used to process them.
BGP AS-PATH entries	Displays the number of BGP AS_PATH attributes processed and the amount of memory used to process them.
BGP community entries	Displays the number of BGP COMMUNITY attributes processed and the amount of memory used to process them. The `show ip bgp community` command provides more details on the COMMUNITY attributes.

Field	Description
Dampening enabled	Displayed only when you enable dampening. Displays the number of paths designated as history, dampened, or penalized.
Neighbor	Displays the BGP neighbor address.
AS	Displays the AS number of the neighbor.
MsgRcvd	Displays the number of BGP messages that neighbor received.
MsgSent	Displays the number of BGP messages that neighbor sent.
TblVer	Displays the version of the BGP table that was sent to that neighbor.
InQ	Displays the number of messages from that neighbor waiting to be processed.
OutQ	Displays the number of messages waiting to be sent to that neighbor. If a number appears in parentheses, the number represents the number of messages waiting to be sent to the peer group.
Up/Down	Displays the amount of time that the neighbor is in the Established stage. If the neighbor has never moved into the Established stage, the word never is displayed. The output format is:

Time Established	Display Example
< 1 day	00:12:23 (hours:minutes:seconds)
< 1 week	1d21h (DaysHours)
> 1 week	11w2d (WeeksDays)

State/Pfxrcd	If the neighbor is in Established stage, the number of network prefixes received. If a maximum limit was configured with the `neighbor maximum-prefix` command, (prfxd) appears in this column. If the neighbor is not in Established stage, the current stage is displayed (Idle, Connect, Active, OpenSent, OpenConfirm). When the peer is transitioning between states and clearing the routes received, the phrase (Purging) may appear in this column. If the neighbor is disabled, the phrase (Admin shut) appears in this column.

Example

```
DellEMC# show ip bgp summary
BGP router identifier 192.168.11.5, local AS number 100
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
2 network entrie(s) using 152 bytes of memory
2 paths using 208 bytes of memory
BGP-RIB over all using 210 bytes of memory
2 BGP path attribute entrie(s) using 144 bytes of memory
1 BGP AS-PATH entrie(s) using 10 bytes of memory
2 neighbor(s) using 16384 bytes of memory

Neighbor        AS            MsgRcvd  MsgSent     TblVer  InQ  OutQ Up/Down  State/Pfx
172.16.0.2      200               10        8          0    0     0 00:05:34 2
192.168.10.2    100                0       22          0    0     0 00:00:00 (shut)
DellEMC#
```

show running-config bgp

To display the current BGP configuration, use this feature.

Syntax `show running-config bgp`

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the E-Series.

Example

```
DellEMC# show running-config bgp
!
router bgp 100
 network 1.1.11.1/32
 network 1.1.12.1/32
 network 1.1.13.1/32
 neighbor 10.1.1.2 remote-as 200
 neighbor 10.1.1.2 no shutdown
DellEMC#
```

timers bgp

Adjust the BGP Keep Alive and Hold Time timers.

Syntax

`timers bgp` *`keepalive holdtime`*

To return to the default, use the `no timers bgp` command.

Parameters

keepalive	Enter a number for the time interval, in seconds, between keepalive messages sent to the neighbor routers. The range is from 1 to 65535. The default is **60 seconds**.
holdtime	Enter a number for the time interval, in seconds, between the last keepalive message and declaring the router dead. The range is from 3 to 65535. The default is **180 seconds**.

Defaults None

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the E-Series.

timers bgp extended

Adjust the BGP idle holdtime for all the BGP neighbors.

Syntax

`timers bgp extended` *`idle-holdtime`*

To return to the default, use the `no timers bgp extended` command.

Parameters

extended *idle-holdtime*	Enter a number for the time interval, in seconds, for the peer to be idle state. The range is from 1 to 32767. The default is **15 seconds**.

Defaults

The default *idle-holdtime* is **15 seconds**.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the C9010, MXL, FN IOM, S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6010–ON, S6100–ON, Z9100–ON, Z9500, and S6000–ON.

Usage Information

The peer remains in idle state based on the configured `idle-holdtime`. The less the `idle-holdtime`, lesser the peer in idle state.

For the new *idle-holdtime* to take effect, you need to shutdown all the peers manually using `neighbor shutdown` command and enable the peers again.

MBGP Commands

Multiprotocol BGP (MBGP) is an enhanced BGP that enables multicast routing policy throughout the internet and connecting multicast topologies between BGP and autonomous systems (ASs).

Dell EMC Networking OS MBGP is implemented as per IETF RFC 1858.

BGPv4 is supported in the following:

Dell EMC Networking OS Version	Platform Support
7.8.1.0, MBGP for IPv4 Multicast Only	S-Series

debug ip bgp dampening

View information on routes being dampened.

Syntax

```
debug ip bgp [vrf vrf-name] [ipv4 {unicast | multicast} | ipv6 unicast] dampening
```

To disable debugging, use the `no debug ip bgp dampening` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on dampened routes corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view dampened-route information related only to ipv4 multicast routes.
ipv4 unicast	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view dampened-route information related only to ipv4 unicast routes.
ipv6 *unicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `unicast` to view dampened-route information related only to ipv6 unicast routes.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced IPv6 MGBP support for the E-Series.

distance bgp

Define an administrative distance for routes.

Syntax

`distance bgp external-distance internal-distance local-distance`

To return to default values, use the `no distance bgp` command.

Parameters

external-distance	Enter a number to assign to routes learned from a neighbor external to the AS. The range is from 1 to 255. The default is **20**.
internal-distance	Enter a number to assign to routes learned from a router within the AS. The range is from 1 to 255. The default is **200**.
local-distance	Enter a number to assign to routes learned from networks listed in the network command. The range is from 1 to 255. The default is **200**.

Defaults

- external-distance = **20**
- internal-distance = **200**
- local-distance = **200**

Command Modes

ROUTER BGP (conf-router_bgp_af)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048–ON and S4048–ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced IPv6 MGBP on the E-Series.

Usage Information

CAUTION: Dell EMC Networking recommends that you do not change the administrative distance of internal routes. Changing the administrative distances may cause routing table inconsistencies.

The higher the administrative distance assigned to a route means that your confidence in that route is low. Routes assigned an administrative distance of 255 are not installed in the routing table. Routes from confederations are treated as internal BGP routes.

neighbor auto-local-address

Enable BGP to pick the next hop IPv6 address automatically for IPv6 prefix advertised over an IPv4 neighbor.

Syntax

```
neighbor {neighbor-ipv6-address | peer-group name} auto-local-address
```

To disable this feature, use the `no neighbor {neighbor-ipv6-address | peer-group name} auto-local-address` command.

Parameters

neighbor-ipv6–address	Enter the neighbor IPv6 address.
peer-group *name*	Enter the name of the peer group.

Defaults Disabled.

Command Modes ROUTER-BGP mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.2)	Introduced on the S6000, S6000–ON, S6100–ON, and Z9100–ON..

Usage Information If you use this command, the system dynamically picks up the local interface IPv6 address as the next hop for all the outgoing updates over an IPv4 neighbor configured under an IPv6 address family.

show ip bgp dampened-paths

View BGP routes that are dampened (non-active).

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 {multicast | unicast} | ipv6 unicast]
dampened-paths
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes that are affected by a specific community list corresponding to that VRF.
ipv4 *multicast*	(OPTIONAL) Enter the keyword `ipv4` followed by the keyword `multicast` to view information related only to ipv4 multicast routes.
ipv4 *unicast*	(OPTIONAL) Enter the keywords `ipv4` followed by the keyword `unicast` to view information related only to ipv4 unicast routes.
ipv6 unicast	(OPTIONAL) Enter the keyword `ipv6` followed by the keyword `unicast` to view information related only to ipv6 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the ipv4 multicast and ipv6 unicast parameters.
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.

Usage Information

To determine a BGP session flap, both a route-down event and a subsequent route-up event corresponding to a single route are considered. As a result, a flap event is penalized only one time during the route-down event. The subsequent route-up event corresponding to the same route is not considered as a flap and is not penalized.

The history paths that the `show ip bgp` command displays contain only the prefix and the next-hop information. The next-hop information shows the ip address of the neighbor. It does not show the actual next-hop details.

The following describes the `show ip bgp damp` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is dampened.
From	Displays the IP address of the neighbor advertising the dampened route.
Reuse	Displays the hour:minutes:seconds until the dampened route is available.
Path	Lists all the ASs the dampened route passed through to reach the destination network.

Example

```
DellEMC# show ip bgp dampened-paths
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, * valid, >
best
Path source: I - internal, a - aggregate, c - confed-external, r -
redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            From            Reuse     Path

d   55.0.0.0/24      172.16.0.2             00:36:23      200

DellEMC#
```

10

Content Addressable Memory (CAM)

You can use content addressable memory (CAM) commands to configure the amount of memory allocated to CAM memory partitions.

NOTE: Not all CAM commands are supported on all platforms. Be sure to note the platform when looking for a command.

NOTE: If you are using these features for the first time, contact Dell EMC Networking Technical Assistance Center (TAC) for guidance.

Topics:

- CAM Profile Commands
- Unified Forwarding Table Modes

CAM Profile Commands

The CAM profiling feature allows you to partition the CAM to best suit your application. For example:

- Configure more Layer 2 forwarding information base (FIB) entries when the system is deployed as a switch.
- Configure more Layer 3 FIB entries when the system is deployed as a router.
- Configure more access control lists (ACLs) (when IPv6 is not employed).
- Hash multi-protocol label switching (MPLS) packets based on source and destination IP addresses for link aggregation groups (LAGs).
- Hash based on bidirectional flow for LAGs.
- Optimize the virtual local area network (VLAN) ACL Group feature, which permits group VLANs for IP egress ACLs.

Important Points to Remember

- Dell EMC Networking OS supports CAM allocations on the S-Series.
- The CAM configuration is applied to the entire system when you use the CONFIGURATION mode commands. Save the running-configuration to affect the change.
- When budgeting your CAM allocations for ACLs and quality of service (QoS) configurations, remember that ACL and QoS rules might consume more than one CAM entry depending on complexity. For example, transmission control protocol (TCP) and user datagram protocol (UDP) rules with `port range` options might require more than one CAM entry.
- You MUST save your changes and reboot the system for CAM profiling or allocations to take effect.

cam-acl (Configuration)

Select the default CAM allocation settings or reconfigure a new CAM allocation for Layer 2, IPv4, and IPv6 ACLs, Layer 2 and Layer 3 (IPv4) QoS, Layer 2 Protocol Tunneling (L2PT), IP and MAC source address validation for DHCP, Ethernet Connectivity Fault Management (CFM) ACLs, OpenFlow, and Policy-based Routing (PBR).

Syntax

```
cam-acl {default | l2acl number ipv4acl number ipv6acl number ipv4qos
number l2qos number l2pt number ipmacacl number [vman-qos | vman-dual-qos
number] [etsacl number ] [fcoe number][fedgovacl number] [nlbclusteracl
number] [ipv4pbr number] [iscsioptacl number] [openflow number] [vrfv4acl
number] [ipv4udfenable] [ipv4udfmirracl number]
```

Parameters

default Use the default CAM profile settings and set the CAM as follows:

- L2Acl : 2
- Ipv4Acl : 2

- Ipv6Acl : 0
- Ipv4Qos : 2
- L2Qos : 2
- L2PT : 0
- IpMacAcl : 1
- VmanQos : 0
- EtsAcl : 0
- FcoeAcl : 0
- ipv4pbr : 0
- vrfv4Acl : 0
- Openflow : 0
- fedgovacl : 0
- nlbclusteracl: 0
- ipv4udfmirracl: 0
- ipv4mirracl: 0

l2acl *number* Enter the keyword `l2acl` and then the number of l2acl blocks. The range is from 0 to 8 in multiples of 2.

ipv4acl *number* Enter the keyword `ipv4acl` and then the number of FP blocks for IPv4 ACL. The range is from 0 to 9 in multiples of 3, when `ipv4udfenable` is selected. If not enabled, it is in multiples of 2. If the `feature acloptimized` command is enabled, the allocation is in multiples of 1.

ipv6acl *number* Enter the keyword `ipv6acl` and then the number of FP blocks for IPv6 ACL. The range is from 0 to 9 in multiples of 3. If you used the `feature ipv6acloptimized` command, the range is from 0 to 8 in multiples of 2.

ipv4qos *number* Enter the keyword `ipv4qos` and then the number of FP blocks for IPv4 QoS. The range is from 0 to 8 in multiples of 2.

l2qos *number* Enter the keyword `l2qos` and then the number of FP blocks for L2 QoS. The range is from 0 to 8 in multiples of 2.

l2pt *number* Enter the keyword `l2pt` and then the number of FP blocks for l2 protocol tunnelling. The range is from 0 to 8 in multiples of 2.

Ipmacacl *number* Enter the keyword `ipmacacl` and then the number of FP blocks for IP and MAC ACL. The range is from 0 to 9.

nlbclusteracl *number* Enter the keyword `nlbclusteracl` and then the number of FP blocks for nlbcluster ACL. The range is from 0 to 9. By default, the value is 0 and it supports 8 NLB arp entries reserved for internal functionality.

NOTE: When you reconfigure CAM allocation, use the `nlbclusteracl` *`number`* command to change the number of NLB ARP entries. The range is from 0 to 9. The default value is 0. At the default value of 0, eight NLB ARP entries are available for use. This platform supports up to 512 CAM entries. Select 1 to configure 256 entries. Select 2 to configure 512 entries. Even though you can perform CAM carving to allocate the maximum number of NLB entries, Dell EMC Networking recommends that you use a maximum of 64 NLB ARP entries.

vman-qos Enter the keyword `vman-qos` and then the number of FP blocks for VMAN QoS. The range is from 0 to 9.

vman-dual-qos *number* Enter the keyword `vman-dual-qos` and then the number of FP blocks for VMAN dual QoS. The range is from 0 to 4.

Ipv4pbr *number* Enter the keyword `ipv4pbr` and then the number of FP blocks for ipv4pbr ACL. The range is from 0 to 8.Each PBR entry is carved out in double wide mode. While carving, specify only even groups for PBR.

Openflow *number* Enter the keyword `openflow` and then the number of FP blocks for open flow (multiples of 4). The range is from 0 to 8.The range is from 0 to 9 in multiples of 3.

fcoeacl *number*	Enter the keyword `fcoeacl` and then the number of FP blocks for FCOE ACL. The range is from 0 to 6.The range is from 0 to 8 in multiples of 2.
Iscsioptacl *number*	Enter the keyword `iscsioptacl` and then the number of FP blocks for iSCSI optimization ACL. The range is from 0 to 2.The range is from 0 to 9.
ipv4udfmirracl	Enter the keyword `ipv4udfmirracl` and then the number of FP blocks for IPv4 UDF and IPv6 mirror ACL. The range is from 0 to 8.
ipv4mirracl	Enter the `ipv4mirracl` keyword and then the number of FP blocks for IPv4 mirror ACL. The range is from 0 to 8. You cannot use the `ipv4mirracl` and `ipv4udfmirracl` commands at the same time.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.5)	Added the keyword `radius-v4acl` on the S3048–ON.
9.14(1.3P2)	Added the keyword `radius-v4acl` on the S3100 series.
9.14(0.0)	Added the keyword `ipv6mirracl` on the S6000 and S6000–ON. Introduced the `feature ipv6acloptimized` command to make the IPv6 ACL CAM region double-wide on the S5048F–ON, S6100–ON, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Added the keyword `ipv4mirracl`.
9.11(0.0)	Added the keyword `ipv4udfmirracl`.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added the `nlbcluster ACL` keyword. Introduced on the S6000-ON.
9.4.(0.0)	Added support for PBR and VRF.
9.2(1.0)	Introduced on the Z9500.
9.2(0.2)	Added support for fcoe.
9.1.(0.0)	Added support for OpenFlow.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.2	Clarified block information for the S4810.
8.3.10.0	Introduced on the S4810.
8.3.1.0	Added the keywords `ecfmacl`, `vman-qos`, and `vman-dual-qos`.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.

Usage Information Save the new CAM settings to the startup-config (`write-mem` or `copy run start`) then reload the system for the new settings to take effect.

The total amount of space allowed is 12 FP Blocks. System flow requires three blocks; these blocks cannot be reallocated. Only 9 number of blocks can be configured by the user .

The `ipv6acl` allocation must be a factor of 3.

If allocation values are not entered for the CAM regions, the value is 0.

If you enable BMP, to perform a reload on the chassis to upgrade any configuration changes that have changed the NVRAM content, use the command `reload conditional nvram-cfg-change`.

cam-acl-egress

Allocate CAM for egress ACLs.

Syntax `cam-acl-egress default | l2acl number ipv4acl number ipv6acl number`

Parameters

default	Reset the egress CAM ACL entries to default settings.
l2acl *number*	Set the number of blocks for L2 egress ACL entries.
ipv4acl *number*	Set the number of blocks for IPv4 egress ACL entries.
ipv6acl *number*	Set the number of blocks for IPv6 egress ACL entries. It must be a multiple of 2.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

cam-optimization

Optimize CAM utilization for QoS Entries by minimizing require policy-map CAM space.

Syntax `cam-optimization [qos]`

Parameters

qos	Optimize CAM usage for QoS.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0.	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.

Usage Information When you enable this command, if a Policy Map containing classification rules (ACL and/or dscp/ ip-precedence rules) is applied to more than one physical interface on the same port pipe, only a single copy of the policy is written (only one FP entry is used).

NOTE: An ACL itself may still require more that a single FP entry, regardless of the number of interfaces. For more information, refer to the "IP Access Control Lists", "Prefix Lists", and "Route-map" sections in the *Dell EMC Networking OS Configuration Guide*.

feature ipv6acloptimized

Convert the IPv6 ACL CAM to double-wide.

Syntax `feature ipv6acloptimized`

To disable this feature, use the `no feature ipv6acloptimized` command.

Command Modes CONFIGURATION

Defaults Not configured

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S5048F–ON, S6100–ON, and Z9100–ON..

Usage Information

- When you convert the IPv6 ACL CAM region to double-wide, you can configure only up to 64 bit masks for the source IPv6 address and the destination IPv6 address in IPv6 ACL rules. The system rejects the `host` keyword when you write your ACL rules.
- When you convert the IPv6 ACL CAM region to double-wide, carve the IPv6 CAM region in multiples of two. You can use a maximum value of eight.

- This feature is supported for IPv6 user ACLs only in the ingress direction.
- After using the `feature ipv6acloptimized` command on the system, reload the system for the configuration to take effect.

Example

```
DellEMC(conf)# feature ipv6acloptimized
Configuration change will be in effect after save and reload. IPV6
Acls would be based on <= /64 Mask addresses only, Rules with mask
greater than 64 bits or host keyword will be rejected while applying on
interface.
DellEMC(conf)# cam-acl l2acl 0 ipv4acl 0 ipv6acl 8 ipv4qos 0 l2qos 0
l2pt 0 ipmacacl 1 vman-qos 0
DellEMC(conf)# reload
```

show cam-acl

Display the details of the CAM profiles on the chassis and all stack units.

Syntax `show cam-acl`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Updated to display IPv6 flow-based mirroring information on S5048F-ON, S6100–ON, Z9100–ON, S6000, and S6000–ON. Updated to display the IPv6 ACL region in multiples of 2 when the `feature ipv6acloptimized` command is enabled on the S5048F–ON, S6100–ON, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series.

Usage Information The display reflects the settings implemented with the `cam-acl` command.

Example

Example (IPv6 flow-based

```
DellEMC#show cam-acl

-- Chassis Cam ACL --
            Current Settings(in block sizes)
```

mirroring information)

```
                  1 block = 256 entries
            Single Wide Regions: Ipv4Acl
            Double Wide Regions: L2Acl, L2Qos, L2PT
                               : FcoeAcl, ipv4pbr, vrfv4Acl
            Triple Wide Regions: Ipv6Acl, VmanQos, Openflow, ipv4udfmirracl(ipv6mirracl)
L2Acl          :         0
Ipv4Acl        :         2
Ipv6Acl        :         3
Ipv4Qos        :         0
L2Qos          :         0
L2PT           :         0
IpMacAcl       :         1
VmanQos        :         0
EcfmAcl        :         0
EtsAcl         :         0
FcoeAcl        :         0
iscsiOptAcl    :         0
ipv4pbr        :         0
vrfv4Acl       :         0
Openflow       :         0
fedgovacl      :         0
nlbclusteracl  :         0
ipv4udfmirracl*:         3
ipv4mirracl    :         0

* - shared regions
```

Example (When the IPv4 QoS and IPv6 ACL optimization is enabled)

```
DellEMC#show cam-acl
-- Chassis Cam ACL --

             Current Settings(in block sizes)
                   1 block = 256 entries
            Double Wide Regions: L2Acl, Ipv4Acl, Ipv4Qos, L2Qos, L2PT
                               : FcoeAcl, ipv4pbr, vrfv4Acl, IPV6Acl,
IPV6(IPV4QOS)
            Triple Wide Regions: VmanQos, Openflow, ipv4udfmirracl
L2Acl          :         2
Ipv4Acl        :         4
Ipv6Acl*       :         2
Ipv4Qos*       :         0
L2Qos          :         2
L2PT           :         0
IpMacAcl       :         1
VmanQos        :         0
EcfmAcl        :         0
EtsAcl         :         0
FcoeAcl        :         0
iscsiOptAcl    :         0
ipv4pbr        :         0
vrfv4Acl       :         0
Openflow       :         0
fedgovacl      :         0
nlbclusteracl  :         0
ipv4udfmirracl:          0
ipv4mirracl    :         0
* - shared regions
```

show cam-usage

Display the amount of memory space used and available in each CAM partition (including Layer 2 ACL, Layer 3 ACL, and IPv4Flow)

Syntax `show cam-usage [acl | router | switch]`

Parameters

acl	(OPTIONAL) Enter the keyword `acl` to display Layer 2 and Layer 3 ACL CAM usage.
router	(OPTIONAL) Enter the keyword `router` to display Layer 3 CAM usage.
switch	(OPTIONAL) Enter the keyword `switch` to display Layer 2 CAM usage.

Defaults none

Command Modes EXEC Privilege

Command History

Version	Description
9.14(0.0)	Updated to display IPv6 flow-based mirroring information on the S5048F-ON, S6100–ON, Z9100–ON, S6000, and S6000–ON. Updated to display the shared region between IPv4 QoS and IPv6 ACL entries on the S5048F–ON, S6100–ON, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P1)	Optimized the ACL filters to support more than 200 egress ACL rules on the S6000, S6000–ON, S6100–ON, Z9100–ON.
9.11.0.0	The `show cam-usage` command is updated to display ECMP count information.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

The following table describes the output fields of the `show cam-usage` command.

Table 3. Output fields of the show cam-usage command

Field	Description
Stackunit	Number of the stack unit that contains information on ACL VLAN groups
Portpipe	The hardware path that packets follow through a system for ACL optimization
CAM-Region	Type of area in the CAM block that is used for ACL VLAN groups
Total CAM space	Total amount of space in the CAM block
Used CAM	Amount of CAM space that is currently in use
Available CAM	Amount of CAM space that is free and remaining to be allocated for ACLs

Example

```
DellEMC#show cam-usage
Stackunit|Portpipe|Pipeline| CAM Partition    | Total CAM   |  Used CAM   |Available CAM
========|========|========|==================|=============|=============|==============
    1   |   0    |   0    | IN-L2 ACL        |         0   |         0   |         0
        |        |        | IN-L3 ACL        |       512   |         1   |       511
        |        |        | IN-L3 ECMP GRP   |      2048   |         0   |      2048
        |        |        | IN-V6 ACL        |       256   |         0   |       256
        |        |        | IN-NLB ACL       |         0   |         0   |         0
        |        |        | IPMAC ACL        |       256   |         0   |       256
        |        |        | IN-L3-UDFMIRRACL|       256   |         3   |       253
                           (IN-V6-MIRR ACL)
        |        |        | IN-L3-MIRR ACL   |         0   |         0   |         0
        |        |        | OUT-L2 ACL       |       206   |        12   |       194
        |        |        | OUT-L3 ACL       |       202   |         8   |       194
        |        |        | OUT-V6 ACL       |       202   |         3   |       199
        |        |        | IN-L3 QOS        |         0   |         0   |         0
        |        |        | IN-L3 FIB        |     90112   |         5   |     90107
```

Example (show cam-usage router)

```
DellEMC#show cam-usage router
Stackunit|Portpipe|Pipeline| CAM Partition    | Total CAM   |  Used CAM   |Available CAM
========|========|========|==================|=============|=============|==============
    1   |   0    |   0    | IN-L3 ACL        |       512   |         1   |       511
        |        |        | IN-L3 ECMP GRP   |      2048   |         0   |      2048
        |        |        | IN-V6 ACL        |       256   |         0   |       256
        |        |        | IN-L3-UDFMIRRACL|       256   |         0   |       256
                           (IN-V6-MIRR ACL)
        |        |        | IN-L3-MIRR ACL   |         0   |         0   |         0
        |        |        | OUT-L3 ACL       |       202   |         8   |       194
        |        |        | OUT-V6 ACL       |       202   |         3   |       199
        |        |        | IN-L3 QOS        |         0   |         0   |         0
        |        |        | IN-L3 FIB        |     90112   |         5   |     90107
```

test cam-usage

Verify that enough CAM space is available for the IPv6 ACLs you have created.

Syntax

```
test cam-usage service-policy input input policy name stack-unit {number | all}
```

Parameters

policy-map name	Enter the name of the policy-map to verify. Maximum is 32 characters.
number	Enter `all` to get information for all the stack-units or enter the stack-unit number to get information for a specific stack-unit.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced.

Usage Information

This command applies to both IPv4 and IPv6 CAM Profiles, but is best used when verifying QoS optimization for IPv6 ACLs.

QoS Optimization for IPv6 ACLs does not impact the CAM usage for applying a policy on a single (or the first of several) interfaces. It is most useful when a policy is applied across multiple interfaces; it can reduce the impact to CAM usage across subsequent interfaces.

The following describes the `test cam-usage` command shown in the following example.

Term	Explanation
Stack-Unit	Lists the stack unit or units that are checked. Entering all shows the status for all stacks.
Portpipe	Lists the portpipe (port-set) or port pipes (port-sets) that are checked. Entering `all` shows the status for stack-units and port-pipes in the chassis. .
CAM Partition	Shows the CAM profile of the CAM.
Available CAM	Identifies the amount of CAM space remaining for that profile.

Term	Explanation
Estimated CAM per Port	Estimates the amount of CAM space the listed policy will require.
Status	Indicates whether or not the policy will be allowed in the CAM.

Example

```
DellEMC# test cam-usage service-policy input In stack-unit all
Stack-unit|Portpipe| Tile |CAM Partition|Available CAM|Estimated CAM per Port|Status
------------------------------------------------------------------------------
         1 |    0 |        0 | L2ACL     |             0 |                100 | Exception
         1 |    0 |        1 | L2ACL     |           156 |                100 | Allowed
         1 |    0 |        2 | L2ACL     |           256 |                100 | Allowed
         1 |    0 |        3 | L2ACL     |           256 |                100 | Allowed
```

Example

```
DellEMC# test cam-usage service-policy input In stack-unit all
Stack-Unit|Portpipe|CAM Partition|Available CAM|Estimated CAM per Port|Status
------------------------------------------------------------------------------
1 | 0 | IPv4Flow | 102 | 0| Allowed
1 | 0 | IPv4Flow | 102 | 0| Allowed
DellEMC#
!
DellEMC# test cam-usage service-policy input In stack-unit 1 port-set 0
Stack-Unit|Portpipe|CAM Partition|Available CAM|Estimated CAM per Port|Status
------------------------------------------------------------------------------
1 | 0 | IPv4Flow | 102 | 0| Allowed
DellEMC#
```

Unified Forwarding Table Modes

Unified Forwarding Table (UFT) consolidates the resources of several search tables (Layer 2, Layer 3 Hosts, and Layer 3 Route [Longest Prefix Match — LPM]) into a single flexible resource. The system supports several UFT modes to extract the forwarding tables, as required. By default, Dell EMC Networking OS initializes the table sizes to UFT mode 2 profile, as it provides a reasonable shared memory for all the tables. The other supported UFT modes are scaled-l3–hosts (UFT mode 3) and scaled-l3–routes (UFT mode 4).

Important Points to Remember

- All line cards/Stack Members within a single system must have the same UFT mode profiles. This profile must match the system UFT mode profile (the profile on the primary route processor module [RPM]/ Master Unit of the Stack).
- Apply the UFT mode configuration to the entire system when you use the CONFIGURATION mode commands. Save the running-configuration to affect the change.
- Save the changes and reboot the system for UFT mode profiling to take effect.

hardware forwarding-table mode

Select a mode to initialize the maximum scalability size for L2 MAC table or L3 Host table or L3 Route table.

Syntax `hardware forwarding-table mode {scaled-l3- hosts | scaled-l3-routes}hardware forwarding-table-mode {scaled-l2-switch | scaled-l3-hosts | scaled-l3-routes}`

Parameters

scaled-l2-switch	Enter the keywords `scaled-l2-switch` to select the forwarding table mode for scaling l3 switch entries.
scaled-l3-hosts	Enter the keywords `scaled-l3-hosts` to select the forwarding table mode for scaling l3 host entries.
scaled-l3-routes	Enter the keywords `scaled-l3-routes` to select the forwarding table mode for scaling l3 route entries.

Defaults UFT mode 2

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.7(0.0)	Introduced on the S6000, S6000-ON, and Z9500 switch..

Usage Information This command takes effect only after reboot.

Related Commands show hardware forwarding-table mode — displays the hardware forwarding table mode in the current boot and in the next boot.

show hardware forwarding-table mode

Display the hardware forwarding table mode in the current boot and in the next boot.

Syntax `show hardware forwarding-table mode`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.7(0.0)	Introduced on the S6000, S6000-ON, and Z9500 switch.

Example

```
DellEMC#show hardware forwarding-table mode

                    Current Settings
Mode              :  Default
L2 MAC Entries    :   72K
L3 Host Entries   :   72K
L3 Route Entries  :   16K
```

```
DellEMC#show hardware forwarding-table mode

                    Current Settings            Next Boot Settings
Mode              :  Default                    scaled-l3-hosts
L2 MAC Entries    :  160K                        96K
L3 Host Entries   :  144K                       208K
L3 Route Entries  :   16K                        16K

DellEMC#
```

Related Commands hardware forwarding-table mode — selects the mode to initialize the maximum scalability size for L2 MAC table or L3 Host table or L3 Route table.

11

Control Plane Policing (CoPP)

Control plane policing (CoPP) uses access control list (ACL) rules and quality of service (QoS) policies to create filters for a system's control plane. The CoPP filters prevent traffic that is not identified as legitimate from reaching the control plane, and rate-limit traffic to an acceptable level.

Topics:

- control-plane-cpuqos
- cpu-protocol-group
- copp-profile
- cpu-queue
- copp-policy
- protocol-list
- queue-length
- service-policy rate-limit-cpu-queues
- service-policy rate-limit-protocols
- show cpu-queue rate cp
- show ip protocol-queue-mapping
- show ipv6 protocol-queue-mapping
- show mac protocol-queue-mapping
- show running-config copp-profile
- show running-config cpu-protocol-group

control-plane-cpuqos

To manage control-plane traffic, enter control-plane mode and configure the switch.

Syntax	`control-plane-cpuqos`
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

cpu-protocol-group

Creates or removes a protocol group.

Syntax `cpu-protocol-group group-name`

Use the `no cpu-protocol-group group-name` command to remove the protocol-group.

Command Modes CONFIGURATION

Parameters

group-name Enter the unique protocol-group name that you want to create.

NOTE: The length of the group-name that you specify cannot exceed 32 characters.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000. S6000–ON, Z9100–ON, S6100–ON.

Example

```
DellEMC#configure terminal
DellEMC(conf)#cpu-protocol-group PG0
DellEMC(conf-cpu-protocol-group)#
```

copp-profile

Creates a control plane policing (CoPP) profile.

Syntax `copp-profile profile-name`

Use the `no copp-profile profile-name` command to remove the CoPP profile.

Command Modes CONFIGURATION

Parameters

profile-name Enter the unique profile name for the CoPP profile that you want to create.

NOTE: The length of the CoPP profile name cannot exceed 32 characters.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Example

```
DellEMC(conf)#copp-profile COPP
DellEMC(conf-copp-profile)#show config
!
copp-profile COPP
DellEMC(conf-copp-profile)#
```

cpu-queue

Configures queue parameters.

Syntax

`cpu-queue queue-number {protocol-group group-name [qos-policy policy-name] | qos-policy policy-name}`

Use the `no cpu-queue queue-number` command to remove the queue parameter configuration.

Command Modes COPP-PROFILE

Parameters

queue-number	Enter the queue number that you want to configure. The range is from 0 to 11. A queue can be mapped to a protocol-group or a qos-policy or both. Protocol groups cannot be configured for queue numbers 0 and 4. Only qos-policy can be mapped to these two queues.
protocol-group *group-name*	Enter the keyword `protocol-group` followed by the name of the protocol group.
qos-policy *policy-name*	Enter the keyword `qos-policy` followed by the name of the QoS policy. The Rateshape parameters and queue-length are defined in the QoS policy.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Usage Information The protocols which are not mapped to the cpu queues will be mapped to Queue 0. The internal protocols like IPC, VLT etc will be mapped to Queue 4.

Example

```
DellEMC(conf)#copp-profile COPP
DellEMC(conf-copp-profile)#cpu-queue 1 protocol-group PG1 qos-policy QP1
DellEMC(conf-copp-profile)#cpu-queue 2 protocol-group PG2
DellEMC(conf-copp-profile)#cpu-queue 3 qos-policy QP3
DellEMC(conf-copp-profile)#show config
!
copp-profile COPP
 cpu-queue 1 protocol-group PG1 qos-policy QP1
 cpu-queue 2 protocol-group PG2
 cpu-queue 3 qos-policy QP3
DellEMC(conf-copp-profile)#
```

copp-policy

Creates a control plane policing (CoPP) policy.

Syntax

`copp-policy profile-name`

Use the `no copp-policy profile-name` command to remove the CoPP policy.

Command Modes CONTROL-PLANE-CPUQOS

Parameters

profile-name	Enter the unique profile name for the CoPP policy that you want to create. **NOTE:** The length of the profile name that you specify cannot exceed 32 characters.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Usage Information

Following are the prerequisite for applying a CoPP policy:

- Ensure that the protocols are not running. If protocols are running, issues such as, packets arriving out of order, may occur.
- Ensure that the `service-class cpu-queue-buffer` command is not configured. The `copp-policy` command will not be available if the `service-class cpu-queue-buffer` command is configured.
- Ensure that the `service-policy rate-limit-cpu-queues` command is not configured, The `copp-policy` command will not be available if the `service-policy rate-limit-cpu-queues` is configured.
- You cannot associate a protocol group with more than one queue.
- Ensure that each queue contains a unique protocol list. A protocol cannot be configured in more than one queue.

NOTE: The protocols that are not mapped to the CPU queues are mapped to Queue 0.

Example

```
DellEMC(conf)#control-plane-cpuqos
DellEMC(conf-control-cpuqos)#copp-policy COPP
DellEMC(conf-control-cpuqos)#show config
!
control-plane-cpuqos
 copp-policy COPP
DellEMC(conf-control-cpuqos)#
```

protocol-list

Creates a protocol list to be configured under a protocol group.

Syntax

`protocol-list` *`protocol-name1, protocol-name2,.....`*

Use the `no protocol-list` command to remove the protocols from the protocol-group.

Command Modes

CPU-PROTOCOL-GROUP

Parameters

protocol-name1, protocol-name2, ...	Enter the list of protocols to be associated with the protocol group. **NOTE:** When you specify multiple protocols to be associated with a protocol-group profile, you must de-limit each protocol name with only a coma.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Usage Information

When a new set of protocols is configured in the protocol-group over an existing set of protocols, the new set replaces the existing list of protocols in the protocol-group.

Example

```
DellEMC#configure terminal
DellEMC(conf)#cpu-protocol-group PG0
DellEMC(conf-cpu-protocol-group)#protocol-list 802dot1x , arp-req , arp-
rsp
DellEMC(conf-cpu-protocol-group)#show config
!
cpu-protocol-group PG0
protocol-list 802dot1x , arp-req , arp-rsp
DellEMC(conf-cpu-protocol-group)#
```

queue-length

Configures queue length.

Syntax `queue—length queue-length-value`

Use the `no queue-length` command to remove the queue length configuration.

Command Modes QOS-POLICY-INPUT

Parameters

queue-length-value	Enter the queue length value you want to configure. The range is from 0 to 235.

Default The default value is 235.

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Usage Information The queue-length takes effect only if the qos-policy is associated with a copp-policy.

Example

```
DellEMC(conf)#qos-policy-input QP1 cpu-qos
DellEMC(conf-in-qos-policy-cpuqos)#queue-length 235
%Info: queue-length will take effect only when qos-policy is associated
with a CoPP profile.
DellEMC(conf-in-qos-policy-cpuqos)#show conf
!
qos-policy-input QP1 cpu-qos
 queue-length 235
DellEMC(conf-in-qos-policy-cpuqos)#
```

service-policy rate-limit-cpu-queues

Apply a policy map for the system to rate limit control traffic on a per-queue basis.

Syntax `service-policy rate-limit-cpu-queues policy-name`

Parameters

policy-name	Enter the service-policy name, using a string up to 32 characters.

Defaults Not configured.

Command Modes CONTROL-PLANE-CPUQOS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information

Create a policy-map by associating a queue number with the qos-policy.

Create QoS policies prior to enabling this command.

For CoPP, use the keyword `cpu-qos` when creating qos-policy-input.

Related Commands

- qos-policy-input — create a QoS input policy map.
- policy-map-input — create an input policy map.

service-policy rate-limit-protocols

Apply a policy for the system to rate limit control protocols on a per-protocol basis.

Syntax

```
service-policy rate-limit-protocols policy-name
```

Parameters

policy-name	Enter the service-policy name, using a string up to 32 characters.

Defaults

Not configured.

Command Modes

CONTROL-PLANE-CPUQOS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information

This command applies the service-policy based on the type of protocol defined in the ACL rules.

Create ACL and QoS policies prior to enabling this command.

For CoPP, use the keyword `cpu-qos` when creating qos-policy-input.

Related Commands

- ip access-list extended — creates an extended IP ACL.
- mac access-list extended — creates an extended MAC ACL.
- qos-policy-input — creates a QoS input policy map.
- class-map — creates a QoS class map.
- policy-map-input — creates an input policy map.

show cpu-queue rate cp

Display the rates for each CPU queue.

Syntax `show cpu-queue rate cp`

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information This command applies the service-policy based on the type of protocol defined in the ACL rules.

Create ACL and QoS policies prior to enabling this command.

Example

```
DellEMC#show cpu-queue rate cp
 Service-Queue         Rate (PPS)      Burst (Packets)
 --------------        -----------      ----------
Q0                        600              512
Q1                        1000             50
Q2                        300              50
Q3                        1300             50
Q4                        2000             50
Q5                        400              50
Q6                        400              50
Q7                        400              50
Q8                        600              50
```

```
Q9                          600             50
Q10                         600             50
Q11                         300             50
DellEMC#
```

show ip protocol-queue-mapping

Display the queue mapping for each configured protocol.

Syntax `show ip protocol-queue-mapping`

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Modified the output to display MCAST data packet information.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Example

```
DellEMC# show ip protocol-queue-mapping
 Protocol    Src-Port  Dst-Port  TcpFlag Queue EgPort Rate (kbps)
 --------    --------  --------  ------- ----- ------ -----------
TCP (BGP)      any/179   179/any   _       Q9    _      _
UDP (DHCP)     67/68     68/67     _       Q10   _      _
UDP (DHCP-R)   67        67        _       Q10   _      _
TCP (FTP)      any       21        _       Q6    _      _
ICMP           any       any       _       Q6    _      _
IGMP           any       any       _       Q11   _      _
TCP (MSDP)     any/639   639/any   _       Q11   _      _
UDP (NTP)      any       123       _       Q6    _      _
OSPF           any       any       _       Q9    _      _
PIM            any       any       _       Q11   _      _
UDP (RIP)      any       520       _       Q9    _      _
TCP (SSH)      any       22        _       Q6    _      _
TCP (TELNET)   any       23        _       Q6    _      _
VRRP           any       any       _       Q10   _      _
DellEMC#
```

show ipv6 protocol-queue-mapping

Display the queue mapping for each configured IPv6 protocol.

Syntax `show ipv6 protocol-queue-mapping`

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Modified the output to display MCAST data packet information.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Example

```
DellEMC# show ipv6 protocol-queue-mapping
 Protocol  Src-Port  Dst-Port  TcpFlag Queue EgPort Rate (kbps)
 --------  --------  --------  ------- ----- ------ -----------
TCP (BGP)    any/179   179/any    _       Q9    _       _
ICMPV6 NA    any       any        _       Q6    _       _
ICMPV6 RA    any       any        _       Q6    _       _
ICMPV6 NS    any       any        _       Q5    _       _
ICMPV6 RS    any       any        _       Q5    _       _
ICMPV6       any       any        _       Q6    _       _
VRRPV6       any       any        _       Q10   _      _
OSPFV3       any       any        _       Q9    _       _
DellEMC#
```

```
DellEMC# show ipv6 protocol-queue-mapping
 Protocol  Src-Port  Dst-Port  TcpFlag Queue EgPort Rate (kbps)
 --------  --------  --------  ------- ----- ------ -----------
TCP (BGP)    any/179   179/any    _       Q9    _       _
ICMPV6 NA    any       any        _       Q6    _       _
ICMPV6 RA    any       any        _       Q6    _       _
ICMPV6 NS    any       any        _       Q5    _       _
ICMPV6 RS    any       any        _       Q5    _       _
ICMPV6       any       any        _       Q6    _       _
VRRPV6       any       any        _       Q10   _      _
OSPFV3       any       any        _       Q9    _       _
DellEMC#
```

```
DellEMC#show ipv6 protocol-queue-mapping
 Protocol  Src-Port  Dst-Port  TcpFlag Queue EgPort Rate (kbps)
 --------  --------  --------  ------- ----- ------ -----------
```

```
TCP (BGP)     any/179    179/any    _        Q9      _       _
UDP (DHCPV6)  546/547    546/547    _        Q10     _       _
ICMPV6 NA     any        any        _        Q6      _       _
ICMPV6 RA     any        any        _        Q6      _       _
ICMPV6 NS     any        any        _        Q5      _       _
ICMPV6 RS     any        any        _        Q5      _       _
ICMPV6        any        any        _        Q6      _       _
VRRPV6        any        any        _        Q10     _       _
OSPFV3        any        any        _        Q9      _       _
DellEMC#
```

show mac protocol-queue-mapping

Display the queue mapping for the MAC protocols.

Syntax `show mac protocol-queue-mapping`

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Example

```
DellEMC# show mac protocol-queue-mapping
 Protocol  Destination Mac      EtherType Queue EgPort Rate (kbps)
 --------  ---------------      --------- ----- ------ -----------
ARP        any                  0x0806    Q5/Q6  CP      _
FRRP       01:01:e8:00:00:10/11 any       Q7     CP      _
LACP       01:80:c2:00:00:02    0x8809    Q7     CP      _
LLDP       any                  0x88cc    Q8     CP      _
GVRP       01:80:c2:00:00:21    any       Q8     CP      _
STP        01:80:c2:00:00:00    any       Q7     CP      _
ISIS       01:80:c2:00:00:14/15 any       Q9     CP      _
           09:00:2b:00:00:04/05 any       Q9     CP
DellEMC#
```

show running-config copp-profile

Displays the configured CoPP profiles.

Syntax `show running-config copp-profile`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Example

```
DellEMC# show running-config copp-profile
!
copp-profile COPP
 cpu-queue 1 protocol-group PG1 qos-policy qin1
 cpu-queue 11 protocol-group PG3
DellEMC#
```

show running-config cpu-protocol-group

Displays the configured CPU protocol groups.

Syntax `show running-config cpu-protocol-group`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S6000, S6000–ON, Z9100–ON, and S6100–ON.

Example

```
DellEMC#show running-config cpu-protocol-group
!
cpu-protocol-group PG0
protocol-list 802dot1x , arp-req , arp-rsp
!
cpu-protocol-group PG1
protocol-list arp-req , arp-rsp , ip-local-term
!
cpu-protocol-group PG3
protocol-list ttl0 , ttl1
DellEMC#
```

12

Data Center Bridging (DCB)

Data center bridging (DCB) refers to a set of IEEE Ethernet enhancements that provide data centers with a single, robust, converged network to support multiple traffic types, including local area network (LAN), server, and storage traffic.

The Dell EMC Networking OS commands for data center bridging features include 802.1Qbb priority-based flow control (PFC), 802.1Qaz enhanced transmission selection (ETS), and the data center bridging exchange (DCBX) protocol.

This section includes the following:

- DCB Command
- PFC Commands
- ETS Commands
- DCBX Commands

Topics:

- DCB Command
- PFC Commands
- ETS Commands
- DCBX Commands
- dcb-map
- priority-pgid
- priority-group bandwidth pfc
- dcb pfc-shared-buffer-size
- dcb-buffer-threshold
- priority
- dcb-policy buffer-threshold (Interface Configuration)
- dcb pfc-total-buffer-size
- show running-config dcb-buffer-threshold
- dcb {ets | pfc} enable

DCB Command

The following DCB command is supported on the Dell EMC Networking OS.

dcb-enable

Enable data center bridging.

Syntax	`dcb enable[pfc-queues 1-4]`	
	To disable DCB, use the `no dcb enable` command.	
Parameters	***pfc-queues***	Enter the pfc-queue range. To disable DCB, use the no dcb enable command. The range is from 1 to 4.
Defaults	None	
Command Modes	CONFIGURATION	
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.	

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By default, iSCSI is enabled on the unit and the flow control is enabled on all of the interfaces. It is also acts as defaults when the link-level flow control is enabled on one or more interfaces.

Enables priority flow control or enhance transmission selection on interface.

For ETS functioning, first assign the etsacl space using the `cam-acl` command.

```
DellEMC(conf)#cam-acl l2acl 2 ipv4acl 0 ipv6acl 0 ipv4qos 2 l2qos 0 l2pt
0 ipmacacl 0 vman-qos 0 fcoeacl 2 etsacl 1 iscsi 2
```

Related Commands

- dcb <ets | pfc> enable — enable priority flow control or enhanced transmission selection on interface.

PFC Commands

The following PFC commands are supported on the Dell EMC Networking OS.

clear hardware pfc-nodrop-priority

Clear the drop statistics.

Syntax

`clear hardware pfc-nodrop-priority l2-dlf drops stack-unit` *`stack-unit-number`* `port-set` *`port-pipe`*

Parameters

stack-unit *stack-unit-number*	Enter the keywords `stack-unit` and the stack unit number.
port-set *port-pipe*	Enter the keywords `port-set` and port-pipe number. The port-pipe number is 0.

Command Modes

EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the C9010, S6000, S6000–ON, Z9100–ON and S6100–ON.

Related Commands

pfc-nodrop-priority l2-dlf drop — configures to drop the unknown unicast packets flooding on lossless priorities.

show hardware pfc-nodrop-priority — displays the packets drop count corresponding to the priority.

clear pfc counters

Clear the PFC TLV counters and PFC statistics on an interface or stack unit.

Syntax

```
clear pfc counters [interface interface-type | stack-unit {unit-number | all} stack-ports all]
```

Parameters

interface *interface-type*	Enter the keywords `port-type` then the interface information. Enter the subport number if a port is fanned-out into 10G ports.
stack-unit *unit number*	Enter the keywords `stack-unit` then the stack-unit number to be cleared.
stack-ports all	Enter the keywords `stack-ports all` to clear the counters on all stack ports.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information If you do not use the `statistics` parameter, both hardware and DCBx counters clear.

dcb pfc-headroom-buffer-size

Configure a shared head room pool limit.

Syntax

```
dcb pfc-headroom-buffer-size buffer-size
```

To undo the shared head room pool limit configuration, use the `no dcb pfc-headroom-buffer-size buffer-size` command.

Parameters

buffer-size	Enter the maximum buffer value that you want to allocate for the shared head room pool. Each lossless Priority or Priority Group can use up to the peak head room configured for that particular priority from the shared head room configured. The range is from 0 to 4727.

Defaults 1040 KB.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0)	Introduced on the Z9100-ON and S6100-ON.

Example

pfc-nodrop-priority l2-dlf drop

Configure to drop the unknown unicast packets flooding on lossless priorities.

Syntax

```
pfc-nodrop-priority l2-dlf drop
```

To disable the feature, use the `no pfc-nodrop-priority l2-dlf drop` command.

Parameters

l2-dlf	Enter the keywords `l2-dlf` to drop flooding traffic on lossless priorities.
drop	Enter the keyword `drop` to enable the drop action.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the C9010, S6000, S6000–ON, Z9100–ON and S6100–ON.

Related Commands show hardware pfc-nodrop-priority — displays the packets drop count corresponding to the priority.

pfc no-drop queues

Configure the port queues that still function as no-drop queues for lossless traffic.

Syntax

```
pfc no-drop queues queue-range
```

To remove the no-drop port queues, use the `no pfc no-drop queues` command.

Parameters

queue-range	Enter the queue range. Separate the queue values with a comma; specify a priority range with a dash; for example, `pfc no-drop queues 1,3` or `pfc no-drop queues 7` or `pfc no-drop queues 0,7`. The range is from 0 to 7.

Defaults No lossless queues are configured.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

- When you configure lossless queues on an interface, PFC priority configuration is not allowed on the dcb-map profile applied on the interface.
- The maximum number of lossless queues globally supported on the switch is four.

  The following lists the dot1p priority-queue assignments.

dot1p Value in the Incoming Frame	Description heading
0	1
1	0
2	2
3	3
4	4
5	5
6	6
7	7

- Before configuring the port queues to function as no-drop queues, you must first apply the dcb-map map with pfc mode off. To apply the dcb-map with pfc mode off, use the following commands: `dcb-map dcb-map-name` and `no pfc mode on`.

pfc priority

Configure the CoS traffic to be stopped for the specified delay.

Syntax `pfc priority` *`priority-range`*

To delete the pfc priority configuration, use the `no pfc priority` command.

Parameters

priority-range Enter the 802.1p values of the frames to be paused. Separate the priority values with a comma; specify a priority range with a dash; for example, pfc priority 1,3,6-7. The range is from 0 to 7.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

The default number of 802.1p priorities that you can enable for PFC is 2. The maximum number of 802.1p priorities that you can enable for PFC is –4. Queues to which PFC priority traffic is mapped are lossless by default. Traffic may be interrupted due to an interface flap (going down and coming up) when you reconfigure the lossless queues for no-drop priorities.

The default number of lossless queues supported on the switch is two. The maximum number of lossless queues supported on the system is 4.

A PFC peer must support the configured priority traffic (as DCBX detects) to apply PFC.

show dcb

Displays the data center bridging status and the number of PFC-enabled queues.

Syntax `show dcb`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information Specify a stack-unit number on the Master switch in a stack.

Example

```
DellEMC# show dcb
stack-unit 1 port-set 0
      DCB Status : Enabled
    PFC Port Count : 56 (current), 56 (configured)
PFC Queue Count : 2 (current), 2 (configured)
DellEMC#
```

```
DellEMC#show dcb
DCB Status: Enabled, PFC Queue Count: 2
Total Buffer:         Total available buffer excluding the buffer pre-allocated
```

```
                     for guaranteed services like global headroom, queue's min
                     guaranteed buffer and CPU queues.

PFC Total Buffer:    Maximum buffer available for lossless queues.

PFC Shared Buffer:   Buffer used by ingress priority groups for shared usage.

PFC Headroom Buffer: Buffer used by ingress priority group for shared headroom usage.
PFC Available Buffer: Current buffer available for new lossless queues to be
                     Provisioned.

stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Headroom Buffer PFC Available Buffer
      PP            (KB)             (KB)              (KB)                (KB)                (KB)
-------------------------------------------------------------------------------------------------
1     0.0    4727         2656            1040              1040                567
1     0.1    4727         2656            1040              1040                576
1     0.2    4727         2656            1040              1040                567
1     0.3    4727         2656            1040              1040                576
DellEMC#
```

show hardware pfc-nodrop-priority

View the packets drop count corresponding to the priority.

Syntax

```
show hardware pfc-nodrop-priority l2-dlf drops stack-unit stack-unit-number
port-set port-pipe
```

Parameters

stack-unit *stack-unit-number*	Enter the keywords `stack-unit` and the stack unit number.The range is from 0 to 6.
port-set *port-pipe*	Enter the keywords `port-set` and port-pipe number. The port-pipe number is 0.

Command Modes

EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the C9010, S6000, S6000–ON, Z9100–ON and S6100–ON.

Example

```
DellEMC#show hardware pfc-nodrop-priority l2-dlf drops stack-unit 1 port-set 0
-------------------------------------------------
         Priority                       DropCount
-------------------------------------------------
            0                             0
            1                             0
            2                             0
            3                             0
            4                             0
            5                             0
            6                             0
            7                             0
```

Related Commands

pfc-nodrop-priority l2-dlf drop — configures to drop the unknown unicast packets flooding on lossless priorities.

show interface pfc

Displays the PFC configuration applied to ingress traffic on an interface, including priorities and link delay.

Syntax

```
show interface port-type slot/port[/subport] pfc {summary | statistics |
detail | buffer-threshold}
```

Parameters

port-type slot/port[*/subport*] pfc	Enter the port-type slot and port PFC information. Enter the subport number if a port is fanned-out into 10G ports.

{summary | statistics | detail | buffer-threshold}	Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results. Enter the keyword `statistics` to view pfc statistics. Use the keyword `buffer-threshold` to display the buffer threshold details.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

Command Modes

EXEC Privilege

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the Z9500.
9.2.(0.0)	Down status messages added.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To clear the PFC TLV counters, use the `clear pfc counters interface` command.

The following describes the `show interface pfc summary` command shown in the following example.

Field	Description
Interface	Interface type with stack-unit and port number.
Admin mode is on Admin is enabled	PFC admin mode is on or off with a list of the configured PFC priorities. When the PFC admin mode is on, PFC advertisements are enabled to be sent and received from peers; received PFC configuration take effect. The admin operational status for a DCBX exchange of PFC configuration is enabled or disabled.
Remote is enabled, Priority list Remote Willing Status is enabled	Operational status (enabled or disabled) of peer device for DCBX exchange of PFC configuration with a list of the configured PFC priorities. Willing status of peer device for DCBX exchange (Willing bit received in PFC TLV): enabled or disable.

Field	Description
Local is enabled	DCBX operational status (enabled or disabled) with a list of the configured PFC priorities.
Operational status (local port)	Port state for current operational PFC configuration: • `Init`: Local PFC configuration parameters were exchanged with the peer. • `Recommend`: Remote PFC configuration parameters were received from the peer. • `Internally propagated`: PFC configuration parameters were received from the configuration source.
PFC DCBX Oper status	Operational status for the exchange of the PFC configuration on the local port: match (up) or mismatch (down).
State Machine Type	Type of state machine used for DCBX exchanges of the PFC parameters: Feature — for legacy DCBX versions; Symmetric — for an IEEE version.
TLV Tx Status	Status of the PFC TLV advertisements: enabled or disabled.
PFC Link Delay	Link delay (in quanta) used to pause specified priority traffic.
Application Priority TLV: FCOE TLV Tx Status	Status of FCoE advertisements in application priority TLVs from the local DCBX port: enabled or disabled.
Application Priority TLV: SCSI TLV Tx Status	Status of ISCSI advertisements in application priority TLVs from the local DCBX port: enabled or disabled.
Application Priority TLV: Local FCOE Priority Map	Priority bitmap the local DCBX port uses in FCoE advertisements in application priority TLVs.
Application Priority TLV: Local ISCSI Priority Map	Priority bitmap the local DCBX port uses in ISCSI advertisements in application priority TLVs.
Application Priority TLV: Remote FCOE Priority Map	Status of FCoE advertisements in application priority TLVs from the remote peer port: enabled or disabled.
Application Priority TLV: Remote ISCSI Priority Map	Status of iSCSI advertisements in application priority TLVs from the remote peer port: enabled or disabled.
PFC TLV Statistics: Input TLV pkts	Number of PFC TLVs received.
PFC TLV Statistics: Output TLV pkts	Number of PFC TLVs transmitted.
PFC TLV Statistics: Error pkts	Number of PFC error packets received.
PFC TLV Statistics: Pause Tx pkts	Number of PFC pause frames transmitted.

Field	Description
PFC TLV Statistics: Pause Rx pkts	Number of PFC pause frames received.

Example (Summary)

```
DellEMC(conf)#$ interfaces twentyFiveGigE 1/3 pfc buffer-threshold

Interface twentyFiveGigE 1/3

Interface Queue# Lossless Buffer-size Pause-threshold  Resume-offset Shared Threshold
                               (KB)        (KB)              (KB)          Weight
-------------------------------------------------------------------------------------
Tf 1/3    Q0      NO        -           -                 -             -
Tf 1/3    Q1      NO        -           -                 -             -
Tf 1/3    Q2      NO        -           -                 -             -
Tf 1/3    Q3      NO        -           -                 -             -
Tf 1/3    Q4      NO        -           -                 -             -
Tf 1/3    Q5      NO        -           -                 -             -
Tf 1/3    Q6      NO        -           -                 -             -
Tf 1/3    Q7      NO        -           -                 -             -


DellEMC#show interface hundredGigE 1/49  pfc details

Interface hundredGigE 1/49
     Admin mode is on
     Admin is enabled
     Remote is disabled
     Local is enabled
     Pfc Type is Asymmetric
     Oper status is init
     PFC DCBX Oper status is Down
     Reason: Port Shutdown
     State Machine Type is Symmetric
     TLV Tx Status is enabled
     PFC Link Delay 65535 pause quntams
     Application Priority TLV  Parameters :
     ---------------------------------------
     FCOE TLV Tx Status is disabled
     ISCSI TLV Tx Status is disabled
     Local FCOE PriorityMap is 0x0
     Local ISCSI PriorityMap is 0x0

     1 Input TLV pkts, 4 Output TLV pkts, 0 Error pkts, 0 Pause Tx pkts, 0 Pause Rx pkts
     0 Input Appln Priority TLV pkts, 0 Output Appln Priority TLV pkts, 0 Error Appln
Priority TLV Pkts


DellEMC#show interface hundredGigE 1/49  pfc summary

Interface hundredGigE 1/49
     Admin mode is on
     Admin is enabled
     Remote is disabled
     Local is enabled
     Pfc Type is Asymmetric
     Oper status is init
     PFC DCBX Oper status is Down
     Reason: Port Shutdown
     State Machine Type is Symmetric
     TLV Tx Status is enabled
     PFC Link Delay 65535 pause quantams
     Application Priority TLV  Parameters :
     ---------------------------------------
     FCOE TLV Tx Status is disabled
     ISCSI TLV Tx Status is disabled
     Local FCOE PriorityMap is 0x0
     Local ISCSI PriorityMap is 0x0
```

```
show int hundredGigE 1/49  pfc detail

Interface hundredGigE 1/49
     Admin mode is on
     Admin is enabled
     Remote is disabled
     Local is enabled
     Oper status is init
     PFC DCBX Oper status is Down
     Reason: Port Shutdown
     State Machine Type is Symmetric
     TLV Tx Status is enabled
```

```
     PFC Link Delay 65535 pause quntams
     Application Priority TLV  Parameters :
     ------------------------------------
     FCOE TLV Tx Status is disabled
     ISCSI TLV Tx Status is disabled
     Local FCOE PriorityMap is 0x0
     Local ISCSI PriorityMap is 0x0

     1 Input TLV pkts, 4 Output TLV pkts, 0 Error pkts, 0 Pause Tx pkts,
0 Pause Rx pkts
     0 Input Appln Priority TLV pkts, 0 Output Appln Priority TLV pkts,
0 Error Appln Priority TLV Pkts
DellEMC(conf-lldp)#do show int hundredGigE 1/49  pfc summary

Interface hundredGigE 1/49
     Admin mode is on
     Admin is enabled
     Remote is disabled
     Local is enabled
     Oper status is init
     PFC DCBX Oper status is Down
     Reason: Port Shutdown
     State Machine Type is Symmetric
     TLV Tx Status is enabled
     PFC Link Delay 65535 pause quantams
     Application Priority TLV  Parameters :
     ------------------------------------
     FCOE TLV Tx Status is disabled
     ISCSI TLV Tx Status is disabled
     Local FCOE PriorityMap is 0x0
     Local ISCSI PriorityMap is 0x0
```

show interface pfc statistics

Displays counters for the PFC frames received and transmitted (by dot1p priority class) on an interface.

Syntax `show interface port-type pfc statistics`

Parameters

port-type Enter the port type and the interface information.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Enabled to display the command output even without enabling DCB.

Version	Description
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

You can use this command even without enabling DCB.

Example (Summary)

```
DellEMC#show interfaces twentyFiveGigE  1/13 pfc statistics

Interface twentyFiveGigE 1/13

Interface  Priority  Rx XOFF Frames  Rx Total Frames  Tx Total Frames
-------------------------------------------------------------------
Tf 1/13    P0        0               0                0
Tf 1/13    P1        0               0                0
Tf 1/13    P2        0               0                0
Tf 1/13    P3        0               0                0
Tf 1/13    P4        0               0                0
Tf 1/13    P5        0               0                0
Tf 1/13    P6        0               0                0
Tf 1/13    P7        0               0                0
DellEMC(conf)#
```

ETS Commands

The following ETS commands are supported on the Dell EMC Networking OS.

NOTE: Before configuring ETS, assign the etsacl space. using the `cam-acl l2acl 2 ipv4acl 0 ipv6acl 0 ipv4qos 2 l2qos 0 l2pt 0 ipmacacl 0 vman-qos 0 fcoeacl 2 etsacl 1 iscsi 2` command.

dcb-enable

Enable data center bridging.

Syntax

`dcb enable[pfc-queues 1-4]`

To disable DCB, use the `no dcb enable` command.

Parameters

pfc-queues	Enter the pfc-queue range. To disable DCB, use the no dcb enable command. The range is from 1 to 4.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By default, iSCSI is enabled on the unit and the flow control is enabled on all of the interfaces. It is also acts as defaults when the link-level flow control is enabled on one or more interfaces.

Enables priority flow control or enhance transmission selection on interface.

For ETS functioning, first assign the etsacl space using the `cam-acl` command.

```
DellEMC(conf)#cam-acl l2acl 2 ipv4acl 0 ipv6acl 0 ipv4qos 2 l2qos 0 l2pt
0 ipmacacl 0 vman-qos 0 fcoeacl 2 etsacl 1 iscsi 2
```

Related Commands

- dcb <ets | pfc> enable — enable priority flow control or enhanced transmission selection on interface.

clear ets counters

Clear all ETS TLV counters on an interface.

Syntax `clear ets counters port-type slot/port[/subport]`

Parameters

port-type	Enter the keywords `port-type` then the slot/port information. Enter the subport number if a port is fanned-out into 10G ports.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

show interface ets

Displays the ETS configuration applied to egress traffic on an interface, including priority groups with priorities and bandwidth allocation.

Syntax `show interface port-type slot/port[/subport] ets {summary | detail}`

Parameters

***port-type slot/ port[/subport]* ets**	Enter the port-type slot and port ETS information. Enter the subport number if a port is fanned-out into 10G ports.
{summary | detail}	Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.2)	Down status messages added.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Example (Summary)

```
DellEMC#show interface twentyFiveGigE 1/20 ets summary

Interface twentyFiveGigE 1/20
Max Supported TC is 4
Number of Traffic Classes is 8
Admin mode is on

Admin Parameters :
------------------
Admin is enabled

PG-grp     Priority#        BW-%      BW-COMMITTED           BW-PEAK         TSA
                             %     Rate(Mbps) Burst(KB) Rate(Mbps) Burst(KB)
--------------------------------------------------------------------------------
```

```
0          0,1,2,3,4,5,6,7   100   -          -          -          -          ETS
1                            -     -          -          -          -          -
2                            -     -          -          -          -          -
3                            -     -          -          -          -          -
4                            -     -          -          -          -          -
5                            -     -          -          -          -          -
6                            -     -          -          -          -          -
7                            -     -          -          -          -          -

Remote Parameters :
-------------------
Remote is disabled

Local Parameters :
------------------
Local is enabled

PG-grp     Priority#         BW-%      BW-COMMITTED           BW-PEAK          TSA
                              %     Rate(Mbps) Burst(KB) Rate(Mbps) Burst(KB)
-------------------------------------------------------------------------------
0          0,1,2,3,4,5,6,7   100   -          -          -          -          ETS
1                            -     -          -          -          -          -
2                            -     -          -          -          -          -
3                            -     -          -          -          -          -
4                            -     -          -          -          -          -
5                            -     -          -          -          -          -
6                            -     -          -          -          -          -
7                            -     -          -          -          -          -

Oper status is init
ETS DCBX Oper status is Down
Reason: Port Shutdown
State Machine Type is Feature
Conf TLV Tx Status is enabled
```

Example (Detail)

```
DellEMC(conf)#do show interface twentyFiveGigE 1/20 ets detail

Interface twentyFiveGigE 1/20
Max Supported PG is 4
Number of Traffic Classes is 8
Admin mode is on

Admin Parameters :
------------------
Admin is enabled

PG-grp     Priority#         BW-%      BW-COMMITTED           BW-PEAK          TSA
                              %     Rate(Mbps) Burst(KB) Rate(Mbps) Burst(KB)
-------------------------------------------------------------------------------
0          0,1,2,3,4,5,6,7   100   -          -          -          -          ETS
1                            -     -          -          -          -          -
2                            -     -          -          -          -          -
3                            -     -          -          -          -          -
4                            -     -          -          -          -          -
5                            -     -          -          -          -          -
6                            -     -          -          -          -          -
7                            -     -          -          -          -          -

Remote Parameters :
-------------------
Remote is disabled

Local Parameters :
------------------
Local is enabled

PG-grp     Priority#         BW-%      BW-COMMITTED           BW-PEAK          TSA
                              %     Rate(Mbps) Burst(KB) Rate(Mbps) Burst(KB)
-------------------------------------------------------------------------------
0          0,1,2,3,4,5,6,7   100   -          -          -          -          ETS
1                            -     -          -          -          -          -
2                            -     -          -          -          -          -
3                            -     -          -          -          -          -
4                            -     -          -          -          -          -
5                            -     -          -          -          -          -
6                            -     -          -          -          -          -
7                            -     -          -          -          -          -

Oper status is init
ETS DCBX Oper status is Down
Reason: Port Shutdown
State Machine Type is Feature
Conf TLV Tx Status is enabled

23 Input Conf TLV Pkts, 47 Output Conf TLV Pkts, 0 Error Conf TLV Pkts
```

DCBX Commands

The following DCBX commands are supported on the Dell EMC Networking OS.

advertise dcbx-tlv

On a DCBX port with a manual role, configure the PFC and ETS TLVs advertised to DCBX peers.

Syntax

```
advertise dcbx-tlv {ets-conf | ets-reco | pfc} [ets-conf | ets-reco | pfc]
[ets-conf | ets-reco | pfc]
```

To remove the advertised ETS TLVs, use the `no advertise dcbx-tlv` command.

Parameters

{ets-conf | ets-reco | pfc} Enter the PFC and ETS TLVs advertised, where:

- `ets-conf`: enables the advertisement of ETS configuration TLVs.
- `ets-reco`: enables the advertisement of ETS recommend TLVs.
- `pfc`: enables the advertisement of PFC TLVs.

Defaults All PFC and ETS TLVs are advertised.

Command Modes PROTOCOL LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

You can configure the transmission of more than one TLV type at a time; for example: `advertise dcbx-tlv ets-conf ets-reco`.

You can enable ETS recommend TLVs (`ets-reco`) only if you enable ETS configuration TLVs (`ets-conf`). To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-tlv pfc ets-reco`.

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

dcbx port-role

Configure the DCBX port role the interface uses to exchange DCB information.

Syntax

```
dcbx port-role {config-source | auto-downstream | auto-upstream | manual}
```

To remove DCBX port role, use the `no dcbx port-role {config-source | auto-downstream | auto-upstream | manual}` command.

Parameters

config-source | auto-downstream | auto-upstream | manual

Enter the DCBX port role, where:

- `config-source`: configures the port to serve as the configuration source on the switch.
- `auto-upstream`: configures the port to receive a peer configuration. The configuration source is elected from auto-upstream ports.
- `auto-downstream`: configures the port to accept the internally propagated DCB configuration from a configuration source.
- `manual`: configures the port to operate only on administer-configured DCB parameters. The port does not accept a DCB configuration received form a peer or a local configuration source.

Defaults **Manual**

Command Modes INTERFACE PROTOCOL LLDP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

If you use the `auto-upstream` option and the port does not come up on a switch from a different vendor, manually configure the version a CEE on the peer device.

dcbx version

Configure the DCBX version used on the interface.

Syntax `dcbx version {auto | cee | cin | ieee-v2.5}`

To remove the DCBX version, use the `dcbx version {auto | cee | cin | ieee-v2.5}` command.

Parameters

auto | cee | cin | ieee-v2.5

Enter the DCBX version type used on the interface, where:

- `auto`: configures the port to operate using the DCBX version received from a peer.
- `cee`: configures the port to use CDD (Intel 1.01).
- `cin`: configures the port to use Cisco-Intel-Nuova (DCBX 1.0).

NOTE: For CIN, priority-group/traffic-class group wise bandwidth works and priority wise bandwidth configuration is ignored.

- `ieee-v2`: configures the port to use IEEE 802.1az (Draft 2.5).

Defaults **Auto**

Command Modes INTERFACE PROTOCOL LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

debug dcbx

Enable DCBX debugging.

Syntax `debug dcbx {all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}`

To disable DCBX debugging, use the `no debug dcbx` command.

Parameters

{all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv} Enter the type of debugging, where:

- `all`: enables all DCBX debugging operations.
- `auto-detect-timer`: enables traces for DCBX auto-detect timers.
- `config-exchng`: enables traces for DCBX configuration exchanges.
- `fail`: enables traces for DCBX failures.
- `mgmt`: enables traces for DCBX management frames.
- `resource`: enables traces for DCBX system resource frames.
- `sem`: enables traces for the DCBX state machine.
- `tlv`: enables traces for DCBX TLVs.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

fcoe priority-bits

Configure the FCoE priority advertised for the FCoE protocol in application priority TLVs.

Syntax `fcoe priority-bits` *priority-bitmap*

To remove the configured FCoE priority, use the `no fcoe priority-bits` command.

Parameters

priority-bitmap Enter the priority-bitmap range. The range is from 1 to FF.

Defaults 0x8

Command Modes PROTOCOL LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information This command is available at the global level only.

show interface dcbx detail

Displays the DCBX configuration on an interface.

Syntax `show interface` *port-type* `dcbx detail`

Parameters

port-type Enter the port type along with the port number.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.0.2.0	Introduced on the S6000.
9.2.(0.0)	Down status messages added.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To clear DCBX frame counters, use the `clear dcbx counters interface stack-unit/port` command.

The following describes the `show interface dcbx detail` command shown in the following example.

Field	Description
Interface	Interface type with chassis slot and port number.
Port-Role	Configured the DCBX port role: auto-upstream, auto-downstream, config-source, or manual.
DCBX Operational Status	Operational status (enabled or disabled) used to elect a configuration source and internally propagate a DCB configuration. The DCBX operational status is the combination of PFC and ETS operational status.
Configuration Source	Specifies whether the port serves as the DCBX configuration source on the switch: true (yes) or false (no).
Local DCBX Compatibility mode	DCBX version accepted in a DCB configuration as compatible. In auto-upstream mode, a port can only receive a DCBX version supported on the remote peer.

Field	Description
Local DCBX Configured mode	DCBX version configured on the port: CEE,| cin , IEEE v2.5, or Auto (port auto-configures to use the DCBX version received from a peer).
Peer Operating version	DCBX version that the peer uses to exchange DCB parameters.
Local DCBX TLVs Transmitted	Transmission status (enabled or disabled) of advertised DCB TLVs (see TLV code at the top of the show command output).
Local DCBX Status: DCBX Operational Version	DCBX version advertised in Control TLVs.
Local DCBX Status: DCBX Max Version Supported	Highest DCBX version supported in Control TLVs.
Local DCBX Status: Sequence Number	Sequence number transmitted in Control TLVs.
Local DCBX Status: Acknowledgment Number	Acknowledgement number transmitted in Control TLVs.
Local DCBX Status: Protocol State	Current operational state of the DCBX protocol: ACK or IN-SYNC.
Peer DCBX Status: DCBX Operational Version	DCBX version advertised in Control TLVs received from the peer device.
Peer DCBX Status: DCBX Max Version Supported	Highest DCBX version supported in Control TLVs received from the peer device.
Peer DCBX Status: Sequence Number	Sequence number transmitted in Control TLVs received from the peer device.
Peer DCBX Status: Acknowledgment Number	Acknowledgement number transmitted in Control TLVs received from the peer device.
Total DCBX Frames transmitted	Number of DCBX frames sent from the local port.
Total DCBX Frames received	Number of DCBX frames received from the remote peer port.
Total DCBX Frame errors	Number of DCBX frames with errors received.
Total DCBX Frames unrecognized	Number of unrecognizable DCBX frames received.

Example

```
DellEMC# show interface twentyFiveGigE 1/9 dcbx detail

E-ETS Configuration TLV enabled
```

```
  e-ETS Configuration TLV disabled
R-ETS Recommendation TLV enabled
  r-ETS Recommendation TLV disabled
P-PFC Configuration TLV enabled
  p-PFC Configuration TLV disabled
F-Application priority for FCOE enabled
  f-Application Priority for FCOE disabled

---------------------------------------------------------------

Interface twentyFiveGigE 1/9
  Remote Mac Address 00:00:00:00:00:11
   Port Role is Auto-Upstream
  DCBX Operational Status is Enabled
  Is Configuration Source? TRUE

Local DCBX Compatibility mode is CEE
  Local DCBX Configured mode is CEE
  Peer Operating version is CEE
  Local DCBX TLVs Transmitted: ErPfi

Local DCBX Status
-----------------
  DCBX Operational Version is 0
  DCBX Max Version Supported is 0
  Sequence Number: 2
  Acknowledgment Number: 2
  Protocol State: In-Sync

Peer DCBX Status:
----------------
  DCBX Operational Version is 0
  DCBX Max Version Supported is 255
  Sequence Number: 2
  Acknowledgment Number: 2
  Total DCBX Frames transmitted 27
  Total DCBX Frames received 6
  Total DCBX Frame errors 0
  Total DCBX Frames unrecognized 0
```

dcb-map

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

Syntax `dcb-map` *map-name*To remove a DCB map from an ethernet interface, use the `no dcb-map` command.

Parameters

map-name Enter a DCB map name. The maximum number of alphanumeric characters is 32.

Defaults None. There are no pre-configured PFC and ETS settings on S5000 Ethernet interfaces.

Command Modes CONFIGURATION

INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.3(0.0)	Introduced on the S4810 and S6000 platforms.

Usage Information

A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).

To display the PFC and ETS settings in DCB maps, enter the `show qos dcb-map` *name* command.

Use the `dcb-map` command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The `dcb-map` command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the `no dcb-map` *map-name* command in Interface configuration mode.

You can enable or disable pfc mode on the DCB mode using the `pfc mode on` or `pfc mode off` command.

priority-pgid

Assign 802.1p priority traffic to a priority group in a DCB map.

Syntax

`priority-pgid` *dot1p0_group-num dot1p1_group-num dot1p2_group-num dot1p3_group-num dot1p4_group-num dot1p5_group-num dot1p6_group-num dot1p7_group-num*

Parameters

dot1p0–7_group-num Enter the priority group number for each 802.1p class of traffic in a DCB map.

Defaults

None

Command Modes

DCB MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.3(0.0)	Introduced on the S4810, S6000 platforms.

Usage Information

PFC and ETS settings are not pre-configured on Ethernet ports. You must use the `dcb-map` command to configure different groups of 802.1p priorities with PFC and ETS settings.

Using the `priority-pgid` command, you assign each 802.1p priority to one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group. For example, the `priority-pgid 0 0 0 1 2 4 4 4` command creates the following groups of 802.1p priority traffic:

- Priority group 0 contains traffic with dot1p priorities 0, 1, and 2.
- Priority group 1 contains traffic with dot1p priority 3.
- Priority group 2 contains traffic with dot1p priority 4.
- Priority group 4 contains traffic with dot1p priority 5, 6, and 7.

To remove a priority-pgid configuration from a DCB map, enter the `no priority-pgid` command.

For PFC enabled priorities, it is recommended to map single priority per Priority group.

priority-group bandwidth pfc

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

Syntax

```
priority-group group-num {bandwidth percentage| strict-priority}
[[committed | peak ] | [peak | committed] {<0-10000>} [<0-10000>]] pfc {on
| off}
```

Parameters

priority-group *group-num*	Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.
bandwidth *percentage*	Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.
strict-priority	Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.
pfc {on | off}	Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

Defaults

None

Command Modes

DCB MAP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.6(0.0)	Added support to configure peak and committed rate on the S6000 platform.
9.3(0.0)	Introduced on the S4810, S6000 platforms.

Usage Information

Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.

Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.

dcb pfc-shared-buffer-size

Configure the maximum amount of shared buffer size for PFC packets in kilobytes.

Syntax `dcb pfc-shared—buffer—size` *buffer-size*

Parameters

buffer-size Enter a number in the range of 0 to 33994727.

Default The default is 10401040KB.

Command Modes CONFIGURATION mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P0)	The default value is changed to 1040 KB for the Z9100–ON and S6100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.6(0.0)	Introduced on the S5000.
9.3(0.0)	Introduced on the S4810, S4820T, and S6000 platforms.

Usage Information Configure the maximum shared buffer available for PFC traffic. You can choose to increase or decrease the shared buffer that is allocated in the system by default. Configure the shared buffer size less than the total PFC buffer size. If the shared buffer size is more than the total PFC buffer size value, the configuration is not saved and a system logging message is generated.

```
DellEMC(conf)#dcb pfc-shared-buffer-size 3000
% Error: Shared buffer size cannot be greater than the the available
buffer in the system
DellEMC(conf)#
```

Enter a smaller value for the shared buffer size or increase the total buffer size appropriately by using the `dcb pfc-total- buffer-size` command.

Example

```
DellEMC(conf)#dcb pfc-shared-buffer-size 800
```

dcb-buffer-threshold

Configure the profile name for the DCB buffer threshold.

Syntax `dcb buffer—threshold profile-name`

Parameters

profile-name	Enter the name of the profile, which can be a string of up to 32 characters in length.

Default None

Command Modes CONFIGURATION mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.6(0.0)	Introduced on the S5000.
9.3(0.0)	Introduced on the S4810, S4820T, and S6000.

Usage Information When you enter the profile name, you enter the DCB buffer threshold configuration mode. You can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets.

Example

```
DellEMC(conf)#dcb-buffer—threshold test
```

Example of commands in `dcb buffer—threshold` mode

`priority value buffer-size size pause-threshold threshold-value resume-offset threshold-value shared-threshold-weight size`

```
DellEMC(conf-dcb-buffer-thr)#priority 0 buffer-size 52 pause-threshold
16 resume-offset 10 shared-threshold-weight 7
```

`priority value buffer-size size pause-threshold threshold-value peak-headroom headroom-value resume-offset threshold-value shared-threshold-weight size`

```
DellEMC(conf-dcb-buffer)#priority value buffer-size size pause-threshold
threshold-value peak-headroom headroom-value resume-offset threshold-
value shared-threshold-weight size
```

priority

Configure the priority for the PFC threshold to be allocated to the buffer space parameters.

Syntax `priority value buffer-size size pause-threshold threshold-value peak-headroom headroom-value resume-offset threshold-value shared-threshold-weight size`

Parameters

priority	Specify the priority of the queue for which the buffer space settings apply.
value	Enter a number in the range of 0 to 7 to denote the priority to be allocated to the dynamic buffer control mechanism.

buffer-size	Ingress buffer size.
size	Size of the ingress buffer in KB. Enter a number in the range of 0 to 7787. The default is 9 KB.Enter a number in the range of 0 to 9. The default is as follows: • 10G – 9 • 25G – 9 • 40G – 9 • 50G – 9 • 100G – 9
pause-threshold	Buffer limit for pause frames to be sent. **NOTE:** In addition to the specified pause-threshold value, pause frames are sent only when the buffer usage exceeds some percentage of the shared buffer.
threshold-value	Buffer limit at which the port sends the pause to peer in KB. Enter a number in the range of 0 to 512. The default is as follows: • 10G – 9 • 25G – 9 • 40G – 9 • 50G – 9 • 100G – 9
peak-headroom	Maximum buffer that a priority can use from the shared headroom pool buffer.
headroom-value	Enter a number in the range 0 to 9. The defaults are as follows: • 10G - 36 KB • 25G - 76 KB • 40G - 76 KB • 50G - 143 KB • 100G - 143 KB
resume-offset	Buffer offset limit for stopping the transmission of pause frames.
threshold-value	Buffer offset limit at which the port resumes the peer in KB. Enter a number in the range of 0 to 512. The default is 9 KB.
shared-threshold-weight	Buffer shared threshold weight
size	Weightage of the priorities on the shared buffer size in the system. Enter a number in the range of 0 to 11. The default shared threshold weight is 11.

Command Modes DCB-BUFFER-THRESHOLD mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P0)	Default values of buffer threshold profile parameters are changed for the Z9100-ON and S6100-ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S4810, S4820T, and S6000 platforms.

Usage Information

For each priority, you can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets. When PFC detects congestion on a queue for a specified priority, it sends a pause frame for the 802.1p priority traffic to the transmitting device.

You can use the `priority` command to set up both the administrative and peer-related PFC priorities. For example, you can configure the intended buffer configuration for all eight priorities. If you configure the number of lossless queues as 4 and if the administrator-configured priorities configured within the DCB input policy is applied, then the configuration for those priorities are pre-designed. However, if the peer-provided priorities are applied, although a DCB input policy is present, the peer-provided priorities become effective for buffer configuration. This method of configuration provides an easy and flexible technique to accommodate both administratively-configured and peer-configured priorities.

Example

```
DellEMC(conf-dcb-buffer-thr)# priority 0 buffer-size 16 pause-threshold
16 resume-offset 10 shared-threshold-weight 7DellEMC(conf-dcb-buffer-thr)#
priority 0 buffer-size 30 pause-threshold 30 resume-offset 10 shared-
threshold-weight 10
```

dcb-policy buffer-threshold (Interface Configuration)

Assign the DCB policy to the DCB buffer threshold profile on interfaces. This setting takes precedence over the global buffer-threshold setting.

Syntax

```
dcb-policy buffer-threshold profile-name
```

Parameters

buffer-threshold	Configure the profile name for the DCB buffer threshold
profile-name	Enter the name of the profile, which can be a string of up to 32 characters in length.

Default

None

Command Modes

INTERFACE mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.3(0.0)	Introduced on the S4810, S4820T, and S6000 platforms.

Usage Information

You can configure up to a maximum of four lossless (PFC) queues. By configuring four lossless queues, you can configure four different priorities and assign a particular priority to each application that your network is used to process. For example, you can assign a higher priority for time-sensitive applications and a lower priority for other services, such as file transfers. You can configure the amount of buffer space to be allocated for each priority and the pause or resume thresholds for the buffer. This method of configuration enables you to effectively manage and administer the behavior of lossless queues.

Example

dcb pfc-total-buffer-size

Configure the total buffer size for PFC in kilobytes.

Syntax `dcb pfc-total-buffer-size` *`buffer-size`*

Parameters

buffer-size	Enter a number in the range of 0 to 4727.

Default The default is 2656KB.

Command Modes CONFIGURATION mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P0)	Default value is changed from 3088 KB to 2656 KB in the Z9100-ON and S6100-ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Introduced on the S5000.
9.3(0.0)	Introduced on the S6000, S4810, and S4820T.

Usage Information

Configure the maximum buffer available for PFC traffic. You can choose to increase or decrease the buffer size that is allocated in the system by default. However, if you modify the PFC buffer size lower than the previously configure size, the system determines whether this reduction in size is valid without disrupting the existing configuration. In such a scenario, disable and re-enable DCB.

The lossless queue limit per port is validated based on the `dcb pfc-queues` command. PFC queue configuration identifies the maximum number of queues a port can support. Although the queue limit per port is a baseline when dynamic buffering is enabled, the limit per port for queues depends on the availability of the buffer.

Example

```
DellEMC(conf)#dcb pfc-total-buffer-size 2800
DellEMC(conf)#

DellEMC#show dcb

DCB Status: Enabled, PFC Queue Count: 2

Total Buffer:         Total available buffer excluding the buffer pre-allocated
                      for guaranteed services like global headroom, queue's min
                      guaranteed buffer and CPU queues.

PFC Total Buffer:     Maximum buffer available for lossless queues.

PFC Shared Buffer:    Buffer used by ingress priority groups for shared usage.

PFC Headroom Buffer:  Buffer used by ingress priority group for shared headroom usage.
PFC Available Buffer: Current buffer available for new lossless queues to be
                      Provisioned.

stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Headroom Buffer PFC Available Buffer
      PP            (KB)             (KB)              (KB)                (KB)                (KB)
-----------------------------------------------------------------------------------------------------
1     0.0    4727         2800             1040              1040                711
1     0.1    4727         2800             1040              1040                720
1     0.2    4727         2800             1040              1040                711
1     0.3    4727         2800             1040              1040                720
DellEMC#
```

```
DellEMC(conf)#dcb pfc-total-buffer-size 2000
% Error: Total buffer size should not be less than the buffer consumed already
```

```
in the system
DellEMC(conf)#
```

show running-config dcb-buffer-threshold

Displays the DCB buffer threshold details in the running configuration.

Syntax `show running—config dcb-buffer-threshold`

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.3(0.0)	Introduced on the S6000 platform.

Usage Information The following table describes the output fields displayed for the `show running-config dcb-buffer-threshold` command:

Field	Description
Field	Description
Profile name	Name of the DCB buffer threshold profile
Priority	The priority of the queue for which the buffer space settings apply
buffer-size	Ingress buffer size
pause-threshold-value	Buffer limit at which the port sends the pause to peer in KB.
resume-threshold-value	Buffer offset limit at which the port resumes the peer in KB.

Example

```
DellEMC# show running—config dcb-buffer-threshold
!
dcb-buffer-threshold test1
pfc priority 0 buffer-size 40
pfc priority 3 buffer-size 50
!
dcb-buffer-threshold test2
pfc priority 0 buffer-size 80 pause-threshold 50
!
dcb-buffer-threshold test3
pfc priority 0 buffer-size 80 pause-threshold 60 resume-threshold 30
```

```
DellEMC# show running—config dcb-buffer-threshold
!
dcb-buffer-threshold test1
pfc priority 0 buffer-size 40
pfc priority 3 buffer-size 50
!
```

```
dcb-buffer-threshold test2
pfc priority 0 buffer-size 80 pause-threshold 50
!
dcb-buffer-threshold test3
pfc priority 0 buffer-size 80 pause-threshold 60 resume-threshold 30
```

```
DellEMC#show interfaces twentyFiveGigE 1/1 pfc buffer-threshold

Interface twentyFiveGigE 1/1

Interface   Queue#  Lossless  Buffer-size  Pause-threshold  Peak-headroom  Resume-offset  Shared Threshold
                                   (KB)         (KB)             (KB)           (KB)           Weight
-------------------------------------------------------------------------------------------------------
Tf 1/1      Q0      NO        -            -                -              -              -
Tf 1/1      Q1      NO        -            -                -              -              -
Tf 1/1      Q2      NO        -            -                -              -              -
Tf 1/1      Q3      YES       9            9                36             9              11
Tf 1/1      Q4      NO        -            -                -              -              -
Tf 1/1      Q5      NO        -            -                -              -              -
Tf 1/1      Q6      NO        -            -                -              -              -
Tf 1/1      Q7      NO        -            -                -              -              -

On interfaces in which PFC is not enabled.

DellEMC#show interfaces twentyFiveGigE 1/2 pfc buffer-threshold

Interface twentyFiveGigE 1/2

Interface   Queue#  Lossless  Buffer-size  Pause-threshold  Peak-headroom  Resume-offset  Shared Threshold
                                   (KB)         (KB)             (KB)           (KB)           Weight
-------------------------------------------------------------------------------------------------------
Tf 1/2      Q0      NO        -            -                -              -              -
Tf 1/2      Q1      NO        -            -                -              -              -
Tf 1/2      Q2      NO        -            -                -              -              -
Tf 1/2      Q3      NO        -            -                -              -              -
Tf 1/2      Q4      NO        -            -                -              -              -
Tf 1/2      Q5      NO        -            -                -              -              -
Tf 1/2      Q6      NO        -            -                -              -              -
Tf 1/2      Q7      NO        -            -                -              -              -
DellEMC#
```

```
On interface on which PFC is enabled:

DellEMC(conf)#do show interfaces twentyFiveGigE 1/3 pfc buffer-threshold

Interface twentyFiveGigE 1/3

Interface   Queue#  Lossless  Buffer-size  Pause-threshold  Resume-offset  Shared Threshold
                                   (KB)         (KB)             (KB)           Weight
-----------------------------------------------------------------------------------------
Tf 1/3      Q0      NO        -            -                -              -
Tf 1/3      Q1      NO        -            -                -              -
Tf 1/3      Q2      NO        -            -                -              -
Tf 1/3      Q3      YES       200          40               9              8
Tf 1/3      Q4      YES       200          40               9              8
Tf 1/3      Q5      NO        -            -                -              -
Tf 1/3      Q6      NO        -            -                -              -
Tf 1/3      Q7      NO        -            -                -              -
DellEMC(conf)#
```

The following table describes the output fields displayed for the `show interface pfc buffer-threshold` command:

Field	Description
queue	Number of the queue
lossless	Whether the queue is a lossy or lossless queue for which buffer threshold is configured
buffer-size	Ingress buffer size
pause-threshold-value	Buffer limit at which the port sends the pause to peer in KB.
resume-threshold-value	Buffer offset limit at which the port resumes the peer in KB.
shared threshold weight	Weightage of the priorities on the shared buffer size in the system.

dcb {ets | pfc} enable

Enable priority flow control or enhanced transmission selection on interface.

Syntax `dcb {ets | pfc} enable`

- To disable ETS on interface, use "**no dcb ets enable**" command.

- To disable PFC on interface, use "**no dcb pfc enable**" command.

Defaults Enable

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048–ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.3 (0.1)	Introduced on S6000, S4810, and S4820T.

Usage Information PFC and ETS are enabled by default on the interfaces when DCB is globally enabled (refer to dcb enable). In some network topology, you may want to disable PFC on an interface and apply link level flow control; Similarly you may want to disable ETS on an interface and apply QoS bandwidth configurations.

Limitations

- "`dcb-map`" CLI on interface is mutually exclusive to "`no dcb ets enable`" and "`no dcb pfc enable`".
- "`pfc priority`" CLI is mutually exclusive to "`no dcb pfc enable`" command.

13

Debugging and Diagnostics

The basic debugging and diagnostic commands are supported by the Dell EMC Networking OS.

Topics:

- Diagnostics and Monitoring Commands
- Offline Diagnostic Commands
- Hardware Commands

Diagnostics and Monitoring Commands

The following section describes the diagnostics and monitoring commands.

For similar commands, refer to the Control and Monitoring chapter.

logging coredump stack-unit

Enable coredump on a stack.

Syntax `logging coredump stack-unit {stack-unit-number | all}`

Parameters

stack-unit stack-unit-number	Enter the stack-unit id to enable coredump in a particular stack-unit.
all	Enable coredump on all stack-unit.

Defaults Enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON and the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information

The Kernel core dump can be large and may take up to 5 to 30 minutes to upload. Dell EMC Networking OS does not overwrite application core dumps so you should delete them as necessary to conserve space on the flash; if the flash is out of memory, the coredump is aborted. On the S-Series, if the FTP server is not reachable, the application coredump is aborted. Dell EMC Networking OS completes the coredump process and wait until the upload is complete before rebooting the system.

Offline Diagnostic Commands

The offline diagnostics test suite is useful for isolating faults and debugging hardware. While tests are running, Dell EMC Networking OS results are saved as a text file (TestReport-SU-X.txt) in the flash directory. This `show file` command is available only on master and standby.

Important Points to Remember

- Offline diagnostics can only be run when the unit is offline.
- You can only run offline diagnostics on a unit to which you are connected via the console. In other words, you cannot run diagnostics on a unit to which you are connected to via a stacking link.
- Diagnostics only test connectivity, not the entire data path.

diag stack-unit

Run offline diagnostics on a stack unit.

Syntax

`diag stack-unit` *`number`* `[alllevels | level0 | level1 | level2 | interactive` *`test-id`* `] verbose [no-reboot]`

Parameters

number	Enter the stack-unit id.
alllevels	Enter the keyword `alllevels` to run the complete set of offline diagnostic tests.
level0	Enter the keyword `level0` to run Level 0 diagnostics. Level 0 diagnostics check for the presence of various components and perform essential path verifications. In addition, they verify the identification registers of the components on the board.
level1	Enter the keyword `Level1` to run Level 1 diagnostics. Level 1 diagnostics is a smaller set of diagnostic tests with support for automatic partitioning. They perform status/self test for all the components on the board and test their registers for appropriate values. In addition, they perform extensive tests on memory devices (for example, SDRAM, flash, NVRAM, EEPROM, and CPLD) wherever possible. There are no tests on 10G links. At this level, stack ports are shut down automatically.
level2	Enter the keyword `level2` to run Level 2 diagnostics. Level 2 diagnostics are a full set of diagnostic tests with no support for automatic partitioning. Level 2 diagnostics are used primarily for on-board loopback tests and more extensive component diagnostics. Various components on the board are put into Loopback mode and test packets are transmitted through those components. These diagnostics also perform snake tests using VLAN configurations. To test 10G links, physically remove the unit from the stack.
verbose	Enter the keyword `verbose` to run the diagnostic in Verbose mode. Verbose mode gives more information in the output than Standard mode.
testname	Enter the keyword `testname` to run a specific test case. Enclose the test case name in double quotes (“ “). For example: `diag stack-unit 1 level1 testname “first”`. You can use this option only for interactive tests.
no-reboot	Enter the keyword `no-reboot` to prevent the system from rebooting after the test. To bring the stack unit to online state, use the `online stack-unit` *`stack-unit-number`* command.

	interactive	Enter the keyword `interactive` with the test ID to test interactive test cases. The test cases can be found using the `show diag testcase stack-unit stack-unit-id interactive` command.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced the `verbose` option.
7.7.1.0	Introduced on the S-Series.

offline stack-unit

Place a stack unit in the offline state.

Syntax `offline stack-unit` *number*

Parameters

number	Enter the stack-unit id.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added a warning message to the off-line diagnostic.
7.7.1.0	Introduced on the S-Series.

Usage Information

You cannot enter this command on a Master or Standby unit.

The system reboots when the off-line diagnostics complete. This reboot is an automatic process. A warning message appears when the `offline stack-unit` command is implemented.

```
Warning - Diagnostic execution will cause stack-unit to reboot after
completion of diags.
Proceed with Offline-Diags [confirm yes/no]:y
```

```
DellEMC#offline stack-unit 1
Warning - offline of unit will bring down all the protocols and
the unit will be operationally down, except for running Diagnostics.
Please make sure that stacking is not configured for Diagnostics
execution.
Also reboot/online command is necessary for normal operation after the
offline command is issued.
Proceed with Offline [confirm yes/no]:yes
```

online stack-unit

Place a stack unit in the online state.

Syntax `online stack-unit` *number*

Parameters

number	Enter the stack-unit number.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.

Usage Information

You cannot enter this command on a Master or Standby unit.

The system reboots when the off-line diagnostics complete. This reboot is an automatic process. A warning message appears when the `offline stack-unit` command is implemented.

```
Warning - Diagnostic execution will cause stack-unit to reboot after
completion of diags.

Proceed with Offline-Diags [confirm yes/no]:y
```

You cannot enter this command on a unit which is already online.

The system which is currently offline reboots when the `online` command is given.

show diag

Display the diagnostic information.

Syntax

```
show diag {information | stack-unit number [detail [interval] | summary] |
testcase stack-unit number [interactive | level0 | level1 | level2]}
```

Parameters

information	Enter the keyword `information` to display diagnostic information.
stack-unit *number*	Enter the keywords `stack-unit` then the stack-unit number to display diagnostic details of the specific stack unit.
detail	Enter the keyword `detail` to display diagnostic information in detail.
summary	Enter the keyword `summary` to display a summary of diagnostic information.
testcase	Enter the keyword `testcase` to display the list of diagnostic test cases. To display the diagnostic test cases of the particular level, use the keywords `interactive`, `level0`, `level1`, `level2` after the keyword `testcase`.

Defaults None

Command Modes EXEC Privilege

Example

```
DellEMC#show diag information
Diag information:
Diag software image version:
9.8(1.0)
------------------------------------------------------------------
  stack-unit Member  1:     No Unit diags executed yet (stack-unit not
Offline).
------------------------------------------------------------------

DellEMC#show diag testcase stack-unit 1

************************** Z9100 Diagnostics Test
************************

Test ID    Test Description                Test Level
-------    ----------------                ----------
1          SMARTFUSIONFPGAACCESSTEST       Level0
2          CPLDACCESSTEST                  Level0
```

```
3           CPUTYPEDETECTTEST                Level0
4           CPUSDRAMPRESENCETEST             Level0
5           CPUSDRAMSIZETEST                 Level0
6           CPLDBOARDTYPETEST                Level0
7           I2CACCESSTEST                    Level0
8           PSUPRESENCETEST                  Level0
9           PSUSOURCETYPETEST                Level0
10          PSUSTATUSMONITORTEST             Level0
11          PSUFANSPEEDMONITORTEST           Level0
12          PSUFANSTATUSMONITORTEST          Level0
13          PSUFANAIRFLOWTYPETEST            Level0
14          FANTRAYPRESENCETEST              Level0
15          FANSTATUSMONITORTEST             Level0
16          FANAIRFLOWTYPETEST               Level0
17          RTCPRESENCETEST                  Level0
18          SSDPRESENCETEST                  Level0

[output truncated]
```

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced the `verbose` option.
7.7.1.0	Introduced on the S-Series.

Hardware Commands

These commands display information from a hardware sub-component or ASIC.

clear hardware stack-unit

Clear statistics from selected hardware components.

Syntax

```
clear hardware stack-unit id {counters | cpu {data-plane statistics | i2c
statistics | management statistics | party-bus statistics | sata-interface
statistics} | unit number counters | stack-port stack-port-number}
```

Parameters

stack-unit *id*	Enter the keywords `stack-unit` then a number to select a particular stack member and then enter one of the following command options to clear a specific collection of data. The range is from 1 to 6.
counters	Enter the keyword `counters` to clear the counters on the selected stack member.
cpu data-plane statistics	Enter the keywords `cpu data-plane statistics` to clear the data plane statistics.
cpu i2c statistics	Enter the keywords `cpu i2c statistics` to clear the i2c devices statistics.

cpu party-bus statistics	Enter the keywords `cpu party-bus statistics` to clear the management statistics.
cpu sata-interface statistics	Enter the keywords `cpu sata-interface statistics` to clear the sata interface statistics.
stack-port	Enter the keywords `stack-port` then the port number of the stacking port to clear the statistics of the particular stacking port.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Increased the stacking range to 12 units in S3100 series.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Related Commands

- show hardware stack-unit — display the data plane or management plane input and output statistics of the designated component of the designated stack member.

clear hardware system-flow

Clear system-flow statistics from selected hardware components.

Syntax `clear hardware system-flow layer2 stack-unit number port-set 0-0 counters`

Parameters

stack-unit *number*	Enter the keywords `stack-unit` then a number to select a particular stack member and then enter one of the following command options to clear a specific collection of data.
port-set *0–0* counters	Enter the keywords `port-set` along with a port-pipe number, then the keyword counters to clear the system-flow counters on the selected port-pipe. The range is from 0 to 0.

Defaults None

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

clear hardware vlan-counters

Clear VLAN statistics.

Syntax `clear hardware vlan-couters vlan-id`

Parameters

vlan-id	Enter the interface VLAN number. The range is from 1 to 4094.

Defaults None

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced this command.

hardware watchdog

To trigger a reboot and restart the system, set the watchdog timer.

Syntax `hardware watchdog stack-unit {stack-unit-number | all}`

Defaults Enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Usage Information This command enables a hardware watchdog mechanism that automatically reboots an Dell EMC Networking OS switch/ router with a single unresponsive unit. This behavior is a last-resort mechanism intended to prevent a manual power cycle.

show hardware mac

Display MAC ACL entries for the specified stack-unit, port-pipe and pipeline ID.

Syntax `show hardware mac {eg-acl | in-acl} stack-unit id port-set 0–0 pipeline pipeline-number`

Parameters

eg-acl | in-acl	Enter either the keyword `eg-acl` or the keyword `in-acl` to select between ingress or egress ACL data.
stack-*unit id*	Enter the keyword `stack-unit` to select the stack unit ID.
port-set *0–0*	Enter the keywords `port-set` with a port-pipe number to display the MAC ACL entries for the specified port-pipe number. . The range is from 0 to 0.
pipeline *pipeline-number*	Enter the keyword `pipeline` with a pipeline number to display the MAC ACL entries specific to the pipeline number. The range is from 0 to 3.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Usage Information The unit numbers given are internal port numbers.

show hardware ip

Display ACL or QoS data for the selected stack member and stack member port-pipe.

Syntax `show hardware layer3 {acl | qos} stack-unit` *`number`* `port-set` *`0–0`* `pipeline` *`pipeline-number`*

Parameters

acl | qos	Enter either the keyword `acl` or the keyword `qos` to select between ACL or QoS data.
stack-unit *number*	Enter the keywords `stack-unit` then a number to select a stack ID.
port-set *0–0*	Enter the keyword `port-set` with a port-pipe number. The range is from 0 to 0.
pipeline *pipeline-number*	Enter the keyword `pipeline` with a pipeline number to display the MAC ACL entries specific to the pipeline number. The range is from 0 to 3.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

show hardware ipv6

Display Layer 3 IPv6 ACL data for the selected stack member and stack member port-pipe.

Syntax `show hardware layer3 ipv6 acl stack-unit` *`number`* `port-set` *`0-0`* `pipeline` *`pipeline-number`*

Parameters

ipv6 acl	Enter the keyword `ipv6 acl` to select IPv6 ACL data.
stack-unit *number*	Enter the keywords `stack-unit` then a number to select a stack ID. The range is from 1 to 6.
port-set *0–0*	Enter the keyword `port-set` with a port-pipe number. The range is from 0 to 0.
pipeline *pipeline-number*	Enter the keyword `pipeline` with a pipeline number to display the MAC ACL entries specific to the pipeline number. The range is from 0 to 3.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

show hardware stack-unit

Display the data plane or management plane input and output statistics of the designated component of the designated stack member.

Syntax

```
show hardware stack-unit stack-unit-number {cpu {data-plane statistics | i2c statistics | management statistics | party-bus statistics | sata-interface statistics} | drops [unit unit-number] | fpga registers | stack-port stack-port-number | unit unit-number {counters | details | ipmc-replication | port-stats [detail] | register | table-dump table-name}}
```

Parameters

stack-unit *stack-unit-number* {command-option}	Enter the keywords `stack-unit` to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is from 1 to 6.
cpu data-plane statistics	Enter the keywords `cpu data-plane statistics` then the keywords `stack port` and its number, to display the data plane statistics, which shows the High Gig (`Higig`) port raw input/output counter statistics to which the stacking module is connected. Enter the keywords `cpu data-plane statistics` to display the data plane statistics.
cpu i2c statistics	Enter the keywords `cpu i2c statistics` to display the counters of i2c devices.
cpu management statistics	Enter the keywords `cpu management statistics` to display the counters of the management port.
cpu party-bus statistics	Enter the keywords `cpu party-bus statistics`, to display the Management plane input/output counter statistics of the pseudo party bus interface.
cpu sata-interface statistics	Enter the keywords `cpu sata-interface statistics` to display the sata interface error counter statistics.
drops [unit *unit-number*]	Enter the keyword `drops` to display internal drops on the selected stack member. Enter the optional keyword `unit unit-number` to display the internal drop counters of the specified port pipe.
fpga register	Enter the keyword to display the register value of the fpga register.
unit *unit-number* {counters | details | port-stats [detail] | register}unit *unit-number* {counters | ipmc-replication | details | port-stats [detail] | register | table-dump table-name}	Enter the keyword `unit` then a number and then enter one of the keywords to troubleshoot errors on the selected port-pipe and to give status on why a port is not coming up to register level.
TI monitor	Enter the unit keyword to show information regarding the TI register.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Increased the stacking range to 12 units in S3100 series.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Replaced the keyword `port` with `interface`.
9.7(0.0)	Introduced on the S6000-ON.
9.2(0.2)	Modified the `drops` keyword range, unit keyword `range` and added the `buffer` and `cpu management statistics` options.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.5	Added i2c statistics and sata-interfaces statistics.
8.3.11.4	Added user port information.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.

Example (Data-Plane)

```
DellEMC# show hardware stack-unit 1 cpu data-plane statistics
Input Statistics:
 1856 packets, 338262 bytes
 141 64-byte pkts, 1248 over 64-byte pkts, 11 over 127-byte pkts
 222 over 255-byte pkts, 236 over 511-byte pkts, 0 over 1023-byte pkts
 919 Multicasts, 430 Broadcasts
 0 runts, 0 giants, 0 throttles
 0 CRC, 0 overrun, 0 discarded
Output Statistics:
 325 packets, 27629 bytes, 0 underruns
 9 64-byte pkts, 310 over 64-byte pkts, 1 over 127-byte pkts
 1 over 255-byte pkts, 2 over 511-byte pkts, 2 over 1023-byte pkts
 0 Multicasts, 3 Broadcasts, 322 Unicasts
 0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
 Input 00.00 Mbits/sec
 Output 00.00 Mbits/sec
DellEMC#
```

```
DellEMC# show hardware stack-unit 1 cpu data-plane statistics
Input Statistics:
 1856 packets, 338262 bytes
 141 64-byte pkts, 1248 over 64-byte pkts, 11 over 127-byte pkts
 222 over 255-byte pkts, 236 over 511-byte pkts, 0 over 1023-byte pkts
 919 Multicasts, 430 Broadcasts
 0 runts, 0 giants, 0 throttles
 0 CRC, 0 overrun, 0 discarded
Output Statistics:
 325 packets, 27629 bytes, 0 underruns
 9 64-byte pkts, 310 over 64-byte pkts, 1 over 127-byte pkts
 1 over 255-byte pkts, 2 over 511-byte pkts, 2 over 1023-byte pkts
 0 Multicasts, 3 Broadcasts, 322 Unicasts
 0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
```

```
 Input 00.00 Mbits/sec
 Output 00.00 Mbits/sec
DellEMC#
```

```
DellEMC# show hardware stack-unit 1 cpu data-plane statistics

bc pci driver statistics for device:
 rxHandle        :0
 noMhdr          :0
 noMbuf          :0
 noClus          :0
 recvd           :0
 dropped         :0
 recvToNet       :0
 rxError         :0
 rxFwdError      :0
 rxDatapathErr   :0
 rxPkt(COS0 )    :0
 rxPkt(COS1 )    :0
 rxPkt(COS2 )    :0
 rxPkt(COS3 )    :0
 rxPkt(COS4 )    :0
 rxPkt(COS5 )    :0
 rxPkt(COS6 )    :0
 rxPkt(COS7 )    :0
 rxPkt(COS8 )    :0
 rxPkt(COS9 )    :0
 rxPkt(COS10)   :0
 rxPkt(COS11)   :0
 rxPkt(UNIT0)    :0
 transmitted     :0
 txRequested     :0
 noTxDesc        :0
 txError         :0
 txReqTooLarge   :0
 txInternalError :0
 txDatapathErr   :0
 txPkt(COS0 )    :0
 txPkt(COS1 )    :0
 txPkt(COS2 )    :0
 txPkt(COS3 )    :0
 txPkt(COS4 )    :0
 txPkt(COS5 )    :0
 txPkt(COS6 )    :0
 txPkt(COS7 )    :0
 txPkt(COS8 )    :0
 txPkt(COS9 )    :0
 txPkt(COS10)   :0
 txPkt(COS11)   :0
 txPkt(UNIT0)    :0
```

Example (Party-Bus)

```
DellEMC# show hardware stack-unit 1 cpu party-bus statistics
Input Statistics:
    0 packets, 0 bytes
    0 dropped, 0 errors
Output Statistics:
    0 packets, 0 bytes
    0 errors
```

Example (Drops Unit)

```
DellEMC# sh hard stack-unit 1 drops unit 0
PortNumber Ingress Drops IngMac Drops Total Mmu Drops
1          0             0            0
2          0             0            0
3          0             0            0
4          0             0            0
EgMac Drops Egress Drops
0           0
0           0
```

```
0            0
0            0
DellEMC#
```

```
DellEMC# sh hard stack-unit 1 drops unit 0
PortNumber Ingress Drops IngMac Drops Total Mmu Drops
1          0             0            0
2          0             0            0
3          0             0            0
4          0             0            0
EgMac Drops Egress Drops
0           0
0           0
0           0
0           0
DellEMC#
```

```
DellEMC#show hardware stack-unit 1 drops unit 0

UserPort        PortNumber         IngressDrops    IngMacDrops
 1/1            1                 0                0
 1/2            2                 0                0
 1/3            3                 0                0
 1/4            4                 0                0
 1/5            5                 0                0
 1/6            6                 0                0
 1/7            7                 0                0
 1/8            8                 0                0
Ing-MMU-Drops   HOL-MMU-Drops   Aged-MMU-Drops  EgMacDrops
0                0                0                0
0                0                0                0
0                0                0                0
0                0                0                0
0                0                0                0
0                0                0                0
0                0                0                0
0                0                0                0
EgressDrops
0
0
0
0
0
0
0
0
[output truncated]
```

Example (Port-Stats)

```
DellEMC# show hardware stack-unit 1 unit 0 port-stats
     ena/ speed/ link auto STP              lrn inter max loop
port link duplex scan neg? state pause discrd ops face frame back
ge0  down  -     SW   Yes  Block       Untag  FA  SGMII 1554
ge1  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge2  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge3  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge4  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge5  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge6  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge7  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge8  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge9  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge10 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge11 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge12 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge13 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge14 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge15 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge16 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge17 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge18 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge19 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge20 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge21 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge22 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge23 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
hg0 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg1 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg2 down 10G FD  SW   No   Forward     None   F   XGMII 16360
```

```
hg3 down 10G FD  SW   No   Forward     None   F   XGMII 16360
0
DellEMC#
```

```
DellEMC# show hardware stack-unit 1 unit 0 port-stats
     ena/ speed/ link auto STP              lrn inter max loop
port link duplex scan neg? state pause discrd ops face frame back
ge0  down  -     SW   Yes  Block       Untag  FA  SGMII 1554
ge1  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge2  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge3  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge4  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge5  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge6  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge7  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge8  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge9  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge10 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge11 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge12 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge13 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge14 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge15 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge16 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge17 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge18 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge19 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge20 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge21 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge22 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge23 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
hg0 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg1 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg2 down 10G FD  SW   No   Forward     None   F   XGMII 16360
hg3 down 10G FD  SW   No   Forward     None   F   XGMII 16360
0
DellEMC#
```

```
DellEMC# show hardware stack-unit 1 unit 0 port-stats
     ena/      speed/ link auto    STP
port link Lns duplex scan neg?   state   pause  discrd
ce0  up    4 100G   FD   SW   No   Forward           Tag
xe0  !ena  1  25G   FD None  No   Disable  TX RX   None
xe1  !ena  1  50G   FD None  No   Disable  TX RX   None
xe2  !ena  1  25G   FD None  No   Disable  TX RX   None
ce1  up    4 100G   FD   SW   No   Forward           Tag
xe3  !ena  1  25G   FD None  No   Disable  TX RX   None
xe4  !ena  1  50G   FD None  No   Disable  TX RX   None
xe5  !ena  1  25G   FD None  No   Disable  TX RX   None
ce2  up    4 100G   FD   SW   No   Forward           Tag
xe6  !ena  1  25G   FD None  No   Disable  TX RX   None
xe7  !ena  1  50G   FD None  No   Disable  TX RX   None
xe8  !ena  1  25G   FD None  No   Disable  TX RX   None
xe9  up    1  25G   FD   SW   No   Forward           Tag
xe10 up    1  25G   FD   SW   No   Forward           Tag

lrn  inter   max   cut   loop
ops   face frame  thru?  back
FA    CR4  8996    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA    CR4  8996    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA    CR4  8996    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA  XGMII  9412    No
FA     CR  8996    No
FA     CR  8996    No
```

Example (Register)

```
DellEMC# show hardware stack-unit 1 unit 1 register
0x0068003c AGINGCTRMEMDEBUG.mmu0 = 0x00000000
0x0068003d AGINGEXPMEMDEBUG.mmu0 = 0x00000000
0x00680017 ASFCONFIG.mmu0 = 0x0000000e
0x0060004c ASFPORTSPEED.ge0 = 0x00000000
0x0060104c ASFPORTSPEED.ge1 = 0x00000000
0x0060204c ASFPORTSPEED.ge2 = 0x00000000
```

```
0x0060304c ASFPORTSPEED.ge3 = 0x00000000
0x0060404c ASFPORTSPEED.ge4 = 0x00000000
0x0060504c ASFPORTSPEED.ge5 = 0x00000000
0x0060604c ASFPORTSPEED.ge6 = 0x00000000
0x0060704c ASFPORTSPEED.ge7 = 0x00000000
0x0060804c ASFPORTSPEED.ge8 = 0x00000000
0x0060904c ASFPORTSPEED.ge9 = 0x00000000
0x0060a04c ASFPORTSPEED.ge10 = 0x00000000
0x0060b04c ASFPORTSPEED.ge11 = 0x00000000
0x0060c04c ASFPORTSPEED.ge12 = 0x00000000
0x0060d04c ASFPORTSPEED.ge13 = 0x00000000
0x0060e04c ASFPORTSPEED.ge14 = 0x00000000
0x0060f04c ASFPORTSPEED.ge15 = 0x00000000
0x0061004c ASFPORTSPEED.ge16 = 0x00000000
0x0061104c ASFPORTSPEED.ge17 = 0x00000000
0x0061204c ASFPORTSPEED.ge18 = 0x00000000
0x0061304c ASFPORTSPEED.ge19 = 0x00000000
0x0061404c ASFPORTSPEED.ge20 = 0x00000000
0x0061504c ASFPORTSPEED.ge21 = 0x00000000
0x0061604c ASFPORTSPEED.ge22 = 0x00000000
0x0061704c ASFPORTSPEED.ge23 = 0x00000005
0x0061804c ASFPORTSPEED.hg0 = 0x00000007
0x0061904c ASFPORTSPEED.hg1 = 0x00000007
0x0061a04c ASFPORTSPEED.hg2 = 0x00000000
0x0061b04c ASFPORTSPEED.hg3 = 0x00000000
0x0061c04c ASFPORTSPEED.cpu0 = 0x00000000
0x00780000 AUX_ARB_CONTROL.ipipe0 = 0x0000001c
0x0e700102 BCAST_BLOCK_MASK.ge0 = 0x00000000
0x0e701102 BCAST_BLOCK_MASK.ge1 = 0x00000000
0x0e702102 BCAST_BLOCK_MASK.ge2 = 0x00000000
0x0e703102 BCAST_BLOCK_MASK.ge3 = 0x00000000
0x0e704102 BCAST_BLOCK_MASK.ge4 = 0x00000000
0x0e705102 BCAST_BLOCK_MASK.ge5 = 0x00000000
0x0e706102 BCAST_BLOCK_MASK.ge6 = 0x00000000
0x0e707102 BCAST_BLOCK_MASK.ge7 = 0x00000000
0x0e708102 BCAST_BLOCK_MASK.ge8 = 0x00000000
0x0e709102 BCAST_BLOCK_MASK.ge9 = 0x00000000
0x0e70a102 BCAST_BLOCK_MASK.ge10 = 0x00000000
0x0e70b102 BCAST_BLOCK_MASK.ge11 = 0x00000000
0x0e70c102 BCAST_BLOCK_MASK.ge12 = 0x00000000
0x0e70d102 BCAST_BLOCK_MASK.ge13 = 0x00000000
0x0e70e102 BCAST_BLOCK_MASK.ge14 = 0x00000000
0x0e70f102 BCAST_BLOCK_MASK.ge15 = 0x00000000
0x0e710102 BCAST_BLOCK_MASK.ge16 = 0x00000000
0x0e711102 BCAST_BLOCK_MASK.ge17 = 0x00000000
0x0e712102 BCAST_BLOCK_MASK.ge18 = 0x00000000
0x0e713102 BCAST_BLOCK_MASK.ge19 = 0x00000000
0x0e714102 BCAST_BLOCK_MASK.ge20 = 0x00000000
0x0e715102 BCAST_BLOCK_MASK.ge21 = 0x00000000
0x0e716102 BCAST_BLOCK_MASK.ge22 = 0x00000000
0x0e717102 BCAST_BLOCK_MASK.ge23 = 0x00000000
0x0e718102 BCAST_BLOCK_MASK.hg0 = 0x00000000
0x0e719102 BCAST_BLOCK_MASK.hg1 = 0x00000000
0x0e71a102 BCAST_BLOCK_MASK.hg2 = 0x00000000
0x0e71b102 BCAST_BLOCK_MASK.hg3 = 0x00000000
0x0e71c102 BCAST_BLOCK_MASK.cpu0 = 0x00000000
0x0b700001 BCAST_STORM_CONTROL.ge0 = 0x00000000
0x0b701001 BCAST_STORM_CONTROL.ge1 = 0x00000000
0x0b702001 BCAST_STORM_CONTROL.ge2 = 0x00000000
0x0b703001 BCAST_STORM_CONTROL.ge3 = 0x00000000
0x0b704001 BCAST_STORM_CONTROL.ge4 = 0x00000000
0x0b705001 BCAST_STORM_CONTROL.ge5 = 0x00000000
0x0b706001 BCAST_STORM_CONTROL.ge6 = 0x00000000
0x0b707001 BCAST_STORM_CONTROL.ge7 = 0x00000000
0x0b708001 BCAST_STORM_CONTROL.ge8 = 0x00000000
0x0b709001 BCAST_STORM_CONTROL.ge9 = 0x00000000
0x0b70a001 BCAST_STORM_CONTROL.ge10 = 0x00000000
!------------------ output truncated ---------------!
```

```
DellEMC# show hardware stack-unit 1 unit 1 register
0x0068003c AGINGCTRMEMDEBUG.mmu0 = 0x00000000
```

```
0x0068003d AGINGEXPMEMDEBUG.mmu0 = 0x00000000
0x00680017 ASFCONFIG.mmu0 = 0x0000000e
0x0060004c ASFPORTSPEED.ge0 = 0x00000000
0x0060104c ASFPORTSPEED.ge1 = 0x00000000
0x0060204c ASFPORTSPEED.ge2 = 0x00000000
0x0060304c ASFPORTSPEED.ge3 = 0x00000000
0x0060404c ASFPORTSPEED.ge4 = 0x00000000
0x0060504c ASFPORTSPEED.ge5 = 0x00000000
0x0060604c ASFPORTSPEED.ge6 = 0x00000000
0x0060704c ASFPORTSPEED.ge7 = 0x00000000
0x0060804c ASFPORTSPEED.ge8 = 0x00000000
0x0060904c ASFPORTSPEED.ge9 = 0x00000000
0x0060a04c ASFPORTSPEED.ge10 = 0x00000000
0x0060b04c ASFPORTSPEED.ge11 = 0x00000000
0x0060c04c ASFPORTSPEED.ge12 = 0x00000000
0x0060d04c ASFPORTSPEED.ge13 = 0x00000000
0x0060e04c ASFPORTSPEED.ge14 = 0x00000000
0x0060f04c ASFPORTSPEED.ge15 = 0x00000000
0x0061004c ASFPORTSPEED.ge16 = 0x00000000
0x0061104c ASFPORTSPEED.ge17 = 0x00000000
0x0061204c ASFPORTSPEED.ge18 = 0x00000000
0x0061304c ASFPORTSPEED.ge19 = 0x00000000
0x0061404c ASFPORTSPEED.ge20 = 0x00000000
0x0061504c ASFPORTSPEED.ge21 = 0x00000000
0x0061604c ASFPORTSPEED.ge22 = 0x00000000
0x0061704c ASFPORTSPEED.ge23 = 0x00000005
0x0061804c ASFPORTSPEED.hg0 = 0x00000007
0x0061904c ASFPORTSPEED.hg1 = 0x00000007
0x0061a04c ASFPORTSPEED.hg2 = 0x00000000
0x0061b04c ASFPORTSPEED.hg3 = 0x00000000
0x0061c04c ASFPORTSPEED.cpu0 = 0x00000000
0x00780000 AUX_ARB_CONTROL.ipipe0 = 0x0000001c
0x0e700102 BCAST_BLOCK_MASK.ge0 = 0x00000000
0x0e701102 BCAST_BLOCK_MASK.ge1 = 0x00000000
0x0e702102 BCAST_BLOCK_MASK.ge2 = 0x00000000
0x0e703102 BCAST_BLOCK_MASK.ge3 = 0x00000000
0x0e704102 BCAST_BLOCK_MASK.ge4 = 0x00000000
0x0e705102 BCAST_BLOCK_MASK.ge5 = 0x00000000
0x0e706102 BCAST_BLOCK_MASK.ge6 = 0x00000000
0x0e707102 BCAST_BLOCK_MASK.ge7 = 0x00000000
0x0e708102 BCAST_BLOCK_MASK.ge8 = 0x00000000
0x0e709102 BCAST_BLOCK_MASK.ge9 = 0x00000000
0x0e70a102 BCAST_BLOCK_MASK.ge10 = 0x00000000
0x0e70b102 BCAST_BLOCK_MASK.ge11 = 0x00000000
0x0e70c102 BCAST_BLOCK_MASK.ge12 = 0x00000000
0x0e70d102 BCAST_BLOCK_MASK.ge13 = 0x00000000
0x0e70e102 BCAST_BLOCK_MASK.ge14 = 0x00000000
0x0e70f102 BCAST_BLOCK_MASK.ge15 = 0x00000000
0x0e710102 BCAST_BLOCK_MASK.ge16 = 0x00000000
0x0e711102 BCAST_BLOCK_MASK.ge17 = 0x00000000
0x0e712102 BCAST_BLOCK_MASK.ge18 = 0x00000000
0x0e713102 BCAST_BLOCK_MASK.ge19 = 0x00000000
0x0e714102 BCAST_BLOCK_MASK.ge20 = 0x00000000
0x0e715102 BCAST_BLOCK_MASK.ge21 = 0x00000000
0x0e716102 BCAST_BLOCK_MASK.ge22 = 0x00000000
0x0e717102 BCAST_BLOCK_MASK.ge23 = 0x00000000
0x0e718102 BCAST_BLOCK_MASK.hg0 = 0x00000000
0x0e719102 BCAST_BLOCK_MASK.hg1 = 0x00000000
0x0e71a102 BCAST_BLOCK_MASK.hg2 = 0x00000000
0x0e71b102 BCAST_BLOCK_MASK.hg3 = 0x00000000
0x0e71c102 BCAST_BLOCK_MASK.cpu0 = 0x00000000
0x0b700001 BCAST_STORM_CONTROL.ge0 = 0x00000000
0x0b701001 BCAST_STORM_CONTROL.ge1 = 0x00000000
0x0b702001 BCAST_STORM_CONTROL.ge2 = 0x00000000
0x0b703001 BCAST_STORM_CONTROL.ge3 = 0x00000000
0x0b704001 BCAST_STORM_CONTROL.ge4 = 0x00000000
0x0b705001 BCAST_STORM_CONTROL.ge5 = 0x00000000
0x0b706001 BCAST_STORM_CONTROL.ge6 = 0x00000000
0x0b707001 BCAST_STORM_CONTROL.ge7 = 0x00000000
0x0b708001 BCAST_STORM_CONTROL.ge8 = 0x00000000
0x0b709001 BCAST_STORM_CONTROL.ge9 = 0x00000000
```

```
0x0b70a001 BCAST_STORM_CONTROL.ge10 = 0x00000000
!------------------ output truncated ---------------!
```

```
DellEMC# show hardware stack-unit 1 unit 0 register
0x38804000 ASF_CREDIT_THRESH_HI.xe113 = 0x00000007
0x38804010 ASF_CREDIT_THRESH_HI.xe114 = 0x00000007
0x38804001 ASF_CREDIT_THRESH_HI.xe115 = 0x00000007
0x38804011 ASF_CREDIT_THRESH_HI.xe116 = 0x00000007
0x38804002 ASF_CREDIT_THRESH_HI.xe109 = 0x00000007
0x38804012 ASF_CREDIT_THRESH_HI.xe110 = 0x00000007
0x38804003 ASF_CREDIT_THRESH_HI.xe111 = 0x00000007
0x38804013 ASF_CREDIT_THRESH_HI.xe112 = 0x00000007
0x38804004 ASF_CREDIT_THRESH_HI.ce3 = 0x0000001b
0x38804014 ASF_CREDIT_THRESH_HI.xe121 = 0x00000007
0x38804005 ASF_CREDIT_THRESH_HI.xe122 = 0x00000011
0x38804015 ASF_CREDIT_THRESH_HI.xe123 = 0x00000007
0x38804006 ASF_CREDIT_THRESH_HI.xe117 = 0x00000007
0x38804016 ASF_CREDIT_THRESH_HI.xe118 = 0x00000007
0x38804007 ASF_CREDIT_THRESH_HI.xe119 = 0x00000007
0x38804017 ASF_CREDIT_THRESH_HI.xe120 = 0x00000007
0x38804008 ASF_CREDIT_THRESH_HI.xe81 = 0x00000007
0x38804018 ASF_CREDIT_THRESH_HI.xe82 = 0x00000007
0x38804009 ASF_CREDIT_THRESH_HI.xe83 = 0x00000007
0x38804019 ASF_CREDIT_THRESH_HI.xe84 = 0x00000007
0x3880400a ASF_CREDIT_THRESH_HI.xe77 = 0x00000007
0x3880401a ASF_CREDIT_THRESH_HI.xe78 = 0x00000007
0x3880400b ASF_CREDIT_THRESH_HI.xe79 = 0x00000007
!------------------ output truncated ---------------!
```

Example (Counters)

```
DellEMC#show hardware stack-unit 1 unit 0 counters
unit: 0 port: 1 (interface Hu 1/49)
Description                                      Value

RX - IPV4 L3 Unicast Frame Counter                 0
RX - IPV4 L3 Routed Multicast Packets              0
RX - IPV6 L3 Unicast Frame Counter                 0
RX - IPV6 L3 Routed Multicast Packets              0
RX - Unicast Packet Counter                        0
RX - 64 Byte Frame Counter                         0
RX - 65 to 127 Byte Frame Counter                  0
RX - 128 to 255 Byte Frame Counter                 0
RX - 256 to 511 Byte Frame Counter                 0
RX - 512 to 1023 Byte Frame Counter                0
RX - 1024 to 1518 Byte Frame Counter               0
RX - 1519 to 1522 Byte Good VLAN Frame Counter     0
RX - 1519 to 2047 Byte Frame Counter               0
RX - 2048 to 4095 Byte Frame Counter               0
RX - 4096 to 9216 Byte Frame Counter               0
RX - Good Packet Counter                           0
RX - Packet/Frame Counter                          0
RX - Unicast Frame Counter                         0
RX - Multicast Frame Counter                       0
RX - Broadcast Frame Counter                       0
RX - Byte Counter                                  0
RX - Control Frame Counter                         0
RX - Pause Control Frame Counter                   0
RX - Oversized Frame Counter                       0
RX - Jabber Frame Counter                          0
RX - VLAN Tag Frame Counter                        0
RX - Double VLAN Tag Frame Counter                 0
RX - RUNT Frame Counter                            0
RX - Fragment Counter                              0
RX - VLAN Tagged Packets                           0
RX - Ingress Dropped Packet                        0
RX - MTU Check Error Frame Counter                 0
RX - PFC Frame Priority 0                          0
RX - PFC Frame Priority 1                          0
RX - PFC Frame Priority 2                          0
RX - PFC Frame Priority 3                          0
RX - PFC Frame Priority 4                          0
```

```
RX - PFC Frame Priority 5                          0
RX - PFC Frame Priority 6                          0
RX - PFC Frame Priority 7                          0
RX - Debug Counter 0                               0
RX - Debug Counter 1                               0
RX - Debug Counter 2                               0
RX - Debug Counter 3                               0
RX - Debug Counter 4                               0
RX - Debug Counter 5                               0
RX - Debug Counter 6                               0
RX - Debug Counter 7                               0
RX - Debug Counter 8                               0
TX - 64 Byte Frame Counter                         0
TX - 65 to 127 Byte Frame Counter                  0
TX - 128 to 255 Byte Frame Counter                 0
TX - 256 to 511 Byte Frame Counter                 0
TX - 512 to 1023 Byte Frame Counter                0
TX - 1024 to 1518 Byte Frame Counter               0
TX - 1519 to 1522 Byte Good VLAN Frame Counter     0
TX - 1519 to 2047 Byte Frame Counter               0
TX - 2048 to 4095 Byte Frame Counter               0
TX - 4096 to 9216 Byte Frame Counter               0
TX - Good Packet Counter                           0
TX - Packet/Frame Counter                          0
TX - Unicast Frame Counter                         0
TX - Multicast Frame Counter                       0
TX - Broadcast Frame Counter                       0
TX - Byte Counter                                  0
TX - Control Frame Counter                         0
TX - Pause Control Frame Counter                   0
TX - Oversized Frame Counter                       0
TX - Jabber Counter                                0
TX - VLAN Tag Frame Counter                        0
TX - Double VLAN Tag Frame Counter                 0
TX - RUNT Frame Counter                            0
TX - Fragment Counter                              0
TX - PFC Frame Priority 0                          0
TX - PFC Frame Priority 1                          0
TX - PFC Frame Priority 2                          0
TX - PFC Frame Priority 3                          0
TX - PFC Frame Priority 4                          0
TX - PFC Frame Priority 5                          0
TX - PFC Frame Priority 6                          0
TX - PFC Frame Priority 7                          0
TX - Debug Counter 0                               0
TX - Debug Counter 1                               0
TX - Debug Counter 2                               0
TX - Debug Counter 3                               0
TX - Debug Counter 4                               0
TX - Debug Counter 5                               0
TX - Debug Counter 6                               0
TX - Debug Counter 7                               0
TX - Debug Counter 8                               0
TX - Debug Counter 9                               0
TX - Debug Counter 10
```

Example (Details)

```
DellEMC# show hardware stack-unit 1 unit 1 details

*****************************************************

The total no of FP & CSF Devices in the Card is 2
The total no of FP Devices in the Card is 2
The total no of CSF Devices in the Card is 0
The number of ports in device 0 is - 24
The number of Hg ports in devices 0 is - 4
The CPU Port of the device is 28
The number of ports in device 1 is - 24
The number of Hg ports in devices 1 is - 4
The CPU Port of the device is 28
The staring unit no the SWF in the device is 0
```

```
*****************************************************

The Current Link Status Is

Front End Link Status 0x000000000000400000000000
Front End Port Present Status 0x000000000000000000000000
Back Plane Link Status 0x00000000

*****************************************************

Link Status of all the ports in the Device - 1
The linkStatus of Front End Port 0 is FALSE
The linkStatus of Front End Port 1 is FALSE
The linkStatus of Front End Port 2 is FALSE
The linkStatus of Front End Port 3 is FALSE
The linkStatus of Front End Port 4 is FALSE
The linkStatus of Front End Port 5 is FALSE
The linkStatus of Front End Port 6 is FALSE
The linkStatus of Front End Port 7 is FALSE
The linkStatus of Front End Port 8 is FALSE
The linkStatus of Front End Port 9 is FALSE
The linkStatus of Front End Port 10 is FALSE
The linkStatus of Front End Port 11 is FALSE
The linkStatus of Front End Port 12 is FALSE
The linkStatus of Front End Port 13 is FALSE
The linkStatus of Front End Port 14 is FALSE
The linkStatus of Front End Port 15 is FALSE
The linkStatus of Front End Port 16 is FALSE
The linkStatus of Front End Port 17 is FALSE
The linkStatus of Front End Port 18 is FALSE
The linkStatus of Front End Port 19 is FALSE
The linkStatus of Front End Port 20 is FALSE
The linkStatus of Front End Port 21 is FALSE
The linkStatus of Front End Port 22 is FALSE
The linkStatus of Front End Port 23 is TRUE
The linkStatus of Hg Port 24 is TRUE
The linkStatus of Hg Port 25 is TRUE
The linkStatus of Hg Port 26 is FALSE
The linkStatus of Hg Port 27 is FALSE
!------------------ output truncated ---------------!
```

```
DellEMC# show hardware stack-unit 1 unit 1 details

*****************************************************

The total no of FP & CSF Devices in the Card is 2
The total no of FP Devices in the Card is 2
The total no of CSF Devices in the Card is 0
The number of ports in device 0 is - 24
The number of Hg ports in devices 0 is - 4
The CPU Port of the device is 28
The number of ports in device 1 is - 24
The number of Hg ports in devices 1 is - 4
The CPU Port of the device is 28
The staring unit no the SWF in the device is 0
*****************************************************

The Current Link Status Is

Front End Link Status 0x000000000000400000000000
Front End Port Present Status 0x000000000000000000000000
Back Plane Link Status 0x00000000

*****************************************************

Link Status of all the ports in the Device - 1
The linkStatus of Front End Port 0 is FALSE
The linkStatus of Front End Port 1 is FALSE
The linkStatus of Front End Port 2 is FALSE
The linkStatus of Front End Port 3 is FALSE
The linkStatus of Front End Port 4 is FALSE
```

```
The linkStatus of Front End Port 5 is FALSE
The linkStatus of Front End Port 6 is FALSE
The linkStatus of Front End Port 7 is FALSE
The linkStatus of Front End Port 8 is FALSE
The linkStatus of Front End Port 9 is FALSE
The linkStatus of Front End Port 10 is FALSE
The linkStatus of Front End Port 11 is FALSE
The linkStatus of Front End Port 12 is FALSE
The linkStatus of Front End Port 13 is FALSE
The linkStatus of Front End Port 14 is FALSE
The linkStatus of Front End Port 15 is FALSE
The linkStatus of Front End Port 16 is FALSE
The linkStatus of Front End Port 17 is FALSE
The linkStatus of Front End Port 18 is FALSE
The linkStatus of Front End Port 19 is FALSE
The linkStatus of Front End Port 20 is FALSE
The linkStatus of Front End Port 21 is FALSE
The linkStatus of Front End Port 22 is FALSE
The linkStatus of Front End Port 23 is TRUE
The linkStatus of Hg Port 24 is TRUE
The linkStatus of Hg Port 25 is TRUE
The linkStatus of Hg Port 26 is FALSE
The linkStatus of Hg Port 27 is FALSE
!------------------ output truncated ---------------!
```

```
*************************

bcmLinkMonStatusShow: The Current Link Status Is

Front End Link Status        0x00000000 0x00000000 0x00000000 0x00000000
Front End Port Presence      0x00000000 0x00000000 0x00000000 0x00000000
Backplane Link Status        0x00000000
*****************************************************

Link Status of all the ports in the Device - 0

The linkStatus of Front End Port 1 is FALSE
The linkStatus of Front End Port 2 is FALSE
The linkStatus of Front End Port 3 is FALSE
The linkStatus of Front End Port 4 is FALSE
The linkStatus of Front End Port 5 is FALSE
The linkStatus of Front End Port 6 is FALSE
The linkStatus of Front End Port 7 is FALSE
The linkStatus of Front End Port 8 is FALSE

[output truncated]
```

Example (Total-Buffer)

```
DellEMC# show hardware stack-unit 1 buffer total-buffer

DellEMC# show hardware stack-unit 1 buffer total-buffer
----- Buffer Details for Stack-Unit 1 -----
Total Buffers allocated per Stack-Unit 46080
```

Example displaying queue range

```
DellEMC# show hardware stack-unit 0 buffer unit 0 interface all queue 6
buffer-info
       Buffer Stats for Front End Ports
       ================================
-----  Buffer Stats for Interface Tf 1/1   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/2   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/3   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
```

```
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/4   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/5   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/6   Queue 6 -----
 Maximum Shared Limit: 7667
 Default Packet Buffer allocate for the Queue: 8
 Used Packet Buffer: 0
-----  Buffer Stats for Interface Tf 1/7   Queue 6 -----
<output truncated for brevity>
```

Related Commands

- clear hardware system-flow — clear the statistics from selected hardware components.
- show interfaces stack-unit — display information on all interfaces on a specific S-Series stack member.
- show processes cpu (S-Series) — display the CPU usage information based on the processes running in an S-Series.
- show system — display the current status of all the stack members or a specific member.

show hardware buffer

Display the counters for the specified port, minimum guaranteed buffer of a priority-group, and the shared buffer.

Syntax

```
show hardware buffer {headroom-pool {buffer-info | detail buffer-info}}
interface interface-type interface-number {buffer-info | detail buffer-info
| priority-group priority-group-id {buffer-info | detail buffer-info} |
queue queue-no {buffer-info | detail buffer-info }}
```

Parameters

headroom-pool buffer-info — Enter the keyword `headroom-pool` followed by the keyword `buffer-info` for information on the headroom pool buffer usage.

headroom-pool detail buffer-info — Enter the keyword `headroom-pool` followed by the keywords `detail` and `buffer-info` for detailed headroom buffer usage statistics.

interface interface type *interface-number* — Enter the keyword `interface` followed by the keyword `interface type` and *interface number* to display the buffer details of a particular interface.

Enter any of the following keywords and slot/port[/subport] or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port/subport information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

queue — Enter the keyword `queue` followed by *id* for specific queue or keyword `all`.

priority-group — Identifier of the priority group in the range of 0 to 7.

Enter the keyword `priority-group` followed by *id* for specific priority group or keyword `all`.

buffer-info — To display total buffer information for the port interface, enter the keywords `buffer-info`. To display a queue range, enter 0 to 19 for a specific queue or all.

Command Modes

EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0)	Introduced the keyword headroom-pool on the Z9100–ON and S6100–ON.
9.10(0.0)	Introduced on the S6100.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Removed the keyword `port` and added the keywords `interface`, and the variable *interface* .
9.7(0.0)	Introduced on the S6000-ON.
Version 9.3(0.0)	Introduced on the S6000 platform.

Usage Information

The following table describes the fields in the output of the `show` command:

Table 4. Show Output Fields

Field	Description
Buffer Stats for Interface interface-number Queue queue-number	Displays the counters that are calculated by the buffer statistics tracking method for each port per queue on a particular stack member.
Max Shared Limit	Maximum shared buffer space allotted to the specific port for the corresponding stack unit
Default Packet Buffer allocate for the queue	The default packet buffer size in KB that is associated with the particular queue
Used Packet Buffer	Shared buffer space that is in use by the packets

Example displaying buffer information for specified queue

```
DellEMC# show hardware buffer interface hundredGigE 1/10 queue 0 buffer-
info
-----  Buffer Stats for Interface Hu 1/10 Queue 0 -----
 Maximum Shared Limit: 11158
 Default Packet Buffer allocated for the Queue: 0
 Used Packet Buffer: 0
```

Example displaying buffer information for specified priority-group

```
DellEMC# show hardware buffer interface hundredGigE 1/10 priority-group
0 buffer-info
----- Buffer stats for unit: 0 port: 34 (interface Hu 1/10) -----
-------------------------------------------------------------------------
PG# PRIORITIES             ALLOTED (CELLS)          COUNTER (CELLS)
                  MIN    SHARED    MODE    HDRM   MIN    SHARED  HDRM
-------------------------------------------------------------------------
0   0             0      17384     DYNAMIC 174    0      0       0
```

Example displaying buffer information for headroom pool

```
DellEMC#show hardware buffer headroom-pool buffer-info
------Buffer Details for Stack-Unit 1 portpipe 0 ------
-----------------------------------------------------------
Headroom-Pool   Configured Buffer(KB)  Used Buffer(KB)
-----------------------------------------------------------
HP1                    0                      0
DellEMC#
```

show hardware buffer headroom-pool

Display the headroom pool buffer usage.

Syntax

```
show hardware buffer {headroom-pool {buffer-info | detail buffer-info}}
```

Parameters

headroom-pool buffer-info	Enter the keyword `headroom-pool` followed by the keyword `buffer-info` for information on the headroom pool buffer usage.
headroom-pool detail buffer-info	Enter the keyword `headroom-pool` followed by the keywords `detail` and `buffer-info` for detailed headroom buffer usage statistics.

Command Modes

EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0)	Introduced the keyword headroom-pool on the Z9100–ON and S6100–ON.

Example displaying buffer information for headroom pool

```
DellEMC#show hardware buffer headroom-pool buffer-info
------Buffer Details for Stack-Unit 1 portpipe 0 ------
-----------------------------------------------------------------
Headroom-Pool   Configured Buffer(KB)  Used Buffer(KB)
-----------------------------------------------------------------
HP1                     0                     0
DellEMC#
```

show hardware buffer service-pool

Displays the buffer details for the service pool. You can verify the total buffer allocated to the lossy and lossless traffic in the service pool.

Syntax

```
show hardware buffer service-pool {buffer-info | detail buffer-info}
```

Parameters

buffer-info	Enter the keyword `buffer-info` to view the buffer details for the service pool.
detail buffer-info	Enter the keyword `detail buffer-info` to view the buffer details allocated for the MMU units.

Command Modes

EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000, S6000–ON, S6100–ON and Z9100–ON.

Usage Information

Use this command to view the buffer details of lossy and lossless traffic in the service pool. Use the keyword `detail buffer-info` to view the buffer details allocated for each MMU unit.

Example

```
DellEMC#show hardware buffer service-pool buffer-info
------Buffer Details for Stack-Unit 1 portpipe 0 ------
-----------------------------------------------------------------
Service-Pool           Configured Buffer(KB)      Used Buffer(KB)
-----------------------------------------------------------------
SP0(Lossy)             9758                       7760
SP1(Lossless)          3842                       697
```

```
DellEMC#
```

```
DellEMC#show hardware buffer service-pool detail buffer-info
------Buffer Details for Stack-Unit 1 portpipe 0 ------
-----Buffer Details for MMU 0-----
-------------------------------------------------------------------
Service-Pool           Configured Buffer(KB)      Used Buffer(KB)
-------------------------------------------------------------------
SP0(Lossy)             2440                       1942
SP1(Lossless)          961                        225

-----Buffer Details for MMU 1-----
-------------------------------------------------------------------
Service-Pool           Configured Buffer(KB)      Used Buffer(KB)
-------------------------------------------------------------------
SP0(Lossy)             2440                       1943
SP1(Lossless)          961                        226

-----Buffer Details for MMU 2-----
-------------------------------------------------------------------
Service-Pool           Configured Buffer(KB)      Used Buffer(KB)
-------------------------------------------------------------------
SP0(Lossy)             2440                       1939
SP1(Lossless)          961                        32

-----Buffer Details for MMU 3-----
-------------------------------------------------------------------
Service-Pool           Configured Buffer(KB)      Used Buffer(KB)
-------------------------------------------------------------------
SP0(Lossy)             2440                       1938
SP1(Lossless)          961                        227
DellEMC#
```

show hardware buffer-stats-snapshot

Displays buffer statistics tracking resource information for a specific interface.

Syntax

```
show hardware buffer-stats-snapshot resource {headroom-pool [detail] |
service-pool [detail] interface interface {{priority-group {id | all} |
queue ucast {id | all} mcast {id | all} | all} [detail]}
```

Parameters

headroom-pool detail — Enter the keyword `headroom-pool` followed by the keyword `detail` to view detailed information about the headroom pool usage.

service-pool detail — Enter the keyword `service-pool` followed by the keyword `detail` to view detailed information about the service pool usage.

interface *interface* — Enter any of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

queue — Enter the keyword `queue` followed by *all* for displaying details of all queues, `ucast queue-id` or *all* for displaying Unicast queue details, and `mcast queue-id` or *all* for displaying Multicast queue details.

priority-group Enter the keyword `priority-group` followed by *id* for specific priority-group or keyword *all*.

Command Modes

EXEC

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, Z9000, Z9500.

Usage Information

`<Interface><slot/port>-Queue ucast/mcast` — Displays the total unicast/multicast buffer usage on per-port per-queue basis. For CPU port, counters for queues 0 to 11 displays and there is no differentiation between unicast and multicast queues.

Example displaying egress queue-level snapshot for both unicast and multicast packets for the specific interface

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 queue all
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
----------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
----------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
MCAST       9      0
```

Example displaying egress queue-level snapshot for unicast packets for the specific interface

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 queue ucast 0
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
----------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
```

```
---------------------------------------
UCAST       0      0
```

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 queue ucast all
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
```

Example displaying egress queue-level snapshot for multicast packets for the specific interface

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 queue mcast 0
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
MCAST       0      0
```

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 queue mcast all
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
MCAST       9      0
```

Example displaying ingress priority-group level snapshot for the specific interface

```
DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/49 prio-group 0
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/49)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
0       0                0


DellEMC# show hardware buffer-stats-snapshot resource interface
hundredGigE 1/10 prio-group all
Stack-unit 1 unit: 0 port: 34 (interface Hu 1/10)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
0       0                0
1       0                0
2       0                0
3       0                0
4       0                0
5       0                0
```

```
6       0               0
7       0               0
```

Example showing buffer snap shot details for head room pool

```
DellEMC#show hardware buffer-stats-snapshot resource headroom-pool
--------------------------------------
HP#     PEAK USE COUNT(CELLS)
--------------------------------------
0       0
1       0
2       0
3       0
DellEMC#
DellEMC#show hardware buffer-stats-snapshot resource headroom-pool detail
-----------------------------------------------
HP#     MMU#     PEAK USE COUNT(CELLS)
-----------------------------------------------
0       0        0
0       1        0
0       2        0
0       3        0
1       0        0
1       1        0
1       2        0
1       3        0
2       0        0
2       1        0
2       2        0
2       3        0
3       0        0
3       1        0
3       2        0
3       3        0
DellEMC#
```

show hardware drops

Displays internal drops on the specified interface or for a range of interface.

Syntax

`show hardware drops interface` *interface*

Parameters

drops — Enter the keyword `drops` to display internal drops.

interface — Enter any of the following keywords and the interface or interface range information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Command Modes

EXEC

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Included the FEC BER details in the output for 25 and 50GG interfaces of the S5048–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Included the FEC BER details in the output for 100G interfaces of S6100–ON and Z9100–ON . Included FCS Error Ratio in the output for all interfaces of S6000, S6000–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Removed the keywords `stack-unit`. Introduced on the Z9500.
9.7(0.0)	Introduced on the S6000-ON.
9.2(0.2)	Modified the `drops` keyword range, unit keyword `range` and added the `buffer` and `cpu management statistics` options.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.5	Added i2c statistics and sata-interfaces statistics.
8.3.11.4	Added user port information.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.

Example displaying internal drops

```
DellEMC#$show hardware drops interface twentyFiveGigE 1/50/1

Drops in Interface Tf 1/50/1:
 --- Ingress Drops      ---
Ingress Drops                 : 554124048108
IBP CBP Full Drops            : 0
PortSTPnotFwd Drops           : 0
IPv4 L3 Discards              : 0
Policy Discards               : 0
Packets dropped by FP         : 85576276
(L2+L3) Drops                 : 0
Port bitmap zero Drops        : 554124048252
Rx VLAN Drops                 : 47425469
 --- Ingress MAC counters---
Ingress FCSDrops              : 158
Ingress MTUExceeds            : 0
 --- MMU Drops          ---
Ingress MMU Drops             : 0
Ingress Drops Bytes           : 0
HOL DROPS(TOTAL)              : 3240829783
HOL DROPS on COS0             : 0
HOL DROPS on COS1             : 0
HOL DROPS on COS2             : 0
HOL DROPS on COS3             : 0
HOL DROPS on COS4             : 0
```

```
HOL DROPS on COS5             : 0
HOL DROPS on COS6             : 0
HOL DROPS on COS7             : 0
HOL DROPS on COS8             : 0
HOL DROPS on COS9             : 0
HOL DROPS on COS10            : 3240829783
HOL DROPS on COS11            : 0
HOL DROPS on COS12            : 0
HOL DROPS on COS13            : 0
HOL DROPS on COS14            : 0
HOL DROPS on COS15            : 0
HOL DROPS on COS16            : 0
HOL DROPS on COS17            : 0
HOL DROPS on COS18            : 0
HOL DROPS on COS19            : 0
TxPurge CellErr               : 0
Aged Drops                    : 0
 --- Egress MAC counters---
Egress FCS Drops              : 0
 --- Egress FORWARD PROCESSOR Drops   ---
IPv4 L3UC Aged & Drops        : 0
TTL Threshold Drops           : 0
INVALID VLAN CNTR Drops       : 8668
L2MC Drops                    : 0
PKT Drops of ANY Conditions   : 8668
Hg MacUnderflow               : 0
TX Err PKT Counter            : 0
 --- Error counters---
Internal Mac Transmit Errors  : 0
Unknown Opcodes               : 0
Internal Mac Receive Errors   : 0
 --- FEC Counters ---
Ingress FEC uncorrected code words: 0
--- Error Ratio Counters ---
Ingress preFEC Bit Error Ratio: 0.0E0
Ingress FCS Drops Error Ratio : 0.0E0
```

```
DellEMC#show hardware drops interface hundredGigE 1/49

Drops in Interface Hu 1/49:
--- Ingress Drops      ---
Ingress Drops                 : 32992398774
IBP CBP Full Drops            : 0
PortSTPnotFwd Drops           : 0
IPv4 L3 Discards              : 0
Policy Discards               : 0
Packets dropped by FP         : 0
(L2+L3) Drops                 : 0
Port bitmap zero Drops        : 32992398774
Rx VLAN Drops                 : 0
--- Ingress MAC counters---
Ingress FCSDrops              : 0
Ingress MTUExceeds            : 0
--- MMU Drops          ---
Ingress MMU Drops             : 0
Ingress Drops Bytes           : 0
HOL DROPS(TOTAL)              : 0
HOL DROPS on COS0             : 0
HOL DROPS on COS1             : 0
HOL DROPS on COS2             : 0
HOL DROPS on COS3             : 0
HOL DROPS on COS4             : 0
HOL DROPS on COS5             : 0
HOL DROPS on COS6             : 0
HOL DROPS on COS7             : 0
HOL DROPS on COS8             : 0
HOL DROPS on COS9             : 0
HOL DROPS on COS10            : 0
HOL DROPS on COS11            : 0
HOL DROPS on COS12            : 0
HOL DROPS on COS13            : 0
```

```
HOL DROPS on COS14            : 0
HOL DROPS on COS15            : 0
HOL DROPS on COS16            : 0
HOL DROPS on COS17            : 0
HOL DROPS on COS18            : 0
HOL DROPS on COS19            : 0
TxPurge CellErr               : 0
Aged Drops                    : 0
--- Egress MAC counters---
Egress FCS Drops              : 0
--- Egress FORWARD PROCESSOR Drops   ---
IPv4 L3UC Aged & Drops        : 0
TTL Threshold Drops           : 0
INVALID VLAN CNTR Drops       : 0
L2MC Drops                    : 0
PKT Drops of ANY Conditions   : 0
Hg MacUnderflow               : 0
TX Err PKT Counter            : 0
--- Error counters---
Internal Mac Transmit Errors  : 0
Unknown Opcodes               : 0
Internal Mac Receive Errors   : 0
--- FEC Counters ---
Ingress FEC corrected blocks  : 1325
Ingress FEC uncorrected blocks: 4
--- Error Ratio Counters ---
Ingress preFEC Bit Error Ratio: 3.727463E-11
Ingress FCS Drops Error Ratio : 0.0E0
DellEMC#
```

show hardware counters interface

Display the counter information for a specific interface.

Syntax `show hardware counters interface interface`

Parameters

counters Enter the keywords `counters` to display counter value for the specified stack-member the port-pipe.

interface *interface* Enter any of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Example

```
DellEMC# show hardware counters interface hundredGigE 1/49
unit: 0 port: 34 (interface Hu 1/49)
Description                                    Value

RX - IPV4 L3 Unicast Frame Counter               0
RX - IPV4 L3 Routed Multicast Packets            0
RX - IPV6 L3 Unicast Frame Counter               0
RX - IPV6 L3 Routed Multicast Packets            0
RX - Unicast Packet Counter                      0
RX - 64 Byte Frame Counter                       0
RX - 65 to 127 Byte Frame Counter                0
RX - 128 to 255 Byte Frame Counter               0
RX - 256 to 511 Byte Frame Counter               0
RX - 512 to 1023 Byte Frame Counter              0
RX - 1024 to 1518 Byte Frame Counter             0
RX - 1519 to 1522 Byte Good VLAN Frame Counter   0
RX - 1519 to 2047 Byte Frame Counter             0
RX - 2048 to 4095 Byte Frame Counter             0
RX - 4096 to 9216 Byte Frame Counter             0
RX - Good Packet Counter                         0
RX - Packet/Frame Counter                        0
RX - Unicast Frame Counter                       0
RX - Multicast Frame Counter                     0
RX - Broadcast Frame Counter                     0
RX - Byte Counter                                0
RX - Control Frame Counter                       0
RX - Pause Control Frame Counter                 0
RX - Oversized Frame Counter                     0
RX - Jabber Frame Counter                        0
RX - VLAN Tag Frame Counter                      0
RX - Double VLAN Tag Frame Counter               0
RX - RUNT Frame Counter                          0
RX - Fragment Counter                            0
RX - VLAN Tagged Packets                         0
RX - Ingress Dropped Packet                      0
RX - MTU Check Error Frame Counter               0
RX - PFC Frame Priority 0                        0
RX - PFC Frame Priority 1                        0
RX - PFC Frame Priority 2                        0
RX - PFC Frame Priority 3                        0
RX - PFC Frame Priority 4                        0
RX - PFC Frame Priority 5                        0
RX - PFC Frame Priority 6                        0
RX - PFC Frame Priority 7                        0
RX - Debug Counter 0                             0
RX - Debug Counter 1                             0
RX - Debug Counter 2                             0
<output truncated for brevity>
```

show hardware system-flow

Display Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

Syntax

```
show hardware system-flow stack-unit id port-set number [counters |
pipeline pipeline-number]
```

Parameters

stack-unit *id*	Enter the keywords `stack-unit` to select a stack member ID.
port-set *number*	Enter the keywords `port-set` with a port-pipe number.
[counters | pipeline *pipeline-number*]	(OPTIONAL) Enter the keyword `counters` for the specified port-pipe. Enter the keyword `pipeline` to display entries specific to a pipeline.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Example

```
DellEMC# show hardware system-flow stack-unit 1 port-set 0 counters
-------------------------------------------------------------
EntryId Description                 #HITS
-------------------------------------------------------------
2048    STP BPDU Redirects           0
2047    LLDP BPDU Redirects          0
2045    LACP traffic Redirects       0
2044    GVRP traffic Redirects       0
2043    ARP Reply Redirects          0
2042    802.1x frames Redirects      0
2041    VRRP frames Redirects        0
2040    GRAT ARP                     0
2039    DROP Cases                   0
2038    OSPF1 STUB                   0
2037    OSPF2 STUB                   0
2036    VRRP STUB                    0
2035    L2_DST_HIT+BC MAC+VLAN 4095  0
2034    L2_DST_HIT+BC MAC            0
2033    Catch all                    0
384     OSPF[224.0.0.5] Packets      0
383     OSPF[224.0.0.6] Packets      0
```

```
382     VRRP Packets                    0
380     BCast L2_DST_HIT on VLAN 4095 0
379     BCAST L2_DST_HIT Packets        0
4       Unknown L2MC Packets            0
3       L2DLF Packets                   0
2       L2UCAST Packets                 0
1       L2BCASTPackets                  0
25
DellEMC#
```

```
DellEMC# show hardware system-flow stack-unit 1 port-set 0 counters
-------------------------------------------------------------
EntryId Description                  #HITS
-------------------------------------------------------------
2048    STP BPDU Redirects            0
2047    LLDP BPDU Redirects           0
2045    LACP traffic Redirects        0
2044    GVRP traffic Redirects        0
2043    ARP Reply Redirects           0
2042    802.1x frames Redirects       0
2041    VRRP frames Redirects         0
2040    GRAT ARP                      0
2039    DROP Cases                    0
2038    OSPF1 STUB                    0
2037    OSPF2 STUB                    0
2036    VRRP STUB                     0
2035    L2_DST_HIT+BC MAC+VLAN 4095   0
2034    L2_DST_HIT+BC MAC             0
2033    Catch all                     0
384     OSPF[224.0.0.5] Packets       0
383     OSPF[224.0.0.6] Packets       0
382     VRRP Packets                  0
380     BCast L2_DST_HIT on VLAN 4095 0
379     BCAST L2_DST_HIT Packets      0
4       Unknown L2MC Packets          0
3       L2DLF Packets                 0
2       L2UCAST Packets               0
1       L2BCASTPackets                0
25
DellEMC#
```

```
DellEMC# show hardware system-flow stack-unit 1 port-set 0 counters
-------------------------------------------------------------------------
       EntryId                Description                          #HITS for Pipeline: 0
-------------------------------------------------------------------------
       3067                   STP BPDU Redirects                   0
       3065                   LLDP BPDU Redirects                  0
       3063                   LACP traffic Redirects               0
       3062                   GVRP traffic Redirects               0
       3061                   ARP Reply Redirects                  0
       3060                   802.1x frames Redirects              0
       3059                   VRRP frames Redirects                0
       3058                   IPv6VRRP frames Redirects            0
       3056                   OSPFv3 Multicast [33:33:00:00:00:06]    0
       3057                   OSPFv3 Multicast [33:33:00:00:00:05]    0
       3054                   GRAT ARP                             0
       3053                   ISIS L1, L2 traffic Redirects        0
       3052                   ISIS P2P IIH, EH
                               traffic Redirects                   0
```

Example

```
param1=0(0x00)},
   action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
   action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
   action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
   meter=NULL,
   counter={idx=1, mode=0x01, entries=1}

############### FP Entry for redirecting LACP traffic to CPU Port
#############
   EID 2045: gid=1,
   slice=15, slice_idx=0x02, prio=0x7fd, flags=0x82, Installed
   tcam: color_indep=0, higig=0, higig_mask=0,
   KEY=0x00000000 00000000 00000000 0180c200 00020000 00000000 00000000
, FPF4=0x00
   MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
,       0x00
```

```
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=2, mode=0x01, entries=1}

################## FP Entry for redirecting GVRP traffic to RSM
############
    EID 2044: gid=1,
    slice=15, slice_idx=0x03, prio=0x7fc, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 0180c200 00210000 00000000 00000000
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=3, mode=0x01, entries=1}

################## FP Entry for redirecting ARP Replies to RSM
##############
    EID 2043: gid=1,
    slice=15, slice_idx=0x04, prio=0x7fb, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 00000000 00000000 00000806 00001600
, FPF4=0x00
MASK=0x00000000 00000000 00000000 00000000 00000000 0000ffff 00001600
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=6(0x06), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
!--------- output truncated -----------------!
```

```
param1=0(0x00)},
   action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
   action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
   action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
   meter=NULL,
   counter={idx=1, mode=0x01, entries=1}

############## FP Entry for redirecting LACP traffic to CPU Port
############
   EID 2045: gid=1,
   slice=15, slice_idx=0x02, prio=0x7fd, flags=0x82, Installed
   tcam: color_indep=0, higig=0, higig_mask=0,
   KEY=0x00000000 00000000 00000000 0180c200 00020000 00000000 00000000
, FPF4=0x00
   MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
,       0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=2, mode=0x01, entries=1}

################## FP Entry for redirecting GVRP traffic to RSM
############
    EID 2044: gid=1,
    slice=15, slice_idx=0x03, prio=0x7fc, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 0180c200 00210000 00000000 00000000
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
```

```
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=3, mode=0x01, entries=1}

################## FP Entry for redirecting ARP Replies to RSM
##############
    EID 2043: gid=1,
    slice=15, slice_idx=0x04, prio=0x7fb, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 00000000 00000000 00000806 00001600
, FPF4=0x00
MASK=0x00000000 00000000 00000000 00000000 00000000 0000ffff 00001600
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=6(0x06), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
!--------- output truncated -----------------!
```

```
DellEMC# show hardware system-flow stack-unit 1 port-set 0

############## FP Entry for redirecting STP BPDU to CPU Port ################
EID 0x00000bfb: gid=0x3c,
         slice=5, slice_idx=0, part =1 prio=0xbfb, flags=0x10202, Installed, Enabled
              tcam: color_indep=0,
 DstMac
    Part:0 Offset0: 48 Width0:  16
    Part:0 Offset1: 64 Width1:  16
    Part:0 Offset2: 80 Width2:   4
    Part:0 Offset3: 84 Width3:   4
    Part:0 Offset4: 88 Width4:   4
    Part:0 Offset5: 92 Width5:   4
    DATA=0x00000180 c2000000
    MASK=0x0000ffff ffffffff
 InPorts
    Part:0 Offset0:  0 Width0:  36
    DATA=0x00000001 ffffffff
    MASK=0x00000001 ffffffff
 HiGig
    Part:0 Offset0: 150 Width0:   2
    DATA=0x00000000
    MASK=0x00000001
         action={act=DropPrecedence, param0=1(0x1), param1=0(0), param2=0(0), param3=0(0)}
         action={act=Drop, param0=0(0), param1=0(0), param2=0(0), param3=0(0)}
         action={act=CosQCpuNew, param0=7(0x7), param1=0(0), param2=0(0), param3=0(0)}
         action={act=CopyToCpu, param0=1(0x1), param1=0(0), param2=0(0), param3=0(0)}
         policer=
         statistics={stat id 1  slice = 8 idx=3 entries=1}{GreenPackets}{GreenBytes}

################ FP Entry for redirecting LLDP BPDU to RSM ################
EID 0x00000bf9: gid=0x3c,
         slice=5, slice_idx=0x1, part =1 prio=0xbf9, flags=0x18202, Installed, Enabled
              tcam: color_indep=0,
 DstMac
    Part:0 Offset0: 48 Width0:  16
    Part:0 Offset1: 64 Width1:  16
    Part:0 Offset2: 80 Width2:   4
    Part:0 Offset3: 84 Width3:   4
    Part:0 Offset4: 88 Width4:   4
    Part:0 Offset5: 92 Width5:   4
    DATA=0x00000180 c200000e
    MASK=0x0000ffff ffffffff
```

show hardware vlan-counters

Display the hardware VLAN statistics.

Syntax `show hardware vlan-counters vlan-id`

Parameters

vlan-id	Enter the interface VLAN number. The range is from 1 to 4094.

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced this command.

Example

```
DellEMC# show hardware vlan-counters 1
Counters for vlanid: 1
------------------------
Total number of inpackets:  0
Total number of inbytes:    0
Total number of outpackets: 0
Total number of outbytes:   0
DellEMC#
```

Related Commands

- clear hardware system-flow — clear the statistics from selected hardware components.

14

Dynamic Host Configuration Protocol (DHCP)

Dynamic host configuration protocol (DHCP) is an application layer protocol that dynamically assigns IP addresses and other configuration parameters to network end-stations (hosts) based on the configuration policies the network administrators determine.

Topics:

- Commands to Configure the System to be a DHCP Server
- Commands to Configure Secure DHCP
- Commands to Configure DNS

Commands to Configure the System to be a DHCP Server

To configure the system to be a DHCP server, use the following commands.

clear ip dhcp

Reset the DHCP counters.

Syntax `clear ip dhcp [binding {address} | conflict | server statistics]`

Parameters

binding	Enter the keyword `binding` to delete all entries in the binding table.
address	Enter the IP address to clear the binding entry for a single IP address.
conflicts	Enter the keyword `conflicts` to delete all of the log entries created for IP address conflicts.
server statistics	Enter the keywords `server statistics` to clear all the server counter information.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

Usage Information Press Enter after the `clear ip dhcp binding` command clears all the IPs from the binding table.

debug ip dhcp server

Display Dell OS debugging messages for DHCP.

Syntax `debug ip dhcp server [events | packets]`

Parameters

events	Enter the keyword `events` to display the DHCP state changes.
packet	Enter the keyword `packet` to display packet transmission/reception.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

debug ipv6 dhcp

To enable debug logs for DHCPv6 relay agent transactions.

Syntax `debug ipv6 dhcp`

To disable the debug logs for dhcpv6 relay agent transactions, use the `debug ipv6 dhcp` command.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000 and Z-Series.

default-router

Assign a default gateway to clients based on the address pool.

Syntax `default-router address [address2...address8]`

Parameters

address Enter a list of routers that may be the default gateway for clients on the subnet. You may specify up to eight routers. List them in order of preference.

Defaults None

Command Modes DHCP <POOL>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

disable

Disable the DHCP server.

Syntax `disable`

DHCP Server is disabled by default. To enable the system to be a DHCP server, use the `no disable` command.

Defaults Disabled

Command Modes CONFIGURATION

DHCP <POOL>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

dns-server

Assign a DNS server to clients based on address pool.

Syntax `dns-server address [address2...address8]`

Parameters

address	Enter a list of DNS servers that may service clients on the subnet. You may list up to eight servers, in order of preference.

Defaults None

Command Modes DHCP <*POOL*>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

domain-name

Assign a domain to clients based on the address pool.

Syntax `domain-name` *name*

Parameters

name	Give a name to the group of addresses in a pool.

Defaults None

Command Modes DHCP <*POOL*>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

excluded-address

Prevent the server from leasing an address or range of addresses in the pool.

Syntax `excluded-address [address | low-address high-address]`

Parameters

address	Enter a single address to be excluded from the pool.
low-address	Enter the lowest address in a range of addresses to be excluded from the pool.
high-address	Enter the highest address in a range of addresses to be excluded from the pool.

Defaults None

Command Modes DHCP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

hardware-address

For manual configurations, specify the client hardware address.

Syntax `hardware-address address`

Parameters

address	Enter the hardware address of the client.

Defaults None

Command Modes DHCP <*POOL*>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

host-address

For manual (rather than automatic) configurations, assign a host to a single-address pool.

Syntax `host–address address`

Parameters

address	Enter the host IP address.

Defaults None

Command Modes DHCP-POOL

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14.1.3	This command replaces `host` command. Introduced on S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, S6000, S4810, S4820T, S5048F-ON, MXL, FN-IOM, and C9010.

Usage Information When you upgrade the Dell EMC Networking OS from an earlier version to 9.14.1.3 or later, the system converts the DHCP CONFIGURATION `host` command in the running configuration to the `host-address` command. If you downgrade the Dell EMC Networking OS from version 9.14.1.3 or later to an earlier version, any existing `host-address` command is deleted from the running configuration. If you want to create manual DHCP bindings, use the `host` command.

ip dhcp server

Enable DHCP server globally.

Syntax `[no] ip dhcp server`

To disable the DHCP server, use the `no ip dhcp server` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Introduced on the S4810 and S4820T.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

lease

Specify a lease time for the addresses in a pool.

Syntax `lease {days [hours] [minutes] | infinite}`

Parameters

days	Enter the number of days of the lease. The range is from 0 to 31.
hours	Enter the number of hours of the lease. The range is from 0 to 23.
minutes	Enter the number of minutes of the lease. The range is from 0 to 59.
infinite	Specify that the lease never expires.

Defaults **24 hours**

Command Modes DHCP <*POOL*>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

netbios-name-server

Specify the NetBIOS Windows Internet Naming Service (WINS) name servers, in order of preference, that are available to Microsoft Dynamic Host Configuration Protocol (DHCP) clients.

Syntax `netbios-name-server address [address2...address8]`

Parameters

address	Enter the address of the NETBIOS name server. You may enter up to eight, in order of preference.

Defaults None

Command Modes DHCP <*POOL*>

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

netbios-node-type

Specify the NetBIOS node type for a Microsoft DHCP client. Dell EMC Networking recommends specifying clients as `hybrid`.

Syntax `netbios-node-type type`

Parameters

type Enter the NETBIOS node type:
- Broadcast: Enter the keyword `b-node`.
- Hybrid: Enter the keyword `h-node`.
- Mixed: Enter the keyword `m-node`.
- Peer-to-peer: Enter the keyword `p-node`.

Defaults **Hybrid**

Command Modes DHCP <*POOL*>

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

network

Specify the range of addresses in an address pool.

Syntax `network network /prefix-length`

Parameters

network/ prefix-length	Specify a range of addresses. Prefix-length range is from 17 to 31.

Defaults None

Command Modes DHCP <*POOL*>

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

pool

Create an address pool.

Syntax `pool name`

Parameters

name	Enter the address pool's identifying name.

Defaults None

Command Modes DHCP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp binding

Display the DHCP binding table.

Syntax `show ip dhcp binding`

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp configuration

Display the DHCP configuration.

Syntax `show ip dhcp configuration [global | pool name]`

Parameters

pool *name*	Display the configuration for a DHCP pool.
global	Display the DHCP configuration for the entire system.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
8.2.1.0	Introduced on the C-Series and S-Series.

Example

```
DellEMC# show ip dhcp configuration global

Protocol status        : Enabled
Number of ping packets : 1
DellEMC#

DellEMC# show ip dhcp configuration  pool p1

Pool Name             : p1
Pool Type             : Dynamic
Domain Name           : dell.com
Lease Time            : 2Days 0Hrs 0Mins
DNS Servers           : 10.11.0.1
Default Routers       : 1.1.1.1
Network               : 1.1.1.0 255.255.255.0
```

show ip dhcp conflict

Display the address conflict log.

Syntax `show ip dhcp conflict address`

Parameters

address	Display a particular conflict log entry.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp server

Display the DHCP server statistics.

Syntax	`show ip dhcp server statistics`
Defaults	None
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

Commands to Configure Secure DHCP

DHCP, as defined by RFC 2131, provides no authentication or security mechanisms. Secure DHCP is a suite of features that protects networks that use dynamic address allocation from spoofing and attacks.

arp inspection

Enable dynamic arp inspection (DAI) on a VLAN.

Syntax	`arp inspection`
Defaults	Disabled
Command Modes	INTERFACE VLAN
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
8.2.1.0	Introduced on the C-Series and S-Series.

Related Commands

- arp inspection-trust — specify a port as trusted so that ARP frames are not validated against the binding table.

arp inspection-limit

Configure dynamic ARP inspection rate-limit to verify the rate of ARP packet received in a port on a specific interval.

Syntax `arp inspection-limit {rate pps [interval seconds]}`

Defaults None

Command Modes INTERFACE CONFIGURATION

Parameters

rate *pps*	Enter the keyword `rate` then the packet per second (pps) value. The range is from 1 to 2048. The default is 15.
interval *seconds*	(Optional) Enter the keyword `interval`then the burst interval in seconds. The range is from 1 to 15. The default is 1.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the S3048-ON, S4048-ON, S4048T-ON, S3100 Series, Z9100-ON, S6100-ON, S6000, S6000-ON, S6010-ON, S5048F-ON, S4810, S4820T, FN IOM and MXL.

arp inspection-trust

Specify a port as trusted so that ARP frames are not validated against the binding table.

Syntax `arp inspection-trust`

Defaults Disabled

Command Modes
- INTERFACE
- INTERFACE PORT-CHANNEL

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
8.2.1.0	Introduced on the C-Series and S-Series.

Related Commands
- arp inspection — enable dynamic ARP inspection on a VLAN.

clear ip dhcp snooping

Clear the DHCP binding table.

Syntax

```
clear ip dhcp snooping {binding | source-address-validation discard-counters [interface interface]}
```

Parameters

binding Clears the binding table.

source-address-validation discard-counters Clears discard counters from all the interfaces configured with IP Source Guard.

interface *interface* (OPTIONAL) Specifies an interface to clear the discard counters.

Enter any of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Added the keywords `discard-counters`, `interface`, and the variable *interface* on the S4810, S4820T, S5000, S6000, Z9000, Z9500.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
8.2.1.0	Introduced on the C-Series and S-Series.

Example The following example shows how to clear the discard counters globally:

```
DellEMC> clear ip dhcp snooping source-address-validation discard-
counters
```

The following example shows how to clear the discard counters on an interface:

```
DellEMC> clear ip dhcp snooping source-address-validation discard-
counters interface twentyFiveGigE 1/1
```

The following example shows how to clear the discard counters on a port channel interface:

```
DellEMC> clear ip dhcp snooping source-address-validation discard-
counters interface portchannel 1
```

Related Commands

- show ip dhcp snooping — display the contents of the DHCP binding table.

clear ipv6 dhcp snooping binding

Clear all the DHCPv6 snooping binding database entries.

Syntax `clear ipv6 dhcp snooping binding`

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

Example

```
DellEMC# clear ipv6 dhcp snooping?
binding   Clear the snooping binding database
```

ip dhcp relay

Enable Option 82.

Syntax `ip dhcp relay information-option [remote-id {port | hostname:port | mac} | circuit-d {port | hostname:port | mac} | trust-downstream]`

Parameters

remote-id	Enter the keyword `remote-id` to configure the system to enable the remote-id string in option-82.
remote-id port	Enter the keywords `remote-id port` to configure the port as the remote id in option–82.
remote-id hostname:port	Enter the keywords `remote-id hostname:port` to configure the format of the hostname and port attributes.
remote-id mac	Enter the keywords `remote-id mac` to configure the chassis MAC address as the remote-id in option–82.
circuit-id	Enter the keyword `circuit-id` to configure the system to enable the circuit-id string in option–82.
circuit-id port	Enter the keywords `circuit-id port` to configure the port as the circuit-is in option-82.
circuit-id hostname:port	Enter the keywords `circuit-id hostname:port` to configure the circuit-id format that is sent to the server.
circuit-id mac	Enter the keywords `circuit-id mac` to configure the chassis MAC address as the circuit-id in option–82.
trust-downstream	Configure the system to trust Option 82 when it is received from the previous-hop router.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(0.2)	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping

Enable DHCP snooping globally.

Syntax `[no] ip dhcp snooping`

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Introduced on the S4810 and S4820T.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

Version	Description
8.2.1.0	Introduced on the C-Series and S-Series on Layer 2 interfaces.
7.8.1.0	Introduced on the C-Series and S-Series on Layer 3 interfaces.

Usage Information

When enabled, no learning takes place until you enable snooping on a VLAN. After disabling DHCP snooping, the binding table deletes and Option 82, IP Source Guard, and Dynamic ARP Inspection are disabled.

Introduced in Dell EMC Networking OS version 7.8.1.0, DHCP snooping was available for Layer 3 only and dependent on DHCP Relay Agent (`ip helper-address`). Dell EMC Networking OS version 8.2.1.0 extends DHCP Snooping to Layer 2. You do not have to enable relay agent to snoop on Layer 2 interfaces.

ipv6 dhcp snooping

Enable DHCPv6 snooping globally for ipv6.

Syntax

`[no] ipv6 dhcp snooping`

To disable the snooping globally, use the `no ipv6 dhcp snooping` command.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ipv6 dhcp snooping vlan

Enable ipv6 DHCP Snooping on VLAN or range of VLANs.

Syntax

`[no] ip dhcp snooping vlan` *`vlan-id`*

To disable the ipv6 dhcp snooping on VLAN basis or range of VLAN, use the `no ipv6 dhcp snooping vlan` **<vlan-id>** command.

Parameters

vlan-id Enter the name of a VLAN id or list of the VLANs to enable DHCP Snooping.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip dhcp snooping binding

Create a static entry in the DHCP binding table.

Syntax

```
[no] ip dhcp snooping binding mac address vlan-id vlan-id ip ip-address
interface interface-type lease number
```

Parameters

mac *address*	Enter the keyword `mac` then the MAC address of the host to which the server is leasing the IP address.
vlan-id *vlan-id*	Enter the keywords `vlan-id` then the VLAN to which the host belongs. The range is from 2 to 4094.
ip *ip-address*	Enter the keyword `ip` then the IP address that the server is leasing.
interface *type*	Enter the keyword `interface` then the type of interface to which the host is connected: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
lease *time*	Enter the keyword `lease` then the amount of time the IP address are leased. The range is from 1 to 4294967295.

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Enhanced the command to map multiple IP addresses to one MAC address on the S4810 and S4820T.
9.13(0.0)	Enhanced the command to map multiple IP addresses to one MAC address on the S5048F–ON.

Version	Description
9.13(0.0)	Enhanced the command to map multiple IP addresses to one MAC address. Enhanced to support DHCP snooping in a VLT setup.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Instructions

You can map multiple IP addresses to the same MAC address.

Related Commands

- show ip dhcp snooping — display the contents of the DHCP binding table.

IPv6 DHCP Snooping Binding

Create a static DHCP snooping binding entry in the snooping database.

Syntax

`[no] ipv6 dhcp snooping binding mac` *`address`* `vlan-id` *`vlan-id`* `ipv6` *`ipv6-address`* `interface` *`interface-type | interface-number`* `lease` *`value`*

To delete the DHCP snooping binding entry from DHCP snooping database, use the `[no] ipv6 dhcp snooping binding mac` *`address`* `vlan-id` *`vlan-id`* `ipv6` *`ipv6-address`* `interface` *`interface-type | interface-number`* `lease` *`value`*command.

Parameters

mac *address*	Enter the keyword `mac` then the MAC address of the host to which the server is leasing the IPv6 address.
vlan-id	Enter the keywords `vlan-id` then the VLAN to which the host belongs. The range is from 2 to 4094.
ipv6 *ipv6-address*	Enter the keyword `ipv6` then the IPv6 address that is leased to the client.
interface *type*	Enter the keyword `interface` then the type of interface to which the host is connected: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

interface *number* Enter the number of the interface.

lease *value* Enter the keyword `lease` then the amount of time the IPv6 address are leased. The range is from 1 to 4294967295.

Defaults None

Command Modes
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip dhcp snooping database

Delay writing the binding table for a specified time.

Syntax `ip dhcp snooping database write-delay` *minutes*

Parameters

minutes The range is from 5 to 21600.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

ipv6 dhcp snooping database write-delay

To set time interval for storing the snooping binding entries in a file.

Syntax `[no] ipv6 dhcp snooping database write-delay value`

To disable the storing of snooping binding entries in a file, use the `no ipv6 dhcp snooping write-delay` command.

Parameters

value	The range is from 5 to 21600. The value of the minutes range is from 5 min. to 15 days.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip dhcp snooping database renew

Renew the binding table.

Syntax `ip dhcp snooping database renew`

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

ipv6 dhcp snooping database renew

To load the binding entries from the file to DHCPv6 snooping binding database.

Syntax `ipv6 dhcp snooping database renew`

Defaults None

Command Modes
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip dhcp snooping trust

Configure an interface as trusted.

Syntax `[no] ip dhcp snooping trust`

Defaults **Untrusted**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

ipv6 dhcp snooping trust

Configure an interface as trusted for DHCP snooping.

Syntax `[no] ipv6 dhcp snooping trust`

To disable dhcp snooping trusted capability on this interface, use the `no ipv6 dhcp snooping trust` command.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip dhcp source-address-validation

Enable the IP Source Guard.

Syntax `[no] ip dhcp source-address-validation [ipmac] [vlan vlan-id]`

Parameters

ipmac	Enable IP+MAC Source Address Validation.
vlan *vlan-id*	(OPTIONAL) SAV validates the source IP address along with the source VLAN ID against the DHCP snooping binding table.

Defaults Disabled

Command Modes INTERFACE

INTERFACE PORTCHANNEL

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Added the `vlan` keyword and the *`vlan-id`* variable . Introduced support for SAV on port channels interfaces.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
8.2.1.0	Added the keyword `ipmac`.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

Allocate at least one FP block to `ipmacacl` before you can enable IP+MAC Source Address Validation and SAV with VLAN option.

1. Use the `cam-acl l2acl` command from CONFIGURATION mode.
2. Save the running-config to the startup-config.
3. Reload the system.

ip dhcp relay information-option

Enable Option 82.

Syntax

```
ip dhcp relay information-option [remote-id {hostname | mac | WORD}]
[circuit-d {hostname:port}] [trust-downstream] [vpn]
```

Parameters

remote-id	Enter the keyword `remote-id` to configure the system to enable the remote-id string in option-82.
remote-id hostname	Enter the keywords `remote-id hostname` to configure the port as the remote id in option–82.
remote-id mac	Enter the keywords `remote-id mac` to configure the chassis MAC address as the remote-id in option–82.
remote-id WORD	Enter the `remote-id WORD` option to configure the system to enable the remote-id string in option 82.
circuit-id	Enter the keyword `circuit-id` to configure the system to enable the circuit-id string in option–82.
circuit-id hostname:port	Enter the keywords `circuit-id hostname:port` to configure the circuit-id format that is sent to the server.
trust-downstream	Configure the system to trust Option 82 when it is received from the previous-hop router.
vpn	Enter the keyword `vpn` to add VPN/VRF related sub-option to relay agent information Option 82. **NOTE:** Adds the VPN/VRF related sub-options into the relay agent information option(82). When DHCP broadcasts are forwarded by the relay agent from clients to DHCP server.

Default

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P0)	Introduced the `circuit-id` attribute in the command.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.4.(0.0)	Added support for VRF.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on C-Series and S-Series.

Example

```
DellEMC(conf)# ip dhcp relay information-option vpn
```

ip dhcp relay source-interface

Configure IPv4 DHCP relay source interface.

Syntax `ip dhcp relay source-interface` *interface*

To disable the IPv4 DHCP relay source interface, use the `no ip dhcp relay source-interface` *interface* command.

Parameters

source-interface *interface* Enter the keyword `source-interface` then the type of interface and the interface information:

- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/plot information.
- For a 10-Gigabit Ethernet information, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet information, enter the keyword `FortyGigabitEthernet` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.
- For a port channel interface, enter thee keyword `port-channel` then a number. The range is from 1 to 128.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Disabled

Command Modes

- CONFIGURATION
- INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the C9010, MXL, FN IOM, S3100 series, S4810, S4820T, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Related Commands

- ipv6 dhcp relay source-interface— Configure DHCP relay source IPv6 interface.

ipv6 dhcp relay source-interface

Configure DHCP relay source IPv6 interface.

Syntax

```
ipv6 dhcp relay source-interface interface
```

To disable the DHCP relay source IPv6 interface, use the `no ipv6 dhcp relay source-interface interface` command.

Parameters

source-interface *interface*

Enter the keyword `source-interface` then the type of interface and the interface information:

- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/plot information.
- For a 10-Gigabit Ethernet information, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet information, enter the keyword `FortyGigabitEthernet` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.
- For a port channel interface, enter thee keyword `port-channel` then a number. The range is from 1 to 128.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Disabled

Command Modes

- CONFIGURATION
- INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the C9010, MXL, FN IOM, S3100 series, S4810, S4820T, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Related Commands

- ip dhcp relay source-interface— Configure DHCP relay source IP interface.

ip dhcp snooping verify mac-address

Validate a DHCP packet's source hardware address against the client hardware address field (CHADDR) in the payload.

Syntax

```
[no] ip dhcp snooping verify mac-address
```

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.2.1.0	Introduced on the C-Series and S-Series.

ipv6 dhcp snooping verify mac-address

Syntax `[no] ipv6 dhcp snooping verify mac-address`

To disable verify source mac-address against IPv6 DHCP packet MAC address, use the `no ipv6 dhcp snooping verify mac-address` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

ip helper-address

Configures the destination broadcast address or the host address for DHCP server requests.

Syntax

```
ip helper-address [vrf vrf-name] ip-address
```

To disable the destination broadcast address or the host address for DHCP server requests, use the `ip helper-address [vrf vrf-name] ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF through which the host address can be reached.
ip-address	Enter an IP address through which the host address can be reached.

Default Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information Use this command on the interfaces where the DHCP clients are connected to forward the packets from clients to DHCP server and vice-versa.

Example

```
DellEMC(conf-if-fo-1/49/1)# ip helper-address vrf jay 10.0.0.2
```

ipv6 helper-address

Configures the IPv6 DHCP helper addresses.

Syntax

```
[no] ipv6 helper-address [vrf vrf-name] ipv6-address
```

To delete the IPv6 helper address, use the `[no] ipv6 helper-address [vrf vrf-name] ipv6-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF through which the host address can be reached.
ipv6-address	Enter the keyword`ipv6-address` through which the server address can be reached.

Default Disabled.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Enhanced to support non-default VRF configuration for DHCPv6 helper address.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000–ON, Z9000, and Z9500.

Usage Information

Use this command on the interfaces where the DHCP clients are connected to forward the packets from clients to DHCP server and vice-versa.

Example

```
DellEMC(conf-if-tf-1/1)# ipv6 helper-address
X:X:X:X::X      IPv6 helper address
VRF             VRF name.
Global          Global address space
```

show ip dhcp snooping

Display the contents of the DHCP binding table or display the interfaces configured with IP Source Guard.

Syntax

```
show ip dhcp snooping [binding | source-address-validation [discard-counters [interface interface]]]
```

Parameters

Parameters	Description
binding	Display the binding table.
source-address-validation	Display the interfaces configured with IP Source Guard.
discard-counters	(OPTIONAL) Display the number of dropped packets.
interface *interface*	(OPTIONAL) Specifies an interface to show the discard counters. Enter any of the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.6(0.0)	Added the `discard-counters`, `interface` keywords, and the *`interface`* variable.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.

Example The following example displays the interfaces configured with IP Source Guard:

```
DellEMC> show ip dhcp snooping source-address-validation
ip sav access-list on twentyFiveGigE 1/1
Total cam count 3
permit host 0.0.0.0 count (0 packets)
permit host 10.1.1.252 count (0 packets)
permit host 10.1.1.253 count (0 packets)
ipmac-vlan sav access-list on twentyFiveGigE 1/2
Total cam count 4
permit host 0.0.0.0 host 00:00:00:00:00:00  count (0 packets)
permit vlan 10 host 10.1.1.1 host 00:00:00:aa:00:01  count (0 packets)
permit vlan 10 host 10.1.1.2 host 00:00:00:aa:00:02  count (0 packets)
permit vlan 20 host 10.2.2.1 host 00:00:00:aa:00:03  count (0 packets)
permit vlan 20 host 10.2.2.2 host 00:00:00:aa:00:04  count (0 packets)
```

The following example displays the port channel interfaces configured with IP Source Guard:

```
DellEMC> show ip dhcp snooping source-address-validation interface
portchannel 10
ipmac-vlan sav access-list on Port-channel 10 on stack-unit 1
Total cam count 5
permit host 0.0.0.0 host 00:00:00:00:00:00  count (0 packets)
permit vlan 10 host 1.1.1.1 host 00:00:00:00:01:01  count (0 packets)
permit vlan 10 host 1.1.1.2 host 00:00:00:00:01:02  count (0 packets)
permit vlan 10 host 1.1.1.3 host 00:00:00:00:01:03  count (0 packets)
ipmac-vlan sav access-list on Port-channel 10 on stack-unit 2
Total cam count 5
```

```
permit host 0.0.0.0 host 00:00:00:00:00:00  count (0 packets)
permit vlan 10 host 1.1.1.1 host 00:00:00:00:01:01  count (0 packets)
permit vlan 10 host 1.1.1.2 host 00:00:00:00:01:02  count (0 packets)
permit vlan 10 host 1.1.1.3 host 00:00:00:00:01:03  count (0 packets)
ipmac-vlan sav access-list on Port-channel 10 on stack-unit 3
Total cam count 5
permit host 0.0.0.0 host 00:00:00:00:00:00  count (0 packets)
permit vlan 10 host 1.1.1.1 host 00:00:00:00:01:01  count (0 packets)
permit vlan 10 host 1.1.1.2 host 00:00:00:00:01:02  count (0 packets)
permit vlan 10 host 1.1.1.3 host 00:00:00:00:01:03  count (0 packets)
```

NOTE: The output for port-channel interfaces does not display the physical interface.

The following example displays the SAV discard counters on all interfaces:

```
DellEMC> show ip dhcp snooping source-address-validation discard-
counters
deny access-list on twentyFiveGigE 1/1
Total cam count 1
deny count (0 packets)
deny access-list on twentyFiveGigE 1/2
Total cam count 2
deny vlan 10 count (0 packets)
deny vlan 20 count (0 packets)
```

The following example displays the SAV discard counters on a particular interface:

```
DellEMC> show ip dhcp snooping source-address-validation discard-
counters interface twentyFiveGigE 1/1
deny access-list on twentyFiveGigE 1/1
Total cam count 2
deny vlan 10 count (0 packets)
deny vlan 20 count (0 packets)
```

The following example displays the SAV discard counters on a port channel interface:

```
DellEMC> show ip dhcp snooping source-address-validation discard-
counters interface portchannel 10
deny access-list on Port-channel 10 on stack-unit 1
Total cam count 1
deny vlan 10 count (0 packets)
deny access-list on Port-channel 10 on stack-unit 2
Total cam count 1
deny vlan 10 count (0 packets)
deny access-list on Port-channel 10 on stack-unit 3
Total cam count 1
deny vlan 10 count (0 packets)
```

NOTE: The output for port-channel interfaces does not display the physical interface. If the LAG member interfaces belong to different stack-units, the counters are displayed per stack-unit for that port channel.

show ipv6 dhcp snooping

Display the DHCPv6 snooping binding database.

Syntax	`show ipv6 dhcp snooping`
Defaults	None
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S6000, S6000-ON, and Z-Series.

Example

```
DellEMC# show  ipv6 dhcp snooping
IPv6 DHCP Snooping                          : Enabled.
IPv6 DHCP Snooping Mac Verification         : Disabled.

Database write-delay (In minutes)           : 5

DHCP packets information
Snooping packets                            : 0
Snooping packets processed on L2 vlans      : 0

DHCP Binding File Details
Invalid File                                : 0
Invalid Binding Entry                       : 0
Binding Entry lease expired                 : 0

DellEMC#
```

Commands to Configure DNS

To configure the Domain Names Systems (DNS) on the system, use the following commands:

ip name-server

Configures one or more name server (DNS) IP addresses. You can configure up to six IP addresses.

Syntax `ip name-server [vrf vrf-name] ip-address [ip-address2] [ip-address3] [ip-address4] [ip-address5] [ip-address6]`

To undo the name server ip address configuration for VRF, use the `no ip name-server [vrf vrf-name] ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the name server IP addresses for that VRF.
***ip-address* [*ip-address2*] [*ip-address3*] [*ip-address4*] [*ip-address5*] [*ip-address6*]**	Enter the IP address of the name server in dotted decimal format. **NOTE:** Use the additional *ip-address* parameters (*ip-address2* to *ip-address6*) in a sequential order to specify up to a maximum of six IP addresses per VRF.

Defaults None

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to associate the system with one or more DNS servers.

In a dual stack setup, the system sends both A (request for IPv4 — RFC 1035) and AAAA (request for IPv6 — RFC 3596) record requests to a DNS server even if only the `ip name-server` command is configured.

Example

```
•    DellEMC(conf)#ip name-server vrf jay 2.2.2.2
•    DellEMC(conf)#ip name-server vrf jay 2.2.2.2 3.3.3.3 4.4.4.4
5.5.5.5 6.6.6.6 7.7.7.7
```

ip domain-name

Configures the default domain corresponding to a specific VRF. This domain is appended to the in complete DNS requests corresponding to the specified VRF.

Syntax

`ip domain-name [vrf vrf-name] name`

To undo the domain name configuration corresponding to a specific VRF, use the `no ip domain-name [vrf vrf-name] name` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the domain corresponding to that VRF.
name	Enter the name of the domain to be appended to the in complete DNS requests corresponding to the specified VRF.

Defaults

None

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information Use this command to configure a domain name corresponding to a VRF. This domain is appended to the in complete DNS requests corresponding to the specified VRF.

Example

```
DellEMC(conf)# ip domain-name vrf jay dell.com
```

ip domain-list

Adds a domain name to the DNS list. This domain name is appended to incomplete host names in DNS requests corresponding to a specific VRF.

Syntax `ip domain-list [vrf vrf-name] name`

To remove a domain name from DNS list, use the `no ip domain-list [vrf vrf-name] name` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to add a domain name to the DNS list corresponding to that VRF.
name	Enter the name of the domain to be appended to the DNS list corresponding to the VRF.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information Use this command to add domain names to the DNS lists corresponding to a specific VRF. You can add up to a maximum of six domain names to the DNS list corresponding to a VRF. This domain is used to complete the unqualified host names.

Example

```
DellEMC(conf)# ip domain-list  vrf jay dell.com
DellEMC(conf)# ip domain-list  vrf jay force10.com
```

ip host

Configures a mapping between the host name server and the IP address for a specific VRF. This mapping information is used by the name-to-IP address table to resolve host names.

Syntax

`ip host [vrf vrf-name] name ip-address`

To undo the host name server to IP address mapping for VRFs, use the `no ip host [vrf vrf-name] name ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the name server to IP address mapping for that VRF.
name	Enter the name od the host to be associated with an IP address.
ip-address	Enter the IP address of the name server in dotted decimal format.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to create a mapping between a host name server and its IP addresses for a specific VRF.

Example

```
DellEMC(conf)# ip host vrf jay dell 1.1.1.1
```

clear host

Removes one or all dynamically learned host table entries for a specific VRF.

Syntax

`clear host [vrf vrf-name] {* | host-name}`

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to delete dynamically learned host table entries corresponding to that VRF.
host-name	Enter the name of the host corresponding to which you want to delete the dynamically learnt host table entries.

*	Enter * to delete all host table entries.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information Use this command to delete one or all dynamically learned host table entries corresponding to a specific VRF.

Example

```
DellEMC# clear host vrf jay dell
DellEMC# clear host  vrf jay *
```

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Equal Cost Multi-Path (ECMP)

Equal cost multi-path (ECMP) supports multiple "best paths" in next-hop packet forwarding to a destination device.

Topics:

- ecmp-group
- hash-algorithm
- ip ecmp-group
- ip ecmp weighted
- link-bundle-distribution trigger-threshold
- link-bundle-monitor enable

ecmp-group

Provides a mechanism to monitor traffic distribution on an ECMP link bundle. A system log is generated when the standard deviation of traffic distribution on a member link exceeds a defined threshold.

Syntax

`ecmp-group {ecmp-group-id interface interface | link-bundle-monitor}`

To remove the selected interface, use the `ecmp-group no interface` command.

To disable link bundle monitoring, use the `ecmp-group no link-bundle-monitor` command.

Parameters

ecmp-group ID	Enter the identifier number for the ECMP group. The range is from 2 to 64.
interface	Enter the following keywords and the interface information to add the interface to the ECMP group: ● For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. ● For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. ● For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. ● For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. ● For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. ● For a LAG interface, enter the keywords `port-channel` then the slot/port information.

Defaults

Off

Command Modes

- CONFIGURATION
- CONFIGURATION ECMP-GROUP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

Usage Information

Using CONFIGURATION mode, create an ECMP group ID. You can then assign interfaces to the ECMP group using CONFIGURATION ECMP-GROUP mode. You can also enable on the port-channel configuration using the CONFIGURATION ECMP-GROUP command mode.

hash-algorithm

Changes the hash algorithm used to distribute traffic flows across a Port Channel and ECMP. The ECMP and LAG options are supported on the S-Series and Z-Series.

Syntax

```
hash-algorithm {algorithm-number | {ecmp {crc16 | crc16cc | crc32MSB |
crc32LSB | crc-upper | dest-ip | lsb | xor1 | xor2 | xor4 | xor8 | xor16}
[number] hg {crc16 | crc16cc | crc32MSB | crc32LSB | xor1 | xor2 | xor4
| xor8 | xor16} stack-unit stack-unit-number | port-set port-pipe | hg-
seed seed-value stack-unit | lag {checksum | crc | xor} [number] nh-ecmp
{checksum | crc | xor}[number] stack—unit number ip-sa-mask value ip-da-
mask value | seed seed-value }
```

To return to the default hash algorithm, use the `no hash-algorithm` command.

To return to the default ECMP hash algorithm, use the `no hash-algorithm ecmp` *algorithm-value* command.

Parameters

ecmp *crc16* | *crc16cc* | *crc32MSB* | *crc32LSB* | *crc-upper* | *dest-ip* | *lsb* | *xor1* | *xor2* | *xor4* | *xor8* | *xor16*

Enter the keyword `ecmp` then one of the following options:

- *crc16*: Use CRC16_BISYNC — 16 bit CRC16-bisync polynomial (default)
- *crc16cc*: Use CRC16_CCITT — 16 bit CRC16 using CRC16-CCITT polynomial
- *crc32MSB*: Use CRC32_UPPER — MSB 16 bits of computed CRC32
- *crc32LSB*: Use CRC32_LOWER — LSB 16 bits of computed CRC32
- *crc-upper*: Uses the upper 32 bits of the key for the hash computation
- *dest-ip*: Uses the destination IP for ECMP hashing
- *lsb*: Returns the LSB of the key as the hash
- *xor1*: Use CRC16_BISYNC_AND_XOR1 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor1
- *xor2*: Use CRC16_BISYNC_AND_XOR2 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor2
- *xor4*: Use CRC16_BISYNC_AND_XOR4 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor4

- *xor8*: Use CRC16_BISYNC_AND_XOR8 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor8
- *xor16*: Use CR16 — 16 bit XOR

hg {*crc16* | *crc16cc* | *crc32MSB* | *crc32LSB* | *xor1* | *xor2* | *xor4* | *xor8* | *xor16*} stack-unit *stack-unit-number* | port-set *port-pipe*

Enter the keyword `hg` then one of the following options:

- *crc16*: Use CRC16_BISYNC — 16 bit CRC16-bisync polynomial (default)
- *crc16cc*: Use CRC16_CCITT — 16 bit CRC16 using CRC16-CCITT polynomial
- *crc32MSB*: Use CRC32_UPPER — MSB 16 bits of computed CRC32
- *crc32LSB*: Use CRC32_LOWER — LSB 16 bits of computed CRC32
- *xor1*: Use CRC16_BISYNC_AND_XOR1 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor1
- *xor2*: Use CRC16_BISYNC_AND_XOR2 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor2
- *xor4*: Use CRC16_BISYNC_AND_XOR4 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor4
- *xor8*: Use CRC16_BISYNC_AND_XOR8 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor8
- *xor16*: Use CR16 — 16 bit XOR

Enter the keywords `stack-unit`, then a stack-unit number, to specify a stack-unit.

Enter the keywords `port-set` *port-pipe* then the port pipe number. The range is from 0 to 5.

hg-seed *seed-value stack-unit*

Enter the keywords `hg-seed` then the hash algorithm seed value. The range is from 0 to 2147483646.

Enter the keywords `stack-unit` then the stack unit number.

Enter the keywords `port-set` then the stack-unit port-pipe number.

lag *hash algorithm*

Enter the keywords `hg-seed` . The range is from 0 to 47.

nh-ecmp *hashalgorithm value*

(OPTIONAL) Enter the keyword **nh-ecmp** then the ECMP hash algorithm value.

stack-unit *number*

(OPTIONAL) : Enter the keyword**stack—unit** then the stack—unit slot number.

ip-sa-mask *value*

(OPTIONAL) Enter the keyword **ip-sa-mask** then the ECMP/LAG hash mask value. The range is from 0 to FF.

ip-da-mask *value*

(OPTIONAL) Enter the keyword **ip-da-mask** then the ECMP/LAG hash mask value. The range is from 0 to FF.

Defaults

IPSA and IPDA mask value is **FF** for the stack-unit.

Command Modes

`CONFIGURATION`

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Added `flow-based-hashing` support for hashing on ECMP for S4820T, S6000, S4048 and Z9500.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Added the `nh-ecmp` option.
7.7.1.1	Added the `nh-ecmp` option.

Usage Information

To ensure that CRC is not used for LAG, set the default hash-algorithm method on E-Series systems. For example,`hash-algorithm ecmp xor lag checksum nh-ecmp checksum.`

The hash value calculated with the hash-algorithm command is unique to the entire unit. The hash algorithm command with the stack-unit option changes the hash for a particular stack-unit by applying the mask specified in the IPSA and IPDA fields.

The stack-unit option is applicable with the lag-hash-align microcode only. Any other microcode returns an error message as follows:

- `DellEMC(conf)#hash-algorithm linecard 5 ip-sa-mask ff ip-da-mask ff`
- `% Error: This command is not supported in the current microcode configuration`

In addition, the `linecard` *`number`* `ip-sa-mask` *`value`* `ip-da-mask` *`value`* option has the following behavior to maintain bi-directionality:

- When hashing is done on both IPSA and IPDA, the `ip-sa-mask` and `ip-da-mask` values must be equal. (Single Linecard).
- When hashing is done only on IPSA or IPDA, Dell EMC Networking OS maintains bi-directionality with masks set to XX 00 for stack-unit 1 and 00 XX for stack-unit 2 (`ip-sa-mask` and `ip-da-mask`). The mask value must be the same for both stack-units when using multiple stack-units as ingress (where XX is any value from 00 to FF for both stack-units). For example, assume that traffic is flowing between linecard 1 and linecard 2:
- `hash-algorithm linecard 1 ip-sa-mask aa ip-da-mask 00`
- `hash-algorithm linecard 2 ip-sa-mask 00 ip-da-mask aa`

The different hash algorithms are based on the number of Port Channel members and packet values. The default hash algorithm (number 0) yields the most balanced results in various test scenarios, but if the default algorithm does not provide a satisfactory distribution of traffic, use the hash-algorithm command to designate another algorithm.

When a Port Channel member leaves or is added to the Port Channel, the hash algorithm is recalculated to balance traffic across the members.

ip ecmp-group

Enable and specify the maximum number of ecmp that the L3 CAM hold for a route, By default, when maximum paths are not configured, the CAM can hold a maximum of 16 ecmp per route.

Syntax

`ip ecmp-group {maximum-paths | {number} {path-fallback}`

To negate a command, use the `no ip ecmp-group maximum-paths {number}` command.

Parameters

maximum-paths	Specify the maximum number of ECMP for a route. The range is 2 to 64.
path-fallback	Use the keywords `path-fallback` to enable this feature. If you enable the feature, re-enter this keyword to disable the feature.

Defaults

16

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.

Usage Information

You must save the new ECMP settings to the startup-config (`write-mem`) then reload the system for the new settings to take effect.

ip ecmp weighted

Enables weighted ECMP calculations.

Syntax

`ip ecmp weighted`

To disable weighted ECMP calculations, enter the `no ip ecmp weighted` command.

Defaults

N/A

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series.

Usage Information

Enabling this CLI would inform the FIB to re-program the destination prefix paths with weights in the HW/CAM on the fly.

If disabled, the CLI would inform the FIB to re-program the destination prefix paths with no weights or regular ECMP.

Example

```
DellEMC(conf)# ip ecmp ?
weighted                Enables Weighted ECMP
DellEMC(conf)# ip ecmp weighted
DellEMC(conf)#do show running-config | grep ecmp
ip ecmp weighted
DellEMC(conf)#
DellEMC(conf)# no ip ecmp ?
weighted                Disables Weighted ECMP
DellEMC(conf)# no ip ecmp weighted
DellEMC(conf)# do show running-config | grep ecmp
```

link-bundle-distribution trigger-threshold

Provides a mechanism to set the threshold to trigger when traffic distribution begins being monitored on an ECMP link bundle.

Syntax

`link-bundle-distribution trigger-threshold [percent]`

To exit from ecmp group mode, use the `exit` command.

Parameters

percent	Indicate the threshold value when traffic distribution starts being monitored on an ECMP link bundle. The range is from 1 to 90%. The default is **60%**.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

link-bundle-monitor enable

Provides a mechanism to enable monitoring of traffic distribution on an ECMP link bundle.

Syntax

```
link-bundle-monitor enable
```

To exit from ECMP group mode, use the `exit` command.

Command Modes

- ECMP-GROUP
- PORT-CHANNEL INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

16

Flex Hash and Optimized Boot-Up

This chapter describes the Flex Hash enhancements.

Topics:

- load-balance ingress-port enable
- load-balance flexhash
- lacp fast-switchover
- encapsulation dot1q

load-balance ingress-port enable

Enable the Flex hash functionality. This utility is supported on the platform.

Syntax

```
load-balance ingress-port enable
```

To disable the Flex hash capability, use the **no** version of this command.

Default

None

Command Modes

CONFIGURATION mode

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.3(0.0)	Introduced on the S6000 platform.
9.2(1.0)	Introduced on the Z9500.

Usage Information

Flex hash uses the RTAG7 bins 2 and 3 (overlay bins). These bins must be enabled for Flex hash to be configured. These bins contain the source module and source port information. These bins are disabled by default in releases of Dell EMC Networking OS earlier than Release 9.3.0.0. The default behavior of disabling of these bins occurs because of incorrect egress port information that would otherwise be displayed in the output of the diagnostic show command of `show ip flow`.

As a result, when load balancing of RRoCE packets using Flex hash is enabled, the `show ip flow` command is not functional. Similarly, when `show ip flow` command operates (ingress port based load balancing is disabled) the hashing of RRoCE packets is not operational.

Flex hash APIs do not mask out unwanted byte values after extraction of the data from the Layer 4 headers for the offset value.

Example

```
DellEMC#load-balance ingress-port enable
```

load-balance flexhash

Specify the parameters for the Flex Hash mechanism, such as whether IPv4 or IPv6 packets must be subject to Flex Hash functionality, a unique protocol number, the offset of hash fields from the start of the L4 header to be used for hash calculation, and a meaningful description to associate the protocol number with the name.

Syntax

```
load-balance flexhash ipv4/ipv6 ip-proto <protocol number> <description string> offset1 <offset1 value> [offset2 <offset2 value>]
```

To disable the Flex hash settings, use the `no load-balance flexhash ipv4/ipv6 ip-proto protocol number` command.

Parameters

ipv4	Denotes whether Flex Hash needs to be enabled for IPv4 packets.
ipv6	Denotes whether Flex Hash needs to be enabled for IPv6 packets.
protocol number	Represents the Outer IPv4 protocol field in case of IPv4 packets, and the Outer IPv6 next header field in case of IPv6 packets. The `ipv4/ipv6` keyword and the IP protocol value are used as keys to identify if a duplicate flex hash configuration is already present. Duplicate flex hash configuration is not possible. To change an existing flex hash configuration, you must delete the existing flex hash attribute and configure the flex attribute afresh.
description string	A description string is followed by the protocol number to enable you to associate the protocol number with the protocol name in an easily-identifiable way. For example, for a protocol number of 254, you can specify the description as RRoCE.
offset1 ***value***	Specify the byte offset from the start of the L4 header from which the 2-byte data is extracted and be used in hash computation. You must enter the offset as an even number. The offset range is 0 – 30 bytes from start of L4 header.
offset2 ***value***	(Optional) Specify the additional 2 bytes that must be extracted from the start of the L4 header to be used for hash computation. You must enter the offset as an even number. The offset range is 0 – 30 bytes from start of L4 header.

Default None

Command Modes CONFIGURATION mode

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.3(0.0)	Introduced on the S6000 platform.
9.2(1.0)	Introduced on the Z9500.

Usage Information

With the introduction of various overlay technologies such as network virtualization using generic routing encapsulation (NVGRE) segments and Routable Remote Direct Memory Access (RRDMA) over Converged Ethernet (RRoCE), information related to a traffic flow is contained in the L4 header. The fields in the L2 and L3 headers are not sufficient to distinguish the flows. Therefore, the fields in the L4 header are processed when hashing is performed for packets over LAG and ECMP links. The Flex Hash functionality enables you to configure a packet search key and matches packets based on the search key. When a packet matches the search key, two 16-bit hash fields are extracted from the start of the L4 header and provided as inputs (bins 2 and 3) for RTAG7 hash computation. You must specify the offset of hash fields from the start of the L4 header, which contains a flow identification field.

You can cause the system to include the fields present at the offsets that you define (from the start of the L4 header) as a part of LAG and ECMP computation. Also, you can specify whether the IPv4 or IPv6 packets must be operated with the Flex Hash mechanism.

Example

```
DellEMC(conf)# load-balance flexhash ipv4 ip-proto 1 desc offset1 1 offset2
2
```

lacp fast-switchover

Cause the physical ports to be aggregated faster by configuring this capability in a port-channel on both the nodes that are members of a port-channel.

Syntax

```
lacp fast-switchover
```

To disable the capability of faster aggregation of the member ports of a LAG or a port-channel bundle, use the no version of this command.

Defaults

Not configured

Command Modes

INTERFACE (conf-if-po-number)

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.3(0.0)	Introduced on the S6000.
9.2(1.0)	Introduced on the Z9500.

Usage Information

You can configure the optimal switchover functionality for LACP. This command applies to dynamic port-channel interfaces only. When applied on a static port-channel, this command has no effect

If you configure the optimized booting-time capability and perform a reload of the system, the LACP application sends PDUs across all the active LACP links immediately.

Related Commands

show lacp — displays the LACP configuration.

encapsulation dot1q

Configures lite-subinterfaces.

Syntax

```
encapsulation dot1q vlan-id
```

To remove a previously configured lite-subinterface, use the `no encapsulation dot1q vlan-id` command.

Parameters

dot1q *vlan-id* Enter the keyword `dot1q` followed by the VLAN ID to which the host belongs. The range is from 1 to 4094. A lite subinterface is considered as a Layer 3 port property and is synchronous with the existing rules of applying Layer 2 or Layer 3 properties to an interface.

Command Modes

INTERFACE

Command History

Version	Description
9.12.1.0	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.3.0.0	Introduced on the S6000.
9.2(1.0)	Introduced on the Z9500.

Usage Information

To enable routing of RRoCE packets, the VLAN ID is mapped to the default VLAN ID of 4095 and this mapping is performed using VLAN translation. After VLAN translation, the RRoCE packets are considered in the same manner as normal IP packets that received on L3 interface and routed in the egress direction. At the egress interface, the VLAN ID is appended to the packet and transmitted out of the interface as a tagged packet with the dot1Q value preserved. The dot1Q value is preserved only for egress interfaces that are associated with a VLAN or a lite-subinterface . If a Layer 3 interface is configured without the encapsulation 802.1Q VLAN ID or is an untagged interface in a VLAN , the dot1Q value is not preserved .

17

FIP Snooping

In a converged Ethernet network, a switch can operate as an intermediate Ethernet bridge to snoop on FIP packets during the login process on Fibre Channel over Ethernet (FCoE) forwarders (FCFs). Acting as a transit FIP snooping bridge, the switch uses dynamically created access control lists (ACLs) to permit only authorized FCoE traffic to transmit between an FCoE end-device and an FCF.

Topics:

- clear fip-snooping database interface vlan
- clear fip-snooping statistics
- debug fip snooping
- debug fip snooping rx
- feature fip-snooping
- fip-snooping enable
- fip-snooping fc-map
- fip-snooping max-sessions-per-enodemac
- fip-snooping port-mode fcf
- show fip-snooping config
- show fip-snooping enode
- show fip-snooping fcf
- show fip-snooping statistics
- show fip-snooping system
- show fip-snooping vlan

clear fip-snooping database interface vlan

Clear FIP snooping information on a VLAN for a specified FCoE MAC address, ENode MAC address, or FCF MAC address, and remove the corresponding ACLs FIP snooping generates.

Syntax

```
clear fip-snooping database interface vlan {vlan-id} enode {enode-mac-address} | fcf {fcf-mac-address} | session {session-mac-address}
```

Parameters

enode-mac-address	Enter the ENode MAC address of the session which has to be cleared.
fcf-mac-address	Enter the FCF MAC address of the session which has to be cleared.
session-mac-address	Enter the MAC address of the session which has to be cleared.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

clear fip-snooping statistics

Clears the statistics on the FIP packets snooped on all VLANs, a specified VLAN, or a specified port interface.

Syntax `clear fip-snooping statistics [interface vlan vlan-id | interface port-type slot/port[/subport] | interface port-channel port-channel-number]`

Parameters

vlan-id	Enter the VLAN ID of the FIP packet statistics to be cleared.
port-type slot/ port	Enter the slot number and port-type of the FIP packet statistics to be cleared.
port-channelnumber	Enter the port channel number of the FIP packet statistics to be cleared.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

debug fip snooping

Enable debugging on FIP snooping.

Syntax `debug fip-snooping [all | acl | error | ifm | info | ipc | ns | rscn | rx | tx]`

Parameters

all	Enter the keyword `all` to enable debugging on all the options.
acl	Enter the keyword `acl` for ACL-specific debugging.
error	Enter the keyword `error` for error-specific debugging.
ifm	Enter the keyword `ifm` for IFM-specific debugging.

info	Enter the keyword `info` for information-specific debugging.
ipc	Enter the keyword `ipc` for IPC-specific debugging.
ns	Enter the keyword `ns` for name-server-specific debugging.
rscn	Enter the keyword `rscn` for RSCN-specific debugging.
rx	Enter the keyword `rx` for packet receive-specific debugging.
tx	Enter the keyword `tx` for packet transmit-specific debugging.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

debug fip snooping rx

Enable debugging for FIP snooping receive-specific packets.

Syntax `debug fip-snooping rx packet-type [all | discovery | ns | virtual-link-instantiation | virtual-link-maintenance| vlan-discovery] [`*`interface`*`]`

Parameters

packet-type Enter the keyword `packet-type` and then the option type on which to enable debugging. The options are:

- `all` — Enter the keyword `all` to enable debugging on all the options.
- `discovery` — Enter the keyword `discovery` to enable debugging on FCF advertisements and ENode solicitation.
- `ns` — Enter the keyword `ns` to enable debugging of the name-server packets.
- `virtual-link-instantiation` — Enter the keywords `virtual-link-instantiation` to enable debugging on FLOGI, FDISC, and FLOGO packets.
- `virtual-link-maintenance` — Enter the keywords `virtual-link-maintenance` to enable debugging on FIP clear virtual link frames and keepalives.
- `vlan-discovery` — Enter the keywords `vlan-discovery` to enable debugging on VLAN requests and notifications.

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.

- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
9.2(0.2)	Introduced on the S4810 and S4820T. Added the receive parameters `packet-type` and `interfaces` and their options.

feature fip-snooping

Enable FCoE transit and FIP snooping on a switch.

Syntax `feature fip-snooping`

To disable the FCoE transit feature, use the `no feature fip-snooping` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

Before enabling FIP snooping, assign the fcoeacl space using the `cam-acl` command. If not assigned, the following error message is displayed:

```
DellEMC(conf)#feature  fip-snooping
% Error: Cannot enable fip snooping. CAM Region not allocated for Fcoe.

DellEMC(conf)#cam-acl l2acl 2 ipv4acl 0 ipv6acl 0 ipv4qos 2 l2qos 0 l2pt
0 ipmacacl 0 vman-qos 0 fcoeacl 2 etsacl 1 iscsi 2
DellEMC(conf)#feature  fip-snooping
```

fip-snooping enable

Enable FIP snooping on all VLANs or on a specified VLAN.

Syntax

`fip-snooping enable`

To disable the FIP snooping feature on all or a specified VLAN, use the `no fip-snooping enable` command.

Defaults

FIP snooping is disabled on all VLANs.

Command Modes

- CONFIGURATION
- VLAN INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

The maximum number of FCFs supported per FIP snooping-enabled VLAN is 12. The default number of FIP snooping sessions supported per ENode server is 32. The maximum number of FIP snooping sessions supported per ENode server is 64.

fip-snooping fc-map

Configure the FC-MAP value FIP snooping uses on all VLANs.

Syntax

`fip-snooping fc-map` *`fc-map-value`*

To return the configured FM-MAP value to the default value, use the `no fip-snooping fc-map` command.

Parameters

fc-map-value Enter the FC-MAP value FIP snooping uses. The range is from 0EFC00 to 0EFCFF.

Defaults 0x0EFC00

Command Modes
- CONFIGURATION
- VLAN INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

fip-snooping max-sessions-per-enodemac

Configure the maximum session limit per ENode MAC address.

Syntax `fip-snooping max–sessions–per–enode–mac` *`max-sessions-value`*

To return the configured maximum sessions to the default value, use the `no fip-snooping max–sessions–per–enode–mac` command.

Parameters

max-sessions-value	Enter the maximum number of sessions allowed per ENode MAC address. The range is from 1 to 64.

Defaults 32

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
9.2(0.2)	Introduced on the S4810 and S4820T.

fip-snooping port-mode fcf

Configure the port for bridge-to-FCF links.

Syntax

```
fip-snooping port-mode fcf
```

To disable the bridge-to-FCF link on a port, use the `no fip-snooping port-mode fcf` command.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.

show fip-snooping config

Display the FIP snooping status and configured FC-MAP values.

Syntax

```
show fip-snooping config
```

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
DellEMC# show fip-snooping config
FIP Snooping Feature enabled Status: Enabled
FIP Snooping Global enabled Status: Enabled
Global FC-MAP Value: 0X0EFC00

FIP Snooping enabled VLANs
VLAN    Enabled    FC-MAP
----    -------    --------
100     TRUE       0X0EFC00
```

show fip-snooping enode

Display information on the ENodes in FIP-snooped sessions, including the ENode interface and MAC address, FCF MAC address, VLAN ID and FC-ID.

Syntax `show fip-snooping enode [enode-mac-address]`

Parameters

enode-mac-address	Enter the MAC address of the ENodes to display.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping enode` command shown in the following example.

Field	Description
ENode MAC	MAC address of the ENode.
ENode Interface	Slot/ port number of the interface connected to the ENode.
FCF MAC	MAC address of the FCF.
VLAN	VLAN ID number the session uses.
FC-ID	Fibre Channel session ID the FCF assigns.

Example

```
DellEMC# show fip-snooping enode
Enode MAC          Enode Interface FCF MAC           VLAN FC-ID
---------- --------------- ------- ---- -----
d4:ae:52:1b:e3:cd Tf 1/11           54:7f:ee:37:34:40 100 62:00:11
```

show fip-snooping fcf

Display information on the FCFs in FIP-snooped sessions, including the FCF interface and MAC address, FCF interface, VLAN ID, FC-MAP value, FKA advertisement period, and number of ENodes connected.

Syntax `show fip-snooping fcf [fcf-mac-address]`

Parameters

fcf-mac-address Enter the MAC address of the FCF to display.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping fcf` command shown in the following example.

Field	Description
FCF MAC	MAC address of the FCF.
FCF Interface	Slot/port number of the interface to which the FCF is connected.
VLAN	VLAN ID number the session uses.
FC-MAP	FC-Map value the FCF advertises.
ENode Interface	Slot/ number of the interface connected to the ENode.
FKA_ADV_PERIOD	Time (in milliseconds) during which FIP keep-alive advertisements transmit.
No of ENodes	Number of ENodes connected to the FCF.
FC-ID	Fibre Channel session ID the FCF assigns.

Example

```
DellEMC# show fip-snooping fcf
FCF MAC        FCF Interface VLAN FC-MAP FKA_ADV_PERIOD No. of Enodes
------- ------------- ---- ------ -------------- -------------
54:7f:ee:37:34:40 Po 22      100 0e:fc:00 4000                2
```

show fip-snooping statistics

Display statistics on the FIP packets snooped on all interfaces, including VLANs, physical ports, and port channels.

Syntax

```
show fip-snooping statistics [interface vlan vlan-id | interface interface-type | interface port-channel port-channel-number]
```

Parameters

vlan-id	Enter the VLAN ID of the FIP packet statistics displays.
port-channel-number	Enter the port channel number of the FIP packet statistics displays.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping statistics` command shown in the following example.

Field	Description
Number of VLAN Requests	Number of FIP-snoop VLAN request frames received on the interface.
Number of VLAN Notifications	Number of FIP-snoop VLAN notification frames received on the interface.
Number of Multicast Discovery Solicits	Number of FIP-snoop multicast discovery solicit frames received on the interface.
Number of Unicast Discovery Solicits	Number of FIP-snoop unicast discovery solicit frames received on the interface.
Number of FLOGI	Number of FIP-snoop FLOGI request frames received on the interface.
Number of FDISC	Number of FIP-snoop FDISC request frames received on the interface.
Number of FLOGO	Number of FIP-snoop FLOGO frames received on the interface
Number of ENode Keep Alives	Number of FIP-snoop ENode keep-alive frames received on the interface.
Number of VN Port Keep Alives	Number of FIP-snoop VN port (Virtual N-port) keep-alive frames received on the interface

Field	Description
Number of Multicast Discovery Advertisements	Number of FIP-snoop multicast discovery advertisements received on the interface.
Number of Unicast Discovery Advertisements	Number of FIP-snoop unicast discovery advertisements received on the interface.
Number of FLOGI Accepts	Number of FIP FLOGI accept frames received on the interface.
Number of FLOGI Rejects	Number of FIP FLOGI reject frames received on the interface.
Number of FDISC Accepts	Number of FIP FDISC accept frames received on the interface.
Number of FDISC Rejects	Number of FIP FDISC reject frames received on the interface.
Number of FLOGO Accepts	Number of FIP FLOGO accept frames received on the interface.
Number of FLOGO Rejects	Number of FIP FLOGO reject frames received on the interface.
Number of CVLs	Number of FIP clear virtual link frames received on the interface.
Number of FCF Discovery Timeouts	Number of FCF discovery timeouts that occurred on the interface.
Number of VN Port Session Timeouts	Number of VN port session timeouts that occurred on the interface.
Number of Session failures due to Hardware Config	Number of session failures due to hardware configuration that occurred on the interface.

Example

```
DellEMC# show fip-snooping statistics interface vlan 100
Number of Vlan Requests                :0
Number of Vlan Notifications           :0
Number of Multicast Discovery Solicits :2
Number of Unicast Discovery Solicits   :0
Number of FLOGI                        :2
Number of FDISC                        :16
Number of FLOGO                        :0
Number of Enode Keep Alive             :9021
Number of VN Port Keep Alive           :3349
Number of Multicast Discovery Advertisement :4437
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts                :2
Number of FLOGI Rejects                :0
Number of FDISC Accepts                :16
Number of FDISC Rejects                :0
Number of FLOGO Accepts                :0
Number of FLOGO Rejects                :0
Number of CVL                          :0
Number of FCF Discovery Timeouts       :0
Number of VN Port Session Timeouts     :0
```

```
Number of Session failures due to Hardware Config :0
DellEMC(conf)#
```

```
DellEMC# show fip-snooping statistics int twentyFiveGigE 1/11
Number of Vlan Requests                 :1
Number of Vlan Notifications            :0
Number of Multicast Discovery Solicits :1
Number of Unicast Discovery Solicits    :0
Number of FLOGI                         :1
Number of FDISC                         :16
Number of FLOGO                         :0
Number of Enode Keep Alive              :4416
Number of VN Port Keep Alive            :3136
Number of Multicast Discovery Advertisement :0
Number of Unicast Discovery Advertisement :0
Number of FLOGI Accepts                 :0
Number of FLOGI Rejects                 :0
Number of FDISC Accepts                 :0
Number of FDISC Rejects                 :0
Number of FLOGO Accepts                 :0
Number of FLOGO Rejects                 :0
Number of CVL                           :0
Number of FCF Discovery Timeouts        :0
Number of VN Port Session Timeouts      :0
Number of Session failures due to Hardware Config :0
```

Example (Port Channel)

```
DellEMC# show fip-snooping statistics interface port-channel 22
Number of Vlan Requests                 :0
Number of Vlan Notifications            :2
Number of Multicast Discovery Solicits :0
Number of Unicast Discovery Solicits    :0
Number of FLOGI                         :0
Number of FDISC                         :0
Number of FLOGO                         :0
Number of Enode Keep Alive              :0
Number of VN Port Keep Alive            :0
Number of Multicast Discovery Advertisement :4451
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts                 :2
Number of FLOGI Rejects                 :0
Number of FDISC Accepts                 :16
Number of FDISC Rejects                 :0
Number of FLOGO Accepts                 :0
Number of FLOGO Rejects                 :0
Number of CVL                           :0
Number of FCF Discovery Timeouts        :0
Number of VN Port Session Timeouts      :0
Number of Session failures due to Hardware Config :0
```

show fip-snooping system

Display information on the status of FIP snooping on the switch (enabled or disabled), including the number of FCoE VLANs, FCFs, ENodes, and currently active sessions.

Syntax `show fip-snooping system`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
DellEMC# show fip-snooping system
Global Mode : Enabled
FCOE VLAN List (Operational) : 1, 100
FCFs                         : 1
Enodes                       : 2
Sessions                     : 17
```

show fip-snooping vlan

Display information on the FCoE VLANs on which FIP snooping is enabled.

Syntax `show fip-snooping vlan`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the Z9500 and S6000-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
DellEMC# show fip-snooping vlan
* = Default VLAN
VLAN FC-MAP    FCFs Enodes Sessions
---- ------ ---- ------ --------
*1    -        -    -      -
100   0X0EFC00 1    2      17
```

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Force10 Resilient Ring Protocol (FRRP)

FRRP is a proprietary protocol for that offers fast convergence in a Layer 2 network without having to run the spanning tree protocol (STP). The resilient ring protocol is an efficient protocol that transmits a high-speed token across a ring to verify the link status. All the intelligence is contained in the master node with practically no intelligence required of the transit mode.

Important Points to Remember

- FRRP is media- and speed-independent.
- FRRP is a Dell EMC Networking proprietary protocol that does not interoperate with any other vendor.
- Spanning Tree must be disabled on both primary and secondary interfaces before Resilient Ring protocol is enabled.
- A VLAN configured as the control VLAN for a ring cannot be configured as a control or member VLAN for any other ring.
- Member VLANs across multiple rings are not supported in Master nodes.
- If multiple rings share one or more member VLANs, they cannot share any links between them.
- Each ring can have only one Master node; all others are Transit nodes.

Topics:

- clear frrp
- debug frrp
- description
- disable
- interface
- member-vlan
- mode
- protocol frrp
- show frrp
- timer

clear frrp

Clear the FRRP statistics counters.

Syntax	`clear frrp [ring-id]`	
Parameters	**ring-id**	(Optional) Enter the ring identification number. The range is from 1 to 255.
Defaults	None	
Command Modes	EXEC	
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.	

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.5.1.0	Introduced.

Usage Information

Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell EMC Networking OS requires a command line confirmation before the command executes. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Example

```
DellEMC# clear frrp

Clear frrp statistics counter on all ring [confirm] yes

DellEMC#clear frrp 4

Clear frrp statistics counter for ring 4 [confirm] yes

DellEMC#
```

Related Commands

- show frrp — display the Resilient Ring Protocol configuration.

debug frrp

Clear the FRRP statistics counters.

Syntax

`debug frrp {event | packet | detail} [ring-id] [count number]`

To disable debugging, use the `no debug frrp {event | packet | detail} {ring-id} [countnumber]` command.

Parameters

event	Enter the keyword `event` to display debug information related to ring protocol transitions.
packet	Enter the keyword `packet` to display brief debug information related to control packets.
detail	Enter the keyword `detail` to display detailed debug information related to the entire ring protocol packets.
ring-id	(Optional) Enter the ring identification number. The range is from 1 to 255.

	count *number*	Enter the keyword `count` then the number of debug outputs. The range is from 1 to 65534.

Defaults Disabled.

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information Because the resilient ring protocol can potentially transmit 20 packets per interface, restrict debug information.

description

Enter an identifying description of the ring.

Syntax `description *Word*`

To remove the ring description, use the `no description [*Word*]` command.

Parameters

Word	Enter a description of the ring. Maximum: 255 characters.

Defaults None

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

disable

Disable the resilient ring protocol.

Syntax `disable`

To enable the Resilient Ring Protocol, use the `no disable` command.

Defaults **Disabled**

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

interface

Configure the primary, secondary, and control-vlan interfaces.

Syntax

`interface {primary` *`interface`* `secondary` *`interface`* `control-vlan` *`vlan-id`*`}`

To return to the default, use the `no interface {primary` *`interface`* `secondary` *`interface`* `control-vlan vlan-id}` command.

Parameters

primary *interface* Enter the keyword `primary` to configure the primary interface then one of the following interfaces and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

secondary *interface* Enter the keyword `secondary` to configure the secondary interface then one of the following interfaces and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

control-vlan *vlan-id* Enter the keyword `control-vlan` then the VLAN ID. The range is from 1 to 4094.

Defaults None

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information This command causes the Ring Manager to take ownership of the two ports after IFM validates the configuration. Ownership is relinquished for a port only when the interface does not play a part in any control VLAN, that is, the interface does not belong to any ring.

Related Commands
- show frrp — display the Resilient Ring Protocol configuration information.

member-vlan

Specify the member VLAN identification numbers.

Syntax `member-vlan {vlan-range}`

To return to the default, use the `no member-vlan [vlan-range]` command.

Parameters

vlan-range	Enter the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination. For example: VLAN IDs (comma-separated): 3, 4, 6. Range (hyphen-separated): 5-10. Combination: 3, 4, 5-10, 8.

Defaults None

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

mode

Set the Master or Transit mode of the ring.

Syntax `mode {master | transit}`

To reset the mode, use the `no mode {master | transit}` command.

Parameters

master	Enter the keyword `master` to set the Ring node to Master mode.
transit	Enter the keyword`transit` to set the Ring node to Transit mode.

Defaults **Mode None**

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

protocol frrp

Enter the Resilient Ring Protocol and designate a ring identification.

Syntax `protocol frrp {ring-id}`

To exit the ring protocol, use the `no protocol frrp {ring-id}` command.

Parameters

ring-id	Enter the ring identification number. The range is from 1 to 255.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced

Usage Information This command places you into the resilient ring protocol. After executing this command, the command line prompt changes to `conf-frrp`.

show frrp

Display the resilient ring protocol configuration.

Syntax `show frrp [ring-id [summary]] | [summary]`

Parameters

ring-id	Enter the ring identification number. The range is from 1 to 255
summary	(OPTIONAL) Enter the keyword `summary` to view just a summarized version of the Ring configuration.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell EMC Networking OS requires a command line confirmation before the command executes. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Usage Information Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell EMC Networking OS requires a command line confirmation before the command is executed. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Example (Summary)

```
DellEMC# show frrp summary
```

```
Ring-ID State Mode  Ctrl_Vlan Member_Vlans
------------------------------------------
2       UP   Master   2        11-20, 25,27-30
31      UP   Transit  31       40-41
50      Down Transit  50       32
DellEMC#
```

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information

Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell EMC Networking OS requires a command line confirmation before the command executes. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Usage Information

Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell EMC Networking OS requires a command line confirmation before the command is executed. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Example (Summary)

```
DellEMC# show frrp summary
```

```
Ring-ID State Mode  Ctrl_Vlan Member_Vlans
------------------------------------------
2       UP   Master   2        11-20, 25,27-30
31      UP   Transit  31       40-41
50      Down Transit  50       32
DellEMC#
```

Example (1)

```
DellEMC# show frrp 1
Ring protocol 1 is in Master mode
Ring Protocol Interface:
Primary : twentyFiveGigE 1/16 State: Forwarding
Secondary: Port-channel 100 State: Blocking
Control Vlan: 1
Ring protocol Timers: Hello-Interval 50 msec Dead-Interval 150 msec
Ring Master's MAC Address is 00:01:e8:13:a3:19
Topology Change Statistics: Tx:110 Rx:45
Hello Statistics: Tx:13028 Rx:12348
Number of state Changes: 34
Member Vlans: 1000-1009
DellEMC#
```

Example (1)

```
DellEMC# show frrp 1
Ring protocol 1 is in Master mode
Ring Protocol Interface:
Primary : twentyFiveGigE 1/1 State: Forwarding
Secondary: Port-channel 100 State: Blocking
Control Vlan: 1
Ring protocol Timers: Hello-Interval 50 msec Dead-Interval 150 msec
Ring Master's MAC Address is 00:01:e8:13:a3:19
Topology Change Statistics: Tx:110 Rx:45
Hello Statistics: Tx:13028 Rx:12348
Number of state Changes: 34
Member Vlans: 1000-1009
DellEMC#
```

Example (2 Summary)

```
DellEMC# show frrp 2 summary
```

```
DellEMC#show frrp 2 summary
Ring-ID State Mode  Ctrl_Vlan Member_Vlans
------------------------------------------------
2       Up    Master 2        11-20, 25, 27-30
DellEMC#
```

Related Commands

- protocol frrp — enter the resilient ring protocol and designate a ring identification.

timer

Set the hello interval or dead interval for the Ring control packets.

Syntax

`timer {hello-interval` *`milliseconds`*`}| {dead-interval` *`milliseconds`*`}`

To remove the timer, use the `no timer {hello-interval [`*`milliseconds`*`]}| {dead-interval` *`milliseconds`*`}` command.

Parameters

hello-interval *milliseconds*	Enter the keyword `hello-interval` then the time, in milliseconds, to set the hello interval of the control packets. The milliseconds must be entered in increments of 50 millisecond; for example, 50, 100, 150, and so on. If an invalid value is entered, an error message is generated. The range is from 50 to 2000 ms. Default: **500 ms**.
dead-interval *milliseconds*	Enter the keyword `dead-interval` then the time, in milliseconds, to set the dead interval of the control packets. The range is from 50 to 6000 ms. Default: **1500 ms**. **NOTE:** The configured dead interval must be at least three times the hello interval.

Defaults

- **500 ms** for `hello-interval` *`milliseconds`*

- **1500 ms** for `dead-interval`*`milliseconds`*

Command Modes CONFIGURATION (conf-frrp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series.
7.4.1.0	Introduced.

Usage Information The `hello interval` command is the interval at which ring frames are generated from the primary interface of the master node. The `dead interval` command is the time that elapses before a time-out occurs.

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GARP VLAN Registration (GVRP)

The Dell EMC Networking operating system supports the basic GVRP commands on the Dell EMC Networking OS.

The generic attribute registration protocol (GARP) mechanism allows the configuration of a GARP participant to propagate through a network quickly. A GARP participant registers or de-registers its attributes with other participants by making or withdrawing declarations of attributes. At the same time, based on received declarations or withdrawals, GARP handles attributes of other participants.

GVRP enables a device to propagate local VLAN registration information to other participant devices and dynamically update the VLAN registration information from other devices. The registration information updates local databases regarding active VLAN members and through which port the VLANs can be reached.

GVRP ensures that all participants on a bridged LAN maintain the same VLAN registration information. The VLAN registration information propagated by GVRP includes both manually configured local static entries and dynamic entries from other devices.

GVRP participants have the following components:

- The GVRP application
- GARP information propagation (GIP)
- GARP information declaration (GID)

Important Points to Remember

- GVRP is supported on Layer 2 ports only.
- All VLAN ports added by GVRP are tagged.
- GVRP is supported on untagged ports belonging to a default VLAN and tagged ports.
- GVRP cannot be enabled on untagged ports belonging to a non-default VLAN *unless* native VLAN is turned on.
- GVRP requires end stations with dynamic access NICs.
- Based on updates from GVRP-enabled devices, GVRP allows the system to dynamically create a port-based VLAN (unspecified) with a specific VLAN ID and a specific port.
- On a port-by-port basis, GVRP allows the system to learn about GVRP updates to an existing port-based VLAN with that VLAN ID and IEEE 802.1Q tagging.
- GVRP allows the system to send dynamic GVRP updates about your existing port-based VLAN.
- GVRP updates are not sent to any blocked spanning tree protocol (STP) ports. GVRP operates only on ports that are in the forwarding state.
- GVRP operates only on ports that are in the STP forwarding state. If you enable GVRP, a port that changes to the STP Forwarding state automatically begin to participate in GVRP. A port that changes to an STP state other than forwarding no longer participates in GVRP.
- VLANs created dynamically with GVRP exist only as long as a GVRP-enabled device is sending updates. If the devices no longer send updates, or GVRP is disabled, or the system is rebooted, all dynamic VLANs are removed.
- GVRP manages the active topology, not non-topological data such as VLAN protocols. If a local bridge must classify and analyze packets by VLAN protocols, manually configure protocol-based VLANs, and simply rely on GVRP for VLAN updates. But if the local bridge must know only how to reach a given VLAN, then GVRP provides all necessary information.
- The VLAN topologies that GVRP learns are treated differently from VLANs that are statically configured. The GVRP dynamic updates are not saved in NVRAM, while static updates are saved in NVRAM. When GVRP is disabled, the system deletes all VLAN interfaces that were learned through GVRP and leaves unchanged all VLANs that were manually configured.

Topics:

- clear gvrp statistics
- debug gvrp
- disable
- garp timers
- gvrp enable
- gvrp registration
- protocol gvrp

- show config
- show garp timers
- show gvrp
- show gvrp statistics

clear gvrp statistics

Clear GVRP statistics on an interface.

Syntax `clear gvrp statistics interface interface`

Parameters

interface *interface*

Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

- show gvrp statistics — display the GVRP statistics.

debug gvrp

Enable debugging on GVRP.

Syntax

```
debug gvrp {config | events | pdu}
```

To disable debugging, use the `no debug gvrp {config | events | pdu}` command.

Parameters

config	Enter the keyword `config` to enable debugging on the GVRP configuration.
event	Enter the keyword `event` to enable debugging on the JOIN/LEAVE events.
pdu	Enter the keyword `pdu` then one of the following Interface keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Disabled.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

disable

Globally disable GVRP.

Syntax

`disable`

To re-enable GVRP, use the `no disable` command.

Defaults

Enabled.

Command Modes

CONFIGURATION-GVRP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

- gvrp enable — enable GVRP on physical interfaces and LAGs.
- protocol gvrp — access GVRP protocol.

garp timers

Set the intervals (in milliseconds) for sending GARP messages.

Syntax

`garp timers {join | leave | leave-all}`

To return to the previous setting, use the `no garp timers {join | leave | leave-all}` command.

Parameters

join Enter the keyword `join` then the number of milliseconds to configure the join time. The range is from 100 to 147483647 milliseconds. The default is **200 milliseconds**.

NOTE: Designate the milliseconds in multiples of 100.

leave Enter the keyword `leave` then the number of milliseconds to configure the leave time. The range is from 100 to 2147483647 milliseconds. The default is **600 milliseconds**.

NOTE: Designate the milliseconds in multiples of 100.

leave-all Enter the keywords `leave-all` then the number of milliseconds to configure the leave-all time. The range is from 100 to 2147483647 milliseconds. The default is 1000 milliseconds.

NOTE: Designate the milliseconds in multiples of 100.

Defaults As above.

Command Modes CONFIGURATION-GVRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

- Join Timer — `Join` messages announce the willingness to register some attributes with other participants. For reliability, each GARP application entity sends a `Join` message twice and uses a join timer to set the sending interval.
- Leave Timer — `Leave` announces the willingness to de-register with other participants. Together with `Join`, `Leave` messages help GARP participants complete attribute reregistration and de-registration. The leave timer starts after receipt of a leave message sent for de-registering some attribute information. If a `Join` message is *not* received before the `Leave` time expires, the GARP application entity removes the attribute information as requested.
- Leave All Timer — The `Leave All` timer starts when a GARP application entity starts. When this timer expires, the entity sends a `Leave-all` message so that other entities can reregister their attribute information. Then the `Leave-all` time begins again.

Related Commands

- show garp timers — display the current GARP times.

gvrp enable

Enable GVRP on physical interfaces and LAGs.

Syntax

`gvrp enable`

To disable GVRP on the interface, use the `no gvrp enable` command.

Defaults

Disabled.

Command Modes

CONFIGURATION-INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

- disable — globally disable GVRP.

gvrp registration

Configure the GVRP register type.

Syntax

`gvrp registration {fixed | normal | forbidden}`

To return to the default, use the `gvrp register normal` command.

Parameters

fixed	Enter the keyword `fixed` then the VLAN range in a comma-separated VLAN ID set.
normal	Enter the keyword `normal` then the VLAN range in a comma-separated VLAN ID set. This setting is the default.
forbidden	Enter the keyword `forbidden` then the VLAN range in a comma-separated VLAN ID set.

Defaults **normal**

Command Modes CONFIGURATION-INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information Fixed registration prevents an interface, configured using the command line, to belong to a VLAN (static configuration) from being unconfigured when it receives a `Leave` message. Therefore, Registration mode on that interface is fixed.

Normal registration is the default registration. The port's membership in the VLAN depends on GVRP. The interface becomes a member of a VLAN after learning about the VLAN through GVRP. If the VLAN is removed from the port that sends GVRP advertisements to this device, the port stops being a member of the VLAN.

To advertise or learn about VLANs through GVRP, use the `forbidden` command when you do not want the interface.

Related Commands

- show gvrp — display the GVRP configuration including the registration.

protocol gvrp

Access GVRP protocol — (config-gvrp)#.

Syntax `protocol gvrp`

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

- disable — globally disable GVRP.

show config

Display the global GVRP configuration.

Syntax `show config`

Command Modes CONFIGURATION-GVRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

- gvrp enable — enable GVRP on physical interfaces and LAGs.
- protocol gvrp — access the GVRP protocol.

show garp timers

Display the GARP timer settings for sending GARP messages.

Syntax `show garp timers`

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Example

```
DellEMC# show garp timers
GARP Timers      Value (milliseconds)
----------------------------------------
Join Timer         200
Leave Timer        600
LeaveAll Timer     10000
DellEMC#
```

Related Commands

- garp timers — set the intervals (in milliseconds) for sending GARP messages.

show gvrp

Display the GVRP configuration.

Syntax `show gvrp [brief | interface]`

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to display a brief summary of the GVRP configuration.
interface	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information If no ports are GVRP participants, the message output changes from `GVRP Participants running on <port_list>` to `GVRP Participants running on no ports`.

Example

```
DellEMC# show gvrp brief
GVRP Feature is currently enabled.
Port                GVRP Status      Edge-Port
-----------------------------------------------
Tf 1/1             Disabled          No
Tf 1/2             Enabled           No
Tf 1/3             Disabled          No
Tf 1/4             Disabled          No
Tf 1/5             Disabled          No
Tf 1/6             Disabled          No
Tf 1/7             Disabled          No
Tf 1/8             Disabled          No
DellEMC# show gvrp brief
```

Related Commands

- show gvrp statistics — display the GVRP statistics.

show gvrp statistics

Display the GVRP configuration statistics.

Syntax

```
show gvrp statistics {interface interface | summary}
```

Parameters

interface *interface*	(OPTIONAL) Enter the keyword `interface` then one of the interface keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
summary	Enter the keyword `summary` to display just a summary of the GVRP statistics.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

Invalid messages/attributes skipped can occur in the following cases:

- The incoming GVRP PDU has an incorrect length.
- "End of PDU" was reached before the complete attribute could be parsed.
- The Attribute Type of the attribute that was being parsed was not the GVRP VID Attribute Type (0x01).
- The attribute that was being parsed had an invalid attribute length.
- The attribute that was being parsed had an invalid GARP event.
- The attribute that was being parsed had an invalid VLAN ID. The valid range is from 1 to 4095.

A failed registration can occur for the following reasons:

- `Join` requests were received on a port that was blocked from learning dynamic VLANs (GVRP Blocking state).
- An entry for a new GVRP VLAN could not be created in the GVRP database.

Example

```
DellEMC# show gvrp statistics interface twentyFiveGigE 1/1

Join Empty Received: 0
Join In Received: 0
Empty Received: 0
LeaveIn Received: 0
Leave Empty Received: 0
Leave All Received: 40
Join Empty Transmitted: 156
Join In Transmitted: 0
Empty Transmitted: 0
Leave In Transmitted: 0
Leave Empty Transmitted: 0
Leave All Transmitted: 41
Invalid Messages/Attributes skipped: 0
Failed Registrations: 0
DellEMC#
```

Related Commands

- show gvrp — display the GVRP configuration.

20

ICMP Message Types

This section lists and describes the possible ICMP message type resulting from a ping. The first three columns list the possible symbol or type/code. For example, you would receive a ! or 03 as an echo reply from your ping.

Table 5. ICMP messages and their definitions

Symbol	Type	Code	Description	Query	Error
.			Timeout (no reply)		
!	0	3	echo reply	.	
U	3		destination unreachable:		
		0	network unreachable		.
		1	host unreachable		.
		2	protocol unreachable		.
		3	port unreachable		.
		4	fragmentation needed but don't fragment bit set		.
		5	source route failed		.
		6	destination network unknown		.
		7	destination host unknown		.
		8	source host isolated (obsolete)		.
		9	destination network administratively prohibited		.
		10	destination host administratively prohibited		.
		11	network unreachable for TOS		.
		12	host unreachable for TOS		.
		13	communication administratively prohibited by filtering		.
		14	host precedence violation		.
		15	precedence cutoff in effect		.
C	4	0	source quench		.
	5		redirect		.
		0	redirect for network		.
		1	redirect for host		.
		2	redirect for type-of-service and network		.
		3	redirect for type-of-service and host		.
	8	0	echo request	.	
	9	0	router advertisement	.	
	10	0	router solicitation	.	
&	11		time exceeded:		

Table 5. ICMP messages and their definitions (continued)

Symbol	Type	Code	Description	Query	Error
		0	time-to-live equals 0 during transit		.
		1	time-to-live equals 0 during reassembly		.
	12		parameter problem:		
		1	IP header bad (catchall error)		.
		2	required option missing		.
	13	0	timestamp request	.	
	14	0	timestamp reply	.	
	15	0	information request (obsolete)	.	
	16	0	information reply (obsolete)	.	
	17	0	address mask request	.	
	18	0	address mask reply	.	

21

Internet Group Management Protocol (IGMP)

The IGMP commands are supported on the Dell EMC Networking OS.

Topics:

- IGMP Commands
- IGMP Snooping Commands

IGMP Commands

Dell EMC Networking OS supports IGMPv1/v2/v3 and is compliant with RFC-3376.

Important Points to Remember

- Dell EMC Networking OS supports protocol-independent multicast-sparse (PIM-SM) and protocol-independent source-specific multicast (PIM-SSM) include and exclude modes.
- IGMPv2 is the default version of IGMP on interfaces. You can configure IGMPv3 on interfaces. It is backward compatible with IGMPv2.
-
- There is no hard limit on the maximum number of groups supported.
- IGMPv3 router interoperability with IGMPv2 and IGMPv1 routers on the same subnet is not supported.
- An administrative command (`ip igmp version`) is added to manually set the IGMP version.
- All commands previously used for IGMPv2 are compatible with IGMPv3.

clear ip igmp groups

Clear entries from the group cache table.

Syntax `clear ip igmp [vrf vrf-name] groups [group-address | interface]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to default VRF.
group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.
interface *interface*	Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

debug ip igmp

Enable debugging of IGMP packets.

Syntax `debug ip igmp [vrf vrf-name] [group address | interface]`

- To disable IGMP debugging, use the `no debug ip igmp [vrf vrf-name] [group address | interface]` command.
- To disable all debugging, use the `undebug all` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to enable debugging of IGMP packets corresponding to that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.
interface *interface*	Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results. This command displays packets for IGMP and IGMP snooping.

ip igmp access-group

To specify access control for packets, use this feature.

Syntax `ip igmp access-group` *`access-list`*

To remove the feature, use the `no ip igmp access-group access-list` command.

Parameters

access-list	Enter the name of the extended ACL (16 characters maximum).

Defaults Not configured

Command Modes INTERFACE (conf-if-*interface-slot/port*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.
7.6.1.0	Introduced on E-Series.

Usage Information The access list accepted is an extended ACL. To block IGMP reports from hosts, on a per-interface basis based on the group address and source address that you specify in the access list, use this feature.

ip igmp immediate-leave

Enable IGMP immediate leave.

Syntax `ip igmp immediate-leave [group-list prefix-list-name]`

To disable `ip igmp immediate leave`, use the `no ip igmp immediate-leave` command.

Parameters

group-list *prefix-list-name*	Enter the keywords `group-list` then a string up to 16 characters long of the prefix-list-name.

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

Querier normally sends some group-specific queries when a `leave` message is received for a group prior to deleting a group from the membership database. There may be situations when you require immediate deletion of a group from the membership database. This command provides a way to achieve the immediate deletion. In addition, this command provides a way to enable `immediate-leave processing` for specified groups.

ip igmp last-member-query-interval

Change the last member query interval, which is the Max Response Time inserted into Group-Specific Queries sent in response to Leave Group messages. This interval is also the interval between Group-Specific Query messages.

Syntax

`ip igmp last-member-query-interval` *`milliseconds`*

To return to the default value, use the `no ip igmp last-member-query-interval` command.

Parameters

milliseconds	Enter the number of milliseconds as the interval. For IGMP version 2, the range is from 100 to 25599. For IGMP version 3, the range is from 100 to 65535. The default value is **1000 milliseconds**.

Defaults

1000 milliseconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	For IGMP version 2, the Interval range is from 100 to 25599. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
E-Series legacy command	

ip igmp query-interval

Change the transmission frequency of IGMP general queries the Querier sends.

Syntax `ip igmp query-interval seconds`

To return to the default values, use the `no ip igmp query-interval` command.

Parameters

seconds	Enter the number of seconds between queries sent out. The range is from 1 to 18000. The default is **60 seconds**.

Defaults **60 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Maximum range of the Hello interval value is changed to 18000. Introduced on the S6000-ON.

Version	Description
9.5(0.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
7.5.1.0	Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
E-Series legacy command.	

Usage Information If you have configured the hello interval value to be greater than 18000, you must first reset that value to be less than or equal to 18000 before upload. Otherwise, the command execution fails during bootup and the hello interval value is set to the default value.

ip igmp query-max-resp-time

Set the maximum query response time advertised in general queries.

NOTE: The IGMP query-max-resp-time value must be less than the IGMP query-interval value.

Syntax `ip igmp query-max-resp-time seconds`

To return to the default values, use the `no ip igmp query-max-resp-time` command.

Parameters

seconds	Enter the number of seconds for the maximum response time. The range is from 1 to 25. The default is **10 seconds**.

Defaults **10 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
7.5.1.0	Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
E-Series legacy command.	

ip igmp ssm-map

To translate (*,G) memberships to (S,G) memberships, use a statically configured list.

Syntax

`ip igmp [vrf vrf-name] ssm-map std-access-list source-address`

Undo this configuration, that is, remove SSM map (S,G) states and replace them with (*,G) state, use the `ip igmp [vrf vrf-name] ssm-map std-access-list source-address` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
std-access-list	Specify the standard IP access list that contains the mapping rules for multicast groups.
source-address	Specify the multicast source address to which the groups are mapped.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added support for VRF and Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.
7.7.1.0	Introduced on the E-Series.

Usage Information Mapping applies to both v1 and v2 IGMP joins; any updates to the ACL are reflected in the IGMP groups. You may not use extended access lists with this command. When you configure a static SSM map and the router cannot find any matching access lists, the router continues to accept (*,G) groups.

Related Commands

- ip access-list standard — create a standard access list to filter based on IP address.

ip igmp version

Manually set the version of the router to IGMPv2 or IGMPv3.

Syntax `ip igmp version {2 | 3}`

Parameters

2	Enter the number 2 to set the IGMP version number to IGMPv2.
3	Enter the number 3 to set the IGMP version number to IGMPv3.

Defaults **2** (IGMPv2)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Changed the default IGMP from version 2 to version 3. Introduced on the S6000-ON
9.5(0.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

show ip igmp groups

View the IGMP groups.

Syntax

```
show ip igmp [vrf vrf-name] groups [group-address [detail] | detail |
interface [group-address [detail]]]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.
group-address	(OPTIONAL) Enter the group address in dotted decimal format to view information on that group only.
interface	(OPTIONAL) Enter the interface type and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
detail	(OPTIONAL) Enter the keyword `detail` to display the IGMPv3 source information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series and C-Series.
7.5.1.0	Expanded to support the `detail` option.
E-Series legacy command.	

Usage Information

This command displays the IGMP database, including configured entries for either all groups on all interfaces, all groups on specific interfaces, or specific groups on specific interfaces.

The following describes the `show ip igmp groups` command shown in the following example.

Field	Description
Group Address	Lists the multicast address for the IGMP group.
Interface	Lists the interface type, slot and port number.
Mode	Displays the IGMP version used.
Uptime	Displays the amount of time the group has been operational.
Expires	Displays the amount of time until the entry expires.
Last Reporter	Displays the IP address of the last host to be a member of the IGMP group.

Example

```
DellEMC# show ip igmp groups
Total Number of Groups: 5
IGMP Connected Group Membership
Group Address Interface Uptime   Expires
225.0.0.0    Vlan 100   00:00:05 00:02:04

225.0.0.1    Vlan 100   00:00:05 00:02:04

225.0.0.2    Vlan 100   00:00:05 00:02:04

225.0.0.3    Vlan 100   00:00:05 00:02:04

225.0.0.4    Vlan 100   00:00:05 00:02:04
```

Example (VLT)

NOTE: The asterisk (*) after the port channel number (Po 2) highlighted in the following example indicates the port channel is VLT, that the local VLT port channel is down and the remote VLT port is up.

```
DellEMC# show ip igmp groups
Total Number of Groups: 5
IGMP Connected Group Membership
Group Address Interface Mode Uptime Expires Last Reporter
225.0.0.0    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51

225.0.0.1    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
```

```
225.0.0.2    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51

225.0.0.3    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51

225.0.0.4    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
```

Example (Details)

```
DellEMC# show ip igmp group details
Interface                   Vlan 20
Group                          232.1.1.5
Uptime                        00:11:22
Expires                         Never
Router mode               INCLUDE
Last reporter               35.0.0.2
Group source list
Source address            Expires
65.0.0.1                            00:01:22
65.0.0.2                            00:01:22
65.0.0.3                            00:01:22
65.0.0.4                            00:01:22
65.0.0.5                            00:01:22
```

show ip igmp interface

View information on the interfaces participating in IGMP.

Syntax `show ip igmp [vrf vrf-name] interface [interface]`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to view IGMP interfaces associated with that VRF.

interface (OPTIONAL) Enter the interface type and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information

IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results.

The `show ip igmp interface` command does not display information corresponding to the loop-back interfaces.

Example

```
DellEMC# show ip igmp interface
twentyFiveGigE 1/1 is down, line protocol is down
  Internet protocol processing disabled
twentyFiveGigE 1/5 is down, line protocol is down
  Internet protocol processing disabled
twentyFiveGigE 1/6 is down, line protocol is down
  Internet protocol processing disabled
twentyFiveGigE 1/7 is up, line protocol is down
  Internet protocol processing disabled
  Vlan 20
   Inbound IGMP access group is not set
   Internet address is 35.0.0.1/24
   IGMP is enabled on interface
   IGMP query interval is 60 seconds
   IGMP querier timeout is 125 seconds
   IGMP max query response time is 10 seconds
   IGMP last member query response interval is 1000 ms
   IGMP immediate-leave is enabled for all groups
   IGMP activity: 0 joins
   IGMP querying router is 35.0.0.1 (this system)
   IGMP version is 2
```

Example (VRF)

```
DellEMC# show ip igmp vrf BLUE interface
twentyFiveGigE 1/20
  Inbound IGMP access group is not set
  Internet address is 50.10.4.1/24
  IGMP is up on the interface
  IGMP query interval is 60 seconds
  IGMP querier timeout is 0 seconds
  IGMP max query response time is 10 seconds
  IGMP last member query response interval is 1000 ms
  IGMP immediate-leave is disabled
  IGMP activity: 0 joins
  IGMP querying router is 50.10.4.1 (this system)
```

```
  IGMP version is 3
Vlan 4007
  Inbound IGMP access group is not set
  Internet address is 50.30.124.4/24
  IGMP is up on the interface
  IGMP query interval is 60 seconds
  IGMP querier timeout is 83 seconds
  IGMP max query response time is 10 seconds
  IGMP last member query response interval is 1000 ms
  IGMP immediate-leave is disabled
  IGMP activity: 0 joins
  IGMP querying router is 50.30.124.1
  IGMP version is 3
DellEMC#
```

show ip igmp ssm-map

Display is a list of groups that are currently in the IGMP group table and contain SSM mapped sources.

Syntax `show ip igmp [vrf vrf-name] ssm-map [group]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
group	(OPTIONAL) Enter the multicast group address in the form A.B.C.D to display the list of sources to which this group is mapped.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.
7.7.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip igmp ssm-map
Interface                    Vlan 20
Group                           232.1.1.5
Uptime                         00:11:22
Expires                          Never
Router mode               INCLUDE
Last reporter                35.0.0.2
Group source list
Source address             Expires
65.0.0.1                             00:01:22
65.0.0.2                             00:01:22
65.0.0.3                             00:01:22
65.0.0.4                             00:01:22
65.0.0.5                             00:01:22
```

Related Commands

- ip igmp ssm-map — use a statically configured list to translate (*,G) memberships to (S,G) memberships.

IGMP Snooping Commands

Dell EMC Networking OS supports IGMP Snooping version 2 and 3 on all Dell EMC Networking systems.

Important Points to Remember for IGMP Snooping

- Dell EMC Networking OS supports version 1, version 2, and version 3 hosts.
- Dell EMC Networking OS IGMP snooping implementation is based on IP multicast address (not based on Layer 2 multicast mac address) and the IGMP snooping entries are in Layer 3 flow table not in Layer 2 forwarding information base (FIB).
- Dell EMC Networking OS IGMP snooping implementation is based on draft-ietf-magma-snoop-10.
- Dell EMC Networking OS supports IGMP snooping on JUMBO-enabled cards.
- IGMP snooping is not enabled by default on the switch.
- A maximum of 1800 groups and 600 VLAN are supported.
- IGMP snooping is not supported on a default VLAN interface.
- IGMP snooping is not supported over VLAN-Stack-enabled VLAN interfaces (you must disable IGMP snooping on a VLAN interface before configuring VLAN-Stack-related commands).
- IGMP snooping does not react to Layer 2 topology changes triggered by spanning tree protocol (STP).
- IGMP snooping reacts to Layer 2 topology changes multiple spanning tree protocol (MSTP) triggers by sending a general query on the interface that comes in the FWD state.

Important Points to Remember for IGMP Querier

- The IGMP snooping Querier supports version 2.
- You must configure an IP address to the VLAN interface for IGMP snooping Querier to begin. The IGMP snooping Querier disables itself when a VLAN IP address is cleared, and then it restarts itself when an IP address is reassigned to the VLAN interface.
- When enabled, IGMP snooping Querier does not start if there is a statically configured multicast router interface in the VLAN.
- When enabled, IGMP snooping Querier starts after one query interval in case no IGMP general query (with IP SA lower than its VLAN IP address) is received on any of its VLAN members.
- When enabled, IGMP snooping Querier periodically sends general queries with an IP source address of the VLAN interface. If it receives a general query on any of its VLAN member, it checks the IP source address of the incoming frame.

  If the IP SA in the incoming IGMP general query frame is lower than the IP address of the VLAN interface, the switch disables its IGMP snooping Querier functionality.

  If the IP SA of the incoming IGMP general query is higher than the VLAN IP address, the switch continues to work as an IGMP snooping Querier.

clear ip igmp snooping groups

Clear snooping entries from the group cache table.

Syntax `clear ip igmp snooping groups [group-address interface | interface]`

Parameters

group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.
interface *interface*	Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on S-Series and Z–Series.

Usage Information IGMP commands accept only non-VLAN interfaces — specifying VLAN does not yield results.

debug ip igmp snooping

Enable debugging of IGMP snooping packets on interfaces and groups.

Syntax `debug ip igmp snooping [group address | interface]`

- To disable debugging of IGMP snooping, use the `no debug ip igmp snooping [group address | interface]` command.
- To disable all debugging, use the `undebug all` command.

Parameters

snooping	Enter the keyword snooping to enable debugging of IGMP snooping.

group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.
interface *interface*	Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, Z9000, and Z9500.

Usage Information IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results. This command displays packets for IGMP and IGMP snooping.

ip igmp snooping enable

Enable IGMP snooping on all or a single VLAN. This command is the master on/off switch to enable IGMP snooping.

Syntax `ip igmp snooping enable`

To disable IGMP snooping, use the `no ip igmp snooping enable` command.

Defaults Disabled.

Command Modes
- CONFIGURATION
- INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

To enable IGMP snooping, enter this command. When you enable this command from CONFIGURATION mode, IGMP snooping enables on all VLAN interfaces (except the default VLAN).

NOTE: Execute the `no shutdown` command on the VLAN interface for IGMP Snooping to function.

ip igmp snooping fast-leave

Enable IGMP snooping fast-leave for this VLAN.

Syntax

`ip igmp snooping fast-leave`

To disable IGMP snooping fast leave, use the `no igmp snooping fast-leave` command.

Defaults

Not configured.

Command Modes

INTERFACE VLAN — (conf-if-vl-*n*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information Queriers normally send some queries when a leave message is received prior to deleting a group from the membership database. There may be situations when you require a fast deletion of a group. When you enable IGMP fast leave processing, the switch removes an interface from the multicast group as soon as it detects an IGMP version 2 leave message on the interface.

ip igmp snooping last-member-query-interval

The last member query interval is the maximum response time inserted into Group-Specific queries sent in response to Group-Leave messages.

Syntax `ip igmp snooping last-member-query-interval` *`milliseconds`*

To return to the default value, use the `no ip igmp snooping last-member-query-interval` command.

Parameters

milliseconds Enter the interval in milliseconds. The range is from 100 to 65535. The default is **1000 milliseconds**.

Defaults **1000 milliseconds**

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.

Version	Description
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information This last-member-query-interval is also the interval between successive Group-Specific Query messages. To change the last-member-query interval, use this command.

ip igmp snooping mrouter

Statically configure a VLAN member port as a multicast router interface.

Syntax `ip igmp snooping mrouter interface` *`interface`*

To delete a specific multicast router interface, use the `no igmp snooping mrouter interface` *`interface`* command.

Parameters

interface ***interface*** Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Not configured.

Command Modes INTERFACE VLAN — (conf-if-vl-*n*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information

The Dell EMC Networking OS provides the capability of statically configuring the interface to which a multicast router is attached. To configure a static connection to the multicast router, enter the `ip igmp snooping mrouter interface` command in the VLAN context. The interface to the router must be a part of the VLAN where you are entering the command.

ip igmp snooping querier

Enable IGMP querier processing for the VLAN interface.

Syntax

`ip igmp snooping querier`

To disable IGMP querier processing for the VLAN interface, use the `no ip igmp snooping querier` command.

Defaults

Not configured.

Command Modes

INTERFACE VLAN — (conf-if-vl-*n*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information This command enables the IGMP switch to send General Queries periodically. This behavior is useful when there is no multicast router present in the VLAN because the multicast traffic is not routed. Assign an IP address to the VLAN interface for the switch to act as a querier for this VLAN.

show ip igmp snooping groups

Display snooping related information for all the IGMP groups, interface or one group of one interface.

Syntax `show ip igmp snooping groups [group-address [detail] | detail | interface [group-address [detail]]]`

Parameters

snooping	Enter the keyword `snooping` to display snooping related information.
group-address	(OPTIONAL) Enter the group address in dotted decimal format to view information on that group only.
interface	(OPTIONAL) Enter the interface type and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
detail	(OPTIONAL) Enter the keyword `detail` to display the IGMPv3 source information.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, Z9000, and Z9500.

Usage Information

This command displays the IGMP database, including configured entries for either all groups on all interfaces, all groups on specific interfaces, or specific groups on specific interfaces.

The following describes the `show ip igmp groups` command shown in the following example.

Field	Description
Group Address	Lists the multicast address for the IGMP group.
Interface	Lists the interface type, slot and port number.
Mode	Displays the IGMP version used.
Uptime	Displays the amount of time the group has been operational.
Expires	Displays the amount of time until the entry expires.
Last Reporter	Displays the IP address of the last host to be a member of the IGMP group.
Member Ports	Indicates the port channel. If the port channel is VLT, an asterisk (*) after the port channel number indicates the port channel is locally down and that a remote VLT port is up.

Example

```
DellEMC# show ip igmp snooping groups
Total Number of Groups: 1
IGMP Connected Group Membership
Group Address    Interface      Mode          Uptime    Expires   Last
Reporter
225.1.1.1        Vlan 10       IGMPv2-Compat  00:00:07  00:02:09  1.1.1.2
  Member Ports: Tf 1/17
DellEMC#
```

show ip igmp snooping mrouter

Display multicast router interfaces.

Syntax `show ip igmp snooping mrouter [vlan number]`

Parameters

vlan *number*	Enter the keyword `vlan` then the vlan number. The range is from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information

If the port channel is a VLT port channel, an asterisk (*) after the port channel number (Po 100*) indicates the port channel is locally down and that a remote VLT port is up.

Example

```
DellEMC# show ip igmp snooping mrouter
Interface Router Ports
Vlan 2 Tf 1/3, Po 1
DellEMC#
```

Related Commands

- ip igmp snooping mrouter — configure a static connection to the multicast router.
- show ip igmp groups — view groups.

22

Interfaces

To configure egress, port channel, time domain, and UDP, use these interface commands.

Topics:

- Basic Interface Commands
- Port Channel Commands
- Enhanced Validation of Interface Ranges
- ip http source-interface

Basic Interface Commands

The following commands are for Physical, Loopback, and Null interfaces.

clear counters

Clear the counters displayed in the show interfaces commands for all virtual router redundancy protocol (VRRP) groups, virtual local area networks (VLANs), and physical interfaces, or selected ones.

Syntax `clear counters [interface | vrrp {vr-id | ipv6 vr-id} | learning-limit | vlan vlan-id]`

Parameters

interface (OPTIONAL) Enter any of the following keywords and the interface information to clear counters from a specified interface:

- For IPv4 access-group counters, enter the keyword `ip`.
- For IPv6 access-group counters, enter the keyword `ipv6`.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For MAC access-group counters, enter the keyword `mac`.
- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For the management interface, enter the keyword `ManagementEthernet` then slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a tunnel interface, enter the keyword `tunnel`. The range is from 1 to 16383.

NOTE: This command also enables you to clear the port configurations corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

vrrp [ipv6 {vr-id} | vr-id] (OPTIONAL) Enter the keyword `vrrp` to clear the counters of all VRRP groups. To clear the counters of VRRP groups on all IPv6 interfaces, enter `ipv6`. To clear the counters of a specified group, enter a VRID number from 1 to 255.

learning-limit (OPTIONAL) Enter the keywords `learning-limit` to clear unknown source address (SA) drop counters when MAC learning limit is configured on the interface.

vlan *vlan-id* Enter the keyword `vlan` followed by the interface VLAN number. The range is from 1 to 4094.

Defaults Without an interface specified, the command clears all interface counters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to clear the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Added the VLAN parameter.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.4.1.0	Added support (E-Series only) for VRRP groups in a VRF instance.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4093 VLANs on the E-Series. Prior to the release, 2094 was supported.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Updated the definition of the `learning-limit` option for clarity.

Example

```
DellEMC# clear counters
Clear counters on all interfaces [confirm]
DellEMC#
```

Related Commands

- mac learning-limit — allow aging of MACs even though a learning-limit is configured or disallow station move on learned MACs.

clear dampening

Clear the dampening counters on all the interfaces or just the specified interface.

Syntax `clear dampening [interface]`

Parameters

interface (OPTIONAL) Enter any of the following keywords and the interface information to clear counters from a specified interface:

- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults Without an interface specified, the command clears all interface dampening counters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC# clear dampening twentyFiveGigE 1/1
Clear dampening counters on twentyFiveGigE 1/1 [confirm] y
DellEMC#
```

Related Commands

- show interfaces dampening — display interface dampening information.
- dampening — configure dampening on an interface.

dampening

Configure dampening on an interface.

Syntax `dampening [[[[half-life] [reuse-threshold]] [suppress-threshold]] [max-suppress-time]]`

Parameters

half-life	Enter the number of seconds after which the penalty is decreased. The penalty decreases half after the half-life period expires. The range is from 1 to 30 seconds. The default is **5 seconds**.
reuse-threshold	Enter a number as the reuse threshold, the penalty value below which the interface state is changed to "up". The range is from 1 to 20000. The default is **750**.
suppress-threshold	Enter a number as the suppress threshold, the penalty value above which the interface state is changed to "error disabled". The range is from 1 to 20000. The default is **2500**.
max-suppress-time	Enter the maximum number for which a route can be suppressed. The default is four times the half-life value. The range is from 1 to 86400. The default is **20 seconds**.

Defaults Disabled.

Command Modes INTERFACE (conf-if-)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

With each flap, Dell EMC Networking OS penalizes the interface by assigning a penalty (1024) that decays exponentially depending on the configured half-life. After the accumulated penalty exceeds the suppress threshold value, the interface moves to the Error-Disabled state. This interface state is deemed as "down" by all static/dynamic Layer 2 and Layer 3 protocols. The penalty is exponentially decayed based on the half-life timer. After the penalty decays below the reuse threshold, the interface enables. The configured parameters are as follows:

- `suppress-threshold` should be greater than `reuse-threshold`
- `max-suppress-time` should be at least 4 times `half-life`

NOTE: You cannot apply dampening on an interface that is monitoring traffic for other interfaces.

Example

```
DellEMC(conf-if-tf-1/10)# dampening 20 800 4500 120
DellEMC(conf-if-tf-1/10)#
```

Related Commands

- clear dampening — clear the dampening counters on all the interfaces or just the specified interface.
- show interfaces dampening — display interface dampening information.

description

Assign a descriptive text string to the interface.

Syntax `description desc_text`

To delete a description, use the `no description` command.

Parameters

desc_text	Enter a text string up to 240 characters long.

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Modified for E-Series: Revised from 78 to 240 characters.

Usage Information

Important Points to Remember:

- To use special characters as a part of the description string, you must enclose the whole string in double quotes.
- Spaces between characters are not preserved after entering this command unless you enclose the entire description in quotation marks (“*desc_text*”).
- Entering a text string after the `description` command overwrites any previous text string that you previously configured as the description.
- The `shutdown` and `description` commands are the only commands that you can configure on an interface that is a member of a port-channel.
- Use the `show interfaces description` command to display descriptions configured for each interface.

default interface

Reset a physical interface to its factory default settings.

Syntax `default interface` *`interface-type slot/port - range`*

Parameters

***interface-type slot/port*[*/subport*]**	Enter the interface type and slot/port [/subport] information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port/subport information.
range	• For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1 - 4`. • For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1/1 - 1/1/4`.

Defaults None

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048-ON, S4048-ON, S5000, S6000, S6000–ON, and Z9500.

Usage Information

Use the `default interface` command to set a Gigabit Ethernet, 10- Gigabit Ethernet, or 40-Gigabit Ethernet interface to its factory-default state. By default, a physical interface is disabled (shutdown) with no assigned IP address or switchport (no ip address). This command removes all software settings and all L3, VLAN, VXLAN, and port-channel configurations on a physical interface.

Example

```
DellEMC(conf-if-tf-1/5)# show config
!
interface twentyFiveGigE 1/5
 description testconfig
 no ip address
 portmode hybrid
 switchport
 rate-interval 8
 mac learning-limit 10 no-station-move
 no shutdown
DellEMC(conf-if-tf-1/5)#

DellEMC(conf)# default interface twentyFiveGigE 1/5

DellEMC(conf-if-tf-1/5)# show config
!
interface TwentyFiveGigE 1/5
 no ip address
 shutdown
```

Related Commands

- show running-config – display the current configuration.

duplex (10/100 Interfaces)

Configure duplex mode on the Management Interface interfaces where the speed is set to 10/100.

Syntax

`duplex {half | full}`

To return to the default setting, use the `no duplex` command.

Parameters

half	Enter the keyword `half` to set the physical interface to transmit only in one direction.
full	Enter the keyword `full` to set the physical interface to transmit in both directions.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced

Usage Information

This command applies to any physical interface with speed set to 10/100.

NOTE: Starting with Dell EMC Networking OS version 7.8.1.0, when you use a copper SFP2 module with catalog number GP-SFP2-1T in the S25P model of the S-Series, you can manually set its speed with the `speed` command. When you set the speed to 10 Mbps or 100 Mbps, you can also execute the `duplex` command.

Related Commands

- negotiation auto — enable or disables auto-negotiation on an interface.

disable stack-unit phy temp polling

Disable physical temperature polling for 10GBase-T optical ports.

Syntax

`disable stack-unit` *`unit-number`* `port` *`port-number`* `phy temp polling`

To enable physical temperature polling, use the `enable stack-unit` *`unit-number`* `port` *`port-number`* `phy temp polling` command.

Parameters

stack-unit *unit-number*	Enter the keyword `stack-unit` then the *`unit-number`* for which you want to disable temperature polling. The range is from 1 to 6.
port *port-number*	Enter the keyword `port` then the *`port-number`* for which you want to disable temperature polling. The range is from 1 to 48.

Defaults

Enabled

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S4048–ON and S5048F-ON.

Usage Information

This feature is applicable only for 10GBase-T optical ports.

NOTE: It is not supported for stacking ports.

enable stack-unit phy temp polling

Enable physical temperature polling for 10GBase-T optical ports.

Syntax

`enable stack-unit` *`unit-number`* `port` *`port-number`* `phy temp polling`

To disable physical temperature polling, use the `disable stack-unit` *`unit-number`* `port` *`port-number`* `phy temp polling` command.

Parameters

stack-unit *unit-number* Enter the keyword `stack-unit` then the *`unit-number`* for which you want to enable temperature polling. The range is from 1 to 6.

port *port-number* Enter the keyword `port` then the *`port-number`* for which you want to enable temperature polling. The range is from 1 to 48.

Defaults

Enabled

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S4048–ON and S5048F-ON.

Usage Information

This feature is applicable only for 10GBase-T optical ports.

NOTE: It is not supported for stacking ports.

enable stack-unit transceiver

Enable the 10GBase-T optical port that is reset due to high temperature to normal mode.

Syntax

`enable stack-unit` *`unit-number`* `port` *`port-number`* `transceiver`

Parameters

stack-unit *unit-number* Enter the keyword `stack-unit` then the *`unit-number`* for which you want to enable temperature polling. The range is from 1 to 6.

port *port-number* Enter the keyword `port` then the *`port-number`* for which you want to enable temperature polling. The range is from 1 to 48.

Defaults

Enabled

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S4048–ON and S5048F-ON.

Usage Information

This feature is applicable only for 10GBase-T optical ports.

NOTE: It is not supported for stacking ports.

encapsulation dot1q

Configures lite-subinterfaces.

Syntax

`encapsulation dot1q vlan-id`

To remove a previously configured lite-subinterface, use the `no encapsulation dot1q vlan-id` command.

Parameters

dot1q *vlan-id*	Enter the keyword `dot1q` followed by the VLAN ID to which the host belongs. The range is from 1 to 4094. A lite subinterface is considered as a Layer 3 port property and is synchronous with the existing rules of applying Layer 2 or Layer 3 properties to an interface.

Command Modes

INTERFACE

Command History

Version	Description
9.12.1.0	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.3.0.0	Introduced on the S6000.
9.2(1.0)	Introduced on the Z9500.

Usage Information

To enable routing of RRoCE packets, the VLAN ID is mapped to the default VLAN ID of 4095 and this mapping is performed using VLAN translation. After VLAN translation, the RRoCE packets are considered in the same manner as normal IP packets that received on L3 interface and routed in the egress direction. At the egress interface, the VLAN ID is appended to the packet and transmitted out of the interface as a tagged packet with the dot1Q value preserved. The dot1Q value is preserved only for egress interfaces that are associated with a VLAN or a lite-subinterface . If a Layer 3 interface is configured without the encapsulation 802.1Q VLAN ID or is an untagged interface in a VLAN , the dot1Q value is not preserved .

errdisable recovery cause

Enable automatic recovery of an interface from the Err-disabled state.

Syntax

`errdisable recovery cause {bpduguard | fefd | maclearnlimit | arp-inspection}`

To disable the automatic recovery, use the `no errdisable recovery cause {bpduguard | fefd | maclearnlimit | arp-inspection}` command.

Parameters

bpduguard	Enter the keyword `bpduguard` to enable the timer to recover the interface from BPDU Guard error.
fefd	Enter the keyword `fefd` to enable the timer to recover the interface from FEFD error.
maclearnlimit	Enter the keyword `maclearnlimit` to enable the timer to recover the interface from MAC learning limit error.
arp-inspection	Enter the keyword `arp-inspection` to enable the timer to recover the interface from an arp-inspection error.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced `arp-inspection` option.
9.14(0.0)	Introduced on the platforms S4048–ON, S6100–ON, Z9100–ON, S4048T-ON, S3048–ON, S6000, S6010–ON, S5048F-ON, FN-IOM and MXL.
9.13(0.2P2)	Introduced on the S3100.

Usage Information This command has to be configured before the interface moves to Err-disabled state. If not, the recovery action is not performed.

Related Commands errdisable recovery interval— Configure recovery timer interval for an interface.

errdisable recovery interval

Configure recovery time interval to move an interface from the Err-disabled state.

Syntax `errdisable recovery interval` *`seconds`*

To remove the configured recovery time interval, use the `no errdisable recovery interval` *`seconds`* command.

Parameters

interval *seconds* Enter the keyword `interval` and the number of seconds to recover the interface from Err-disabled state. The range is from 30 to 86,400 seconds. The default is 300 seconds.

Defaults 300 seconds.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the platforms S4048–ON, S6100–ON, Z9100–ON, S4048T-ON, S3048–ON, S6000, S6010–ON, S5048F-ON, FN-IOM, and MXL.
9.13(0.2P2)	Introduced on the S3100.

Usage Information Whenever the Err-disable recovery timer is reconfigured, it will get effective only after the current timer expires. Following message is displayed after each Err-disable recovery timer configuration:

```
DellEMC(conf)# errdisable recovery interval 30
New timer interval will be effective from the next timer instance only.
```

Related Commands errdisable recovery cause — Enable automatic recovery of an interface from the error disabled state.

fec default

Set the FEC to default value.

Syntax `fec default`

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Related Commands fec enable — enables FEC on the interface.

fec enable

Enable FEC on the interface.

Syntax `fec enable {cl91|cl74|cl108}`

To disable FEC, use the `no fec enable` command.

Parameters

cl91	Enables CL91 FEC (Reed Solomon Forward Error Correction) on 100G interfaces. The system displays an error message when this is applied on 25G or 50G interfaces.
cl74	Enables CL74 FEC (BaseR-FEC or Firecode Forward Error Correction) on 25G or 50G interfaces. The system displays an error message when this is applied on 100G interfaces.
cl108	Enables CL108 FEC (RS-FEC for single 25G lane) on 25G or 50G interfaces. The system displays an error message when this is applied on 100G interfaces.

Defaults Enabled on 25G and 50G interfaces

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Enabled on 25G and 50G interfaces on the Z9100–ON by default. Introduced support to enable or disable FEC independent of autonegotiation for 100G interfaces on the S6100–ON and Z9100–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information

This command is not applicable for 10–Gigabit and 40–Gigabit Ethernet interfaces.

You can enable or disable FEC and auto negotiation irrespective of each other on 100G interfaces.

For 100G interfaces, CR4 auto-negotiation is enabled based on the media type. Autonegotiation is enabled on DAC cables by default.

Example

```
DellEMC#show interfaces hu 1/49
hundredGigE 1/49 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:2c:8b:82
    Current address is 34:17:eb:2c:8b:82
Non-qualified pluggable media present, QSFP28 type is 100GBASE-CR4-3M
    AutoNegotiation is OFF
    Forward Error Correction(FEC) configured is cl91
    FEC status is cl91
```

```
DellEMC(conf-if-tf-1/3)#do show int tw 1/3
twentyFiveGigE 1/3 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:0c:02
    Current address is 34:17:eb:37:0c:02
Pluggable media present, SFP28 type is 25GBASE-CR1-1M
    AutoNegotiation is ON
    Forward Error Correction(FEC) configured is cl74
    FEC status is cl74
```

```
DellEMC(conf-if-tf-1/3)#do show int tw 1/3
twentyFiveGigE 1/3 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:0c:02
    Current address is 34:17:eb:37:0c:02
Pluggable media present, SFP28 type is 25GBASE-CR1-1M
    AutoNegotiation is ON
    Forward Error Correction(FEC) configured is cl108
    FEC status is cl108
```

```
DellEMC(conf-if-fi-1/51/1)#do show int fi 1/51/1
fiftyGigE 1/51/1 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:0c:02
    Current address is 34:17:eb:37:0c:02
Pluggable media present, QSFP28 type is 2x50GBASE-CR2-1M
    AutoNegotiation is ON
    Forward Error Correction(FEC) configured is cl74
    FEC status is cl74
    OUI is 0x6a737d
```

```
DellEMC(conf-if-fi-1/51/1)#do show int fi 1/51/1
fiftyGigE 1/51/1 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:0c:02
    Current address is 34:17:eb:37:0c:02
Pluggable media present, QSFP28 type is 2x50GBASE-CR2-1M
    AutoNegotiation is ON
    Forward Error Correction(FEC) configured is cl108
    FEC status is cl108
```

Related Commands

fec default — sets the FEC to default value.show config — displays the interface configuration.

flowcontrol

Control how the system responds to and generates 802.3x pause flow control frames.

Syntax

```
flowcontrol {rx {off | on} tx {off | on} [negotiate | pause-threshold value
| resume-offset value] | [monitor session-ID]}
```

To return to the default, use the `no` form of this command.

Parameters

rx on	Enter the keywords `rx on` to process the received flow control frames on this port. **NOTE:** Flow-control packets are mirrored only when flow-control `rx` is enabled on an interface.
rx off	Enter the keywords `rx off` to ignore the received flow control frames on this port.
tx on	Enter the keywords `tx on` to send control frames from this port to the connected device when a higher rate of traffic is received.
tx off	Enter the keywords `tx off` so that flow control frames are not sent from this port to the connected device when a higher rate of traffic is received.
pause-threshold	Enter the buffer threshold limit for generating `PAUSE` frames.
resume-offset	Enter the offset value for generating `PAUSE` frames to resume traffic.
negotiate	(Optional) Enter the keyword `negotiate` to enable the pause-negotiation with the egress port of the peer device. If the `negotiate` command is not used, pause-negotiation is disabled. 40-gigabit Ethernet interfaces do not support pause-negotiation
monitor	Enter the keyword `monitor` then the session-ID to enable mirror flow control frames on the interface. The range is from 0 to 65535.

Defaults **rx off tx off**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Added support for monitor session.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6.0.0	Added support for the negotiate feature on the S4810 and S4820T.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
6.5.1.9 and 7.4.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series with the `thresholds` option.

Usage Information

The globally assigned 48-bit multicast address 01-80-C2-00-00-01 is used to send and receive pause frames. To allow full-duplex flow control, stations implementing the pause operation instruct the MAC to enable the reception of frames with a destination address equal to this multicast address.

When a port receives traffic at a higher rate than it can process, the frames are stored in the port buffer. As a result, buffer usage increases. When the buffer usage reaches the value specified in the "pause-threshold" argument, the port sends PAUSE frame to the connected link partner to stop sending the traffic. Eventually this reduces the buffer usage. When the buffer usage drops by the value specified in the "resume-threshold", the port again sends a PAUSE frame with 0 as wait-time. This results in resume of the paused traffic flow.

Important Points to Remember

- Do not enable `tx pause` when buffer carving is enabled. For information and assistance, consult Dell EMC Networking TAC.
- The only configuration applicable to half duplex ports is `rx off tx off`. The following error is returned:

  ```
  Can't configure flowcontrol when half duplex is configure, config ignored
  ```

- Half duplex cannot be configured when the flow control configuration is on (default is `rx on tx on`). The following error is returned:

  ```
  Can't configure half duplex when flowcontrol is on, config ignored
  ```

NOTE: The flow control must be off (`rx off tx off`) before configuring the half duplex.

- Speeds less than one Gig cannot be configured when the asymmetric flow control configuration is on. The following error is returned:

  ```
  Can't configure speed <1G when Asymmetric flowcontrol is on, config
  ignored
  ```

- Dell EMC Networking OS only supports `rx on tx on` and `rx off tx off` for speeds less than one Gig (Symmetric).

NOTE: If you use the `disable rx flow control` command, Dell EMC Networking recommends rebooting the system.

NOTE: Dell EMC Networking OS does not support mirroring of `tx` pause frames.

Example

```
DellEMC(conf-if-tf-1/1)# show config
!
interface twentyFiveGigE 1/1
no ip address
switchport
no negotiation auto
flowcontrol rx off tx on
no shutdown
...
```

Example (Monitor Session)

```
DellEMC(conf-if-tf-1/1)#show config
!
interface twentyFiveGigE 1/1
 no ip address
```

```
 shutdown
flowcontrol monitor 5
```

Example (Values)

This Example shows how Dell EMC Networking OS negotiates the flow control values between two Dell EMC Networking chassis connected back-to-back using 1G copper ports.

```
Configured
LocRxConf LocTxConf RemoteRxConf RemoteTxConf
off       off        off           off
                     off           on
                     on            off
                     on            on

off       on         off           off
                     off           on
                     on            off
                     on            on

on        off        off           off
                     off           on
                     on            off
                     on            on

on        on         off           off
                     off           on
                     on            off
                     on            on

LocNegRx LocNegTx RemNegRx RemNegTx
off      off      off      off
off      off      off      off
off      off      off      off
off      off      off      off

off      off      off      off
off      off      off      off
off      on       on       off
off      off      off      off

off      off      off      off
on       off      off      on
on       on       on       on
on       on       on       on

off      off       off     off
off      off       off     off
on       on        on      on
on       on        on      on
```

interface

Configure a physical or virtual interface on the switch.

Syntax `interface interface`

Parameters

interface Enter one of the following keywords and the interface information:

- For a null interface, enter the keyword `null` then the slot/port information. The Null interface number is 0.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added the support for interfaces.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced

Usage Information You cannot delete a physical interface.

By default, physical interfaces are disabled (`shutdown`) and are not assigned to an IP address or switchport. To place an interface in Layer 2 mode, ensure that the interface's configuration does not contain an IP address and enter the `switchport` command.

You can create up to 64 tunnel interfaces. The tunnel is added as a logical interface with no default configuration. To delete a tunnel interface, use the `no interface tunnel` *`tunnel-id`* command.

The tunnel interface operates as an ECMP (equal cost multi path) only when the next hop to the tunnel destination is over a physical interface. If you select any other interface as the next hop to the tunnel destination, the tunnel interface does not operate as an ECMP.

Example

```
DellEMC(conf)# int twentyFiveGigE 1/1
DellEMC(conf-if-tf-1/1)# exit
DellEMC(conf)#
```

```
DellEMC(conf)# int HundredGigE 1/49
DellEMC(conf-if-hu-1/49)# exit
DellEMC(conf)#
```

```
DellEMC(conf)# int FortyGigE 1/49/1
DellEMC(conf-if-fo-1/49/1)# exit
DellEMC(conf)#
```

```
DellEMC(conf)# int TwentyfiveGigE 1/10
DellEMC(conf-if-tf-1/10)# exit
DellEMC(conf)#
```

Related Commands

- interface loopback — configure a Loopback interface.
- interface null — configure a Null interface.
- interface port-channel — configure a port channel.
- interface vlan — configure a VLAN.

interface group

Create or delete group of VLANs with a single command. You can also use this command to apply a set of configurations on a group of interfaces.

Syntax

```
interface group [interface | vlan vlanid {- vlanid } ]
```

To delete a range of VLANs, use the following command:

```
no interface group vlan vlanid {- vlanid}
```

Parameters

interface, interface,... Enter the keywords `interface group` and one of the interfaces — slot/port or VLAN number. Select the range of interfaces for bulk configuration. Spaces are not required between the commas. Comma-separated ranges can include VLANs and physical interfaces.

Enter the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination. For example: VLAN IDs (comma-separated): 3, 4, 6. Range (hyphen-separated): 5-10.

Slot/Port information need not contain a space before and after the dash. For example, both of the following commands are valid: `interface group twentyFiveGigE 1/1 - 1/4; interface group twentyFiveGigE 1/1-1/5 .`

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information The `interface group` command will create all the non-existent VLANs specified in the range. On successful command execution, the CLI switches to the interface group context.

The configuration commands inside the group context will be the similar to that of the existing range command.

Note: For release 9.4(0.0), the group command is supported only for VLANs and physical interfaces.

Example

```
DellEMC(conf)#interface group ?
fiftyGigE               FiftyGigabit Ethernet interface
fortyGigE               FortyGigabit Ethernet interface
gigabitethernet         GigabitEthernet interface IEEE 802.3z
hundredGigE             HundredGigabit Ethernet interface
tengigabitethernet      TenGigabit Ethernet interface
twentyFiveGigE          TwentyFiveGigabit Ethernet interface
vlan                    VLAN keyword

DellEMC(conf)# interface group vlan 1 - 2 , twentyFiveGigE 1/1
DellEMC(conf-if-group-vl-1-2,tf-1/1)# no shutdown
DellEMC(conf-if-group-vl-1-2,tf-1/1)# end
```

Related Commands
- interface range — configure a range of interfaces.
- interface vlan — configures a VLAN.

interface loopback

Configure a Loopback interface.

Syntax `interface loopback number`

To remove a loopback interface, use the `no interface loopback number` command.

Parameters

number Enter a number as the interface number. The range is from 0 to 16383.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced

Example

```
DellEMC(conf)# interface loopback 1655
DellEMC(conf-if-lo-1655)#
```

Related Commands

- interface — configure a physical interface.
- interface null — configure a Null interface.
- interface port-channel — configure a port channel.
- interface vlan — configure a VLAN.

interface managementEthernet

Configure the Management port on the system (either the Primary or Standby RPM).

Syntax `interface managementEthernet slot/port`

Parameters ***slot/port***

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.11.1	Introduced on the S55, S60, and S4810.
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced

Usage Information

You cannot delete a Management port.

The Management port is enabled by default (`no shutdown`). To assign an IP address to the Management port, use the `ip address` command.

Example

```
DellEMC(conf)# interface managementethernet 1/1
DellEMC(conf-if-ma-1/1)#
```

Related Commands

- management route — configure a static route that points to the Management interface or a forwarding router.
- speed (Management interface) — Set the speed for the Management interface.

interface null

Configure a Null interface on the switch.

Syntax `interface null number`

Parameters

number	Enter zero (0) as the Null interface number.

Defaults Not configured; number = **0**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Introduced

Usage Information

You cannot delete the Null interface. The only configuration command possible in a Null interface is `ip unreachables`.

Example

```
DellEMC(conf)# interface null 0
DellEMC(conf-if-nu-0)#
```

Related Commands

- interface — configure a physical interface.
- interface loopback — configure a Loopback interface.
- interface port-channel — configure a port channel.
- interface vlan — configure a VLAN.
- ip unreachables — enable generation of internet control message protocol (ICMP) unreachable messages.

interface range

This command permits configuration of a range of interfaces to which subsequent commands are applied (bulk configuration). Using the `interface range` command, you can enter identical commands for a range of interface.

Syntax

```
interface range interface {slot/port[subport] | port} — {slot/port[subport] | port}, interface {slot/port[/subport] | port} — {slot/port[/subport] | port},...
```

Parameters

***interface* {slot/port[subport] | port} — {slot/port[subport] | port}, *interface* {slot/port[subport] | port} — {slot/port[subport] | port},...**

Enter `interface range` and one of the interfaces and then the interface information. Select the range of interfaces for bulk configuration. You can enter up to six comma-separated ranges. Spaces are not required between the commas. The ranges can include VLANs, port-channels, and physical interfaces.

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport][/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

- For a Tunnel interface, enter the keyword `Tunnel` then a number from 1 to 16383.

Defaults None

Command Modes CONFIGURATION

CONFIGURATION TERMINAL BATCH

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Updated the error message when no ports are configured within the specified interface range.
9.13(0.0)	Introduced the Configuration Terminal Batch mode on C9010.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P2)	Introduced on the S4038-ON.
9.8(0.0P5)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.2.1.0	Added support for 4093 VLANs on E-Series. Prior releases supported 2094.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information When creating an interface range, interfaces appear in the order they are entered; they are not sorted. The command verifies that interfaces are present (physical) or configured (logical).

Important Points to Remember:

- Bulk configuration is created if at least one interface is valid.
- Non-existing interfaces are excluded from the bulk configuration with a warning message.
- The `interface range` prompt includes interface types with slot/port[/subport] information for valid interfaces. The prompt allows for a maximum of 32 characters. If the bulk configuration exceeds 32 characters, it is represented by an ellipsis (...).
- When the `interface range` prompt has multiple port ranges, the smaller port range is excluded from the prompt.
- If overlapping port ranges are specified, the port range is extended to the smallest start port and the biggest end port.

Example (If atleast one port is configured)

```
DellEMC(conf)# interface range twentyFiveGigE 1/10 - 1/25, fortyGigE
1/49/1, twentyFiveGigE 1/27 - 1/32
% Warning: Non-existing ports (not configured) are ignored by
interface-range
```

```
DellEMC(conf)# interface range fortyGigE 1/49/1 - 1/50/1, HundredGigE
1/51, fortyGigE 1/52/1
% Warning: Non-existing ports (not configured) are ignored by
interface-range
```

Example (If no ports are configured within the specified interface range)

```
DellEMC(conf)# interface range twentyFiveGigE 1/10 - 1/25, fortyGigE
1/49/1, twentyFiveGigE 1/27 - 1/32
% Error: No port is configured in interface range
```

```
DellEMC(conf)# interface range fortyGigE 1/49/1 - 1/50/1, HundredGigE
1/51, fortyGigE 1/52/1
% Error: No port is configured in interface range
```

Example (Configuration Terminal Batch Mode)

```
DellEMC(conf-b)#interface range te 1/1-4
DellEMC(conf-if-range-te-1/1-4)#
```

Example (Multiple Ports)

```
DellEMC(conf)# interface range twentyFiveGigE 1/1 - 1/12, twentyFiveGigE
1/3 - 1/9
DellEMC(conf-if-range-tf-1/1-1/12)#
```

Example (Overlapping Ports)

```
DellEMC(conf)# interface range twentyFiveGigE 1/1 - 1/10, twentyFiveGigE
 1/1 - 1/20
DellEMC(conf-if-range-tf-1/1-1/20)#
```

Usage Information

Only VLAN and port-channel interfaces created using the `interface vlan` and `interface port-channel` commands can be used in the `interface range` command.

Use the `show running-config` command to display the VLAN and port-channel interfaces. VLAN or port-channel interfaces that are not displayed in the `show running-config` command cannot be used with the bulk configuration feature of the `interface range` command. You cannot create virtual interfaces (VLAN, Port-channel) using the `interface range` command.

NOTE: If a range has VLAN, physical and port-channel interfaces, only commands related to physical interfaces can be bulk configured. To configure commands specific to VLAN and port-channel only those respective interfaces should be configured in a particular range.

Example (Single Range)

This example shows a single range bulk configuration.

```
DellEMC(config)# interface range twentyFiveGigE 1/1 - 1/7
DellEMC(config-if-range-tf-1/1-1/7)# no shutdown
```

Example (Multiple Range)

This example shows how to use commas to add different interface types to a range of interfaces.

```
DellEMC(config-if)# interface range twentyFiveGigE 1/1 - 1/20,
hundredGigE 1/49 - 1/53
DellEMC(config-if-range-tf-1/1-1/20,hu-1/49-1/53)# no shutdown
```

Example (Multiple Range)

This example shows how to use commas to add VLAN and port-channel interfaces to the range.

```
DellEMC(config-if)# interface range twentyFiveGigE 1/1 - 1/20,
twentyFiveGigE 1/23 -1/24,
Vlan 2-100, Port 1-25
DellEMC(config-if-range-tf-1/1-1/20,tf-1/23-1/24,vl-2-100,po-1-25)# no
```

```
shutdown
DellEMC(config-if-range)#
```

Example (Batch Mode Configuration)

Primary VLT

```
DellEMC(conf-b)#int range Tengigabitethernet 3/0 - 5
DellEMC(conf-if-range-te-3/0-5)#mtu 4500
DellEMC(conf-if-range-te-3/0-5)#exit
DellEMC(conf-b)#show conf
interface range tengigabitethernet 3/0 - 5
mtu 4500
DellEMC(conf-b)#commit
DellEMC(conf-b)#Dec  6 11:30:45 %RPM1-P:CP %CLIBATCH-6-
CLI_BATCH_CONFIG_IN_PROGRESS_TRAP: Batch configuration commit is in
progress
Dec  6 11:30:45 %RPM1-P:CP %CLIBATCH-6-CLI_BATCH_CONFIG_COMPLETE_TRAP:
Batch configuration commit is success
```

Secondary VLT

```
Dec  6 10:43:17 %RPM1-P:CP %CLIBATCH-6-
CLI_BATCH_CONFIG_IN_PROGRESS_TRAP: Batch configuration commit is in
progress
Dec  6 10:43:18 %RPM1-P:CP %CLIBATCH-6-CLI_BATCH_CONFIG_COMPLETE_TRAP:
Batch configuration commit is success
```

Related Commands

- interface port-channel — configure a port channel group.
- interface vlan — configure a VLAN interface.
- show config (from INTERFACE RANGE mode) — display the bulk configuration interfaces.
- show range — display the bulk configuration ranges.
- interface range macro (define) — define a macro for an interface-range.

interface range macro (define)

Defines a macro for an interface range and then saves the macro in the running configuration.

Syntax `define interface range macro` *name interface* , *interface* , ...

Parameters

name	Enter up to 16 characters for the macro name.
interface, interface,...	Enter the keywords `interface range` and the interface information. Select the range of interfaces for bulk configuration. You can enter up to six comma-separated ranges. Spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels, and physical interfaces. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.2.1.0	Added support for 4093 VLANs on E-Series. Prior releases supported 2094.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example (Single Range)

This example shows how to define an interface range macro named test. Execute the `show running-config` command to display the macro definition.

```
DellEMC(config)# define interface-range test twentyFiveGigE  1/1 - 1/3,
twentyFiveGigE  1/5 - 1/7, twentyFiveGigE  1/11 - 1/18

DellEMC# show running-config | grep define
define interface-range test twentyFiveGigE  1/1 - 1/3, twentyFiveGigE
1/5 - 1/7,
twentyFiveGigE  1/11 - 1/18
DellEMC(config)# interface range macro test
DellEMC(config-if-range-tf-1/1-1/3,tf-1/5-1/7,tf-1/11-1/18)#
```

```
DellEMC(config)# define interface-range test HundredGigE 1/49 - 1/50,
HundredGigE 1/52 - 1/53

DellEMC# show running-config | grep define
define interface-range test HundredGigE 1/49 - 1/50, HundredGigE 1/52 -
1/53
DellEMC(config)# interface range macro test
DellEMC(config-if-range-hu-1/49-1/50,hu-1/52-1/53)#
```

Related Commands

- interface range – configure a range of command (bulk configuration).
- interface range macro name – run an interface range macro.

interface range macro name

Run the interface-range macro to automatically configure the pre-defined range of interfaces.

Syntax `interface range macro name`

Parameters

name	Enter the name of an existing macro.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.0	Introduced

Example (Single Range) This example shows the macro named *test* that was defined earlier.

```
DellEMC(config)# interface range macro test
DellEMC(config-if-range-tf-1/1-1/3,tf-1/4-1/6,tf-1/11-1/22)#
Dell
```

Related Commands

- interface range — configure a range of command (bulk configuration).
- interface range macro (define) — define a macro for an interface range (bulk configuration).

interface vlan

Configure a VLAN. You can configure up to 4094 VLANs.

Syntax `interface vlan vlan-id [of-instance{of-id}]`

Parameters

vlan-id	Enter a number as the VLAN Identifier. The range is from 1 to 4094.

of-instance{*of-id*}	Enter the keyword **of-instance** then the OpenFlow instance ID to add the VLAN to the specified OpenFlow instance. The range is from 1 to 8. **NOTE:** Associate the OpenFlow instance with the VLAN when the VLAN is created. An existing VLAN cannot be associated with an OpenFlow instance.

Defaults

Not configured, except for the Default VLAN, which is configured as VLAN 1.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1.(0.0)	Introduced on the S4810; added support for OpenFlow.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Usage Information

For more information about VLANs and the commands to configure them, see Virtual LAN (VLAN) Commands.

FTP, TFTP, and SNMP operations are not supported on a VLAN. MAC ACLs and IP ACLs are supported. For more information, see Access Control Lists (ACL).

The following features are not supported on VLANs associated with an OpenFlow instance:

- IPv4
- IPv6
- MTU

If OpenFlow VLANs are configured on the switch, spanning-tree protocols cannot be enabled simultaneously.

Example (Single Range)

```
DellEMC(conf)# int vlan 3
DellEMC(conf-if-vl-3)#
```

Related Commands

- interface — configure a physical interface.
- interface loopback — configure a loopback interface.
- interface null — configure a null interface.
- interface port-channel — configure a port channel group.
- show vlan — display the current VLAN configuration on the switch.
- shutdown — disable/enable the VLAN.
- tagged — add a Layer 2 interface to a VLAN as a tagged interface.
- untagged — add a Layer 2 interface to a VLAN as an untagged interface.

intf-type cr1 autoneg

Enable Clause 73 autonegotiation on a 25G CR1 interface.

Syntax

```
intf-type cr1 autoneg
```

Defaults

Not configured

To disable Clause 73 autonegotiation on a 25G CR1 interface, use the no `intf-type cr1 autoneg` command.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on the Z9100–ON.

Example

```
DellEMC(conf-if-tf-1/1)#intf-type cr1 autoneg
DellEMC(conf-if-tf-1/1)#no intf-type cr1 autoneg
```

intf-type cr2 autoneg

Enable Clause 73 autonegotiation on a 50G CR2 interface.

Syntax

```
intf-type cr2 autoneg
```

To disable Clause 73 autonegotiation on a 50G CR2 interface, use the no `intf-type cr2 autoneg` command.

Defaults

Not configured

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on the Z9100–ON.

Example

```
DellEMC(conf-if-fi-1/49/1)#intf-type cr2 autoneg
DellEMC(conf-if-fi-1/49/1)#no intf-type cr2 autoneg
```

intf-type cr4 autoneg

Set the interface type as CR4 with auto-negotiation enabled. To set the interface type as CR4 with autonegotiation disabled, use the no intf-type cr4 autoneg command.

Syntax

```
intf-type cr4 autoneg
```

Defaults

Not configured

Enabled on the 100G interfaces

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.16.1	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

You can configure the interface type as CR4 with auto-negotiation enabled. If a DAC cable link is down, you can resolve the issue by setting the interface type as CR4.

Auto-negotiation is disabled by default. If the CR4 optic fails to come up, use the `autoneg` option.

On 100-Gigabit Ethernet interfaces, CR4 auto-negotiation is enabled by default.

Related Commands

- Interfaces — configure a physical interface.
- interface loopback — configure a loopback interface.
- interface null — configure a null interface.
- interface port-channel — configure a port channel group.

keepalive

Send keepalive packets periodically to keep an interface alive when it is not transmitting data.

Syntax

```
keepalive
```

To stop sending keepalive packets, use the `no keepalive` command.

Defaults

Enabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.2	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you configure `keepalive`, the system sends a self-addressed packet out of the configured interface to verify that the far end of a WAN link is up. When you configure `no keepalive`, the system does not send keepalive packets and so the local end of a WAN link remains up even if the remote end is down.

monitor interface

Monitor counters on a single interface or all interfaces. The screen is refreshed every five seconds and the CLI prompt disappears.

Syntax

`monitor interface [interface]`

To disable monitoring and return to the CLI prompt, press the `q` key.

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For the Management interface on the stack-unit, enter the keyword `managementEthernet` then the slot/port information.
- For a port channel interface, enter the keyword `port-channel` and then a number.
- For a Tunnel interface, enter the keyword `tunnel` then the slot/port. The range is from 1 to 16383.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

In the Example, the delta column displays changes since the last screen refresh.

The following are the `monitor` command menu options.

Key	Description
systest-3	Displays the host name assigned to the system.
monitor time	Displays the amount of time since the `monitor interface` command was entered.
time	Displays the amount of time the chassis is up (since last reboot).
m	Change the view from a single interface to all interfaces on the line card or visa-versa.
c	Refresh the view.
b	Change the counters displayed from Packets on the interface to Bytes.
r	Change the [delta] column from change in the number of packets/bytes in the last interval to rate per second.
l	Change the view to the next interface on the line card, or if in line card mode, the next line card in the chassis.
a	Change the view to the previous interface on the line card, or if in line card mode, the previous line card in the chassis.
T	Increase the screen refresh rate.
t	Decrease the screen refresh rate.
q	Return to the CLI prompt.

Example (Single Interface)

```
systest-3 Monitor time: 00:00:06 Refresh Intvl.: 2s Time: 03:26:26

Interface: Tf 1/3, Enabled, Link is Up, Linespeed is 10000 Mbit

Traffic statistics:    Current    Rate     Delta
       Input bytes:    9069828  43 Bps     86
      Output bytes:  606915800  43 Bps     86
```

```
     Input packets:       54001    0 pps       1
    Output packets:     9401589    0 pps       1
       64B packets:          67    0 pps       0
  Over 64B packets:       49166    0 pps       1
 Over 127B packets:         350    0 pps       0
 Over 255B packets:        1351    0 pps       0
 Over 511B packets:         286    0 pps       0
Over 1023B packets:        2781    0 pps       0
  Error statistics:
   Input underruns:            0    0 pps       0
      Input giants:            0    0 pps       0
   Input throttles:            0    0 pps       0
         Input CRC:            0    0 pps       0
 Input IP checksum:            0    0 pps       0
     Input overrun:            0    0 pps       0
  Output underruns:            0    0 pps       0
  Output throttles:            0    0 pps       0

  m - Change mode                 c - Clear screen
  l - Page up                     a - Page down
  T - Increase refresh interval   t - Decrease refresh interval
  q - Quit
```

Example (All Interfaces)

```
systest-3 Monitor time: 00:01:31 Refresh Intvl.: 2s Time: 03:54:14

Interface  Link   In Packets   [delta] Out Packets
[delta]
   Tf 1/1  Up    14697471418 2661481  13392989657
2661385
   Tf 1/2  Up           3759       3  161959604     832816
   Tf 1/3  Up          62039      53  104239232          3
   Tf 1/4  Up    18182681434      43  6592378911       144
   Tf 1/5  Up              0       0    14950126     81293
   Tf 1/6  Up          60198       9      200899         9
   m - Change mode        c - Clear screen
   b - Display bytes      r - Display pkts/bytes per sec
   l - Page up            a - Page down
```

mtu

Set the link maximum transmission unit (MTU) (frame size) for an Ethernet interface.

Syntax `mtu value`

To return to the default MTU value, use the `no mtu` command.

Parameters

value Enter a maximum frame size in bytes. The range is from 594 to 9416. The default is **1554**.

Defaults **1554**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Reduced the maximum size of the maximum transmission unit (MTU) to 9216 bytes on S6000, S6000-ON, S4048-ON, Z9500, and C9010. Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If the packet includes a Layer 2 header, the difference between the link MTU and IP MTU (`ip mtu` command) must be enough bytes to include the Layer 2 header.

When you enter the `no mtu` command, Dell EMC Networking OS reduces the IP MTU value to 1536 bytes.

Link MTU and IP MTU considerations for port channels and VLANs are as follows.

port channels:

- All members must have the same link MTU value and the same IP MTU value.
- The port channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if the members have a link MTU of 2100 and an IP MTU 2000, the port channel's MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

VLANs:

- All members of a VLAN must have same IP MTU value.
- Members can have different Link MTU values. Tagged members must have a link MTU 4 bytes higher than untagged members to account for the packet tag.
- The VLAN link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the VLAN members. For example, the VLAN contains tagged members with Link MTU of 1522 and IP MTU of 1500 and untagged members with Link MTU of 1518 and IP MTU of 1500. The VLAN's Link MTU cannot be higher than 1518 bytes and its IP MTU cannot be higher than 1500 bytes.

NOTE: When configuring IP MTU on an interface, make sure to set the same or maximum IP MTU value on both ingress and egress interfaces to make IPv4 traffic flow.

The following shows the difference between Link MTU and IP MTU.

Layer 2 Overhead	Link MTU and IP MTU Delta
Ethernet (untagged)	18 bytes
VLAN Tag	22 bytes
Untagged Packet with VLAN-Stack Header	22 bytes

Layer 2 Overhead	Link MTU and IP MTU Delta
Tagged Packet with VLAN-Stack Header	26 bytes

negotiation auto

Enable auto-negotiation on an interface.

Syntax

```
negotiation auto
```

To disable auto-negotiation, use the `no negotiation auto` command.

Defaults Enabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information

This command is supported on 10/100/1000 Base-T Ethernet interfaces.

You can use the `negotiation auto` command on the 10G ports on the device.

The `no negotiation auto` command is only available if you first manually set the speed of a port to **10Mbits** or **100Mbits**.

The `negotiation auto` command provides a `mode` option for configuring an individual port to forced-master/forced slave after you enable auto-negotiation.

If you do not use the `mode` option, the default setting is **slave**. If you do not configure forced-master or forced-slave on a port, the port negotiates to either a master or a slave state. Port status is one of the following:

- Forced-master
- Force-slave
- Master
- Slave
- Auto-neg Error — typically indicates that both ends of the node are configured with forced-master or forced-slave.

CAUTION: Ensure that one end of your node is configured as forced-master and one is configured as forced-slave. If both are configured the same (that is, forced-master or forced-slave), the `show interfaces` command flaps between an auto-neg-error and forced-master/slave states.

You can display master/slave settings with the `show interfaces` command.

Example (Master/Slave)

```
DellEMC(conf)# interface twentyFiveGigE 1/1
DellEMC(conf-if)# neg auto
DellEMC(conf-if-autoneg)# ?

end          Exit from configuration mode
exit         Exit from autoneg configuration mode
mode         Specify autoneg mode
no           Negate a command or set its defaults
show         Show autoneg configuration information
DellEMC(conf-if-autoneg)# mode ?
forced-master Force port to master mode
forced-slave  Force port to slave mode
DellEMC(conf-if-autoneg)#
```

Example (Configured)

```
DellEMC# show interfaces configured
twentyFiveGigE 1/3 is up, line protocol is up
Hardware is DellEMCEth, address is 00:01:e8:05:f7:fc
   Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
Input Statistics:
...
```

User Information

Both sides of the link must have auto-negotiation enabled or disabled for the link to come up.

The following details the possible speed and auto-negotiation combinations for a line between two 10/100/1000 Base-T Ethernet interfaces.

Port 0

- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled* speed 1000 or auto

Port 1

- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100

Link Status Between Port 1 and Port 2

- Up at 1000 Mb/s
- Up at 100 Mb/s

- Up at 100 Mb/s
- Down
- Down

* You cannot disable auto-negotiation when the speed is set to 1000 or auto.

portmode hybrid

To accept both tagged and untagged frames, set a physical port or port-channel. A port configured this way is identified as a hybrid port in report displays.

Syntax

`portmode hybrid`

To return a port to accept either tagged or untagged frames (non-hybrid), use the `no portmode hybrid` command.

Defaults

non-hybrid

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

The following describes the `interface` command shown in the following example. This example sets a port as hybrid, makes the port a tagged member of VLAN 20, and an untagged member of VLAN 10, which becomes the native VLAN of the port. The port now accepts:

- untagged frames and classify them as VLAN 10 frames
- VLAN 20 tagged frames

The following describes the `do show interfaces` command shown in the following example. This example shows output with “Hybrid” as the newly added value for 802.1QTagged. The options for this field are:

- True — port is tagged
- False — port is untagged
- Hybrid — port accepts both tagged and untagged frames

The following describes the `interface vlan` command shown in the following example. This example shows unconfiguration of the hybrid port using the `no portmode hybrid` command.

NOTE: Remove all other configurations on the port before you can remove the hybrid configuration from the port.

Example

```
DellEMC(conf)# interface twentyFiveGigE 1/45
DellEMC(conf-if-tf-1/45)# portmode hybrid
DellEMC(conf-if-tf-1/45)# interface vlan 10
DellEMC(conf-if-vl-10)# untagged twentyFiveGigE 1/45
DellEMC(conf-if-vl-10)# interface vlan 20
DellEMC(conf-if-vl-20)# tagged twentyFiveGigE 1/45
DellEMC(conf-if-vl-20)#
```

Example

```
DellEMC(conf-if-vl-20)# do show interfaces switchport
Name: twentyFiveGigE 1/45
802.1QTagged: Hybrid
Vlan membership:
Vlan  10,   Vlan 20
Native   VlanId: 10
DellEMC(conf-if-vl-20)#
```

Example (Vlan)

```
DellEMC(conf-if-vl-20)# interface vlan 10
DellEMC(conf-if-vl-10)# no untagged twentyFiveGigE 1/45
DellEMC(conf-if-vl-10)# interface vlan 20
DellEMC(conf-if-vl-20)# no tagged twentyFiveGigE 1/45
DellEMC(conf-if-vl-20)# interface twentyFiveGigE 1/45
DellEMC(conf-if-tf-1/45)# no portmode hybrid
DellEMC(conf-if-vl-20)#
```

rate-interval

Configure the traffic sampling interval on the selected interface.

Syntax `rate-interval seconds`

Parameters

seconds Enter the number of seconds for which to collect traffic data. The range is from 5 to 299 seconds.

NOTE: Because polling occurs every 15 seconds, the number of seconds designated here rounds to the multiple of 15 seconds lower than the entered value. For example, if 44 seconds is designated, it rounds to 30; 45 to 59 seconds rounds to 45.

Defaults **299 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced

Usage Information The output of the `show interfaces` command displays the configured rate interval, along with the collected traffic data.

rate-interval (Configuration Mode)

Configure the traffic sampling interval for all physical and logical port-channel interfaces globally. The support to configure rate-interval globally enables you to modify the default interval rate for all physical and logical interfaces at one time.

Syntax `rate-interval` *seconds*

Use the `no rate-interval` command to remove the sampling interval configuration.

Parameters

seconds Enter the number of seconds for which to collect traffic data. The range is from 5 to 299 seconds.

NOTE: Because polling occurs every 15 seconds, the number of seconds designated here round to the multiple of 15 seconds lower than the entered value. For example, if 44 seconds is designated, it rounds to 30; 45 to 59 seconds rounds to 45. If you configure this value to be less than 5, then the entire buffer is cleared; the `show int stats` command shows the rate information to be 0 as the polling interval is less than 5.

Defaults **299 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on all Dell EMC Networking OS platforms.

Usage Information The output of the `show interfaces` command displays the configured rate interval, along with the collected traffic data.

When rate-interval is not configured in the global configuration mode or interface mode, the default value of 299 seconds is applied.

When rate-interval is configured only in the global configuration mode and not in the interface mode, the global rate-interval value is applied at the interface level also.

When rate-interval is configured at the interface level and not in the global configuration mode, the interface level rate-interval value is applied for an interface.

When rate interval is configured in both global configuration mode as well as interface mode, then the rate-interval value configured at interface level is applied as it takes precedence over the global value.

show config

Display the interface configuration.

Syntax `show config`

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-if-hu-1/49)# show config
!
interface HundredGigE 1/49
 no ip address
 mtu 9416
 switchport
 no shutdown
DellEMC(conf-if-hu-1/49)#
```

show config (from INTERFACE RANGE mode)

Display the bulk configured interfaces (`interface range`).

Syntax `show config`

Command Modes CONFIGURATION INTERFACE (conf-if-range)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf)# interface range twentyFiveGigE  1/1 - 1/2
DellEMC(conf-if-range-tf-1/1-1/2)# show config
!
interface twentyFiveGigE 1/1
  no ip address
  switchport
  no shutdown
!
interface twentyFiveGigE  1/2
  no ip address
  switchport
  no shutdown
DellEMC(conf-if-range-tf-1/1-1/2)#
```

show interfaces

Display information on a specific physical interface or virtual interface.

Syntax `show interfaces` *interface-type*[*–range*]

Parameters

interface Enter one of the following keywords and the interface information:

- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For stack-units, enter the keywords `stack-unit` then the slot/port information.
- For a Null interface, enter the keyword `null` then the Null interface number.
- For a port channel interface, enter the keywords `port-channel` then a number.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

-range (Optional) Enter the range of interfaces for which you want to view the information. The format is *interface-type slot/port/*`[`*subport*`]`*-slot/port/*`[`*subport*`]`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.3)	Included the FEC types in the output for 25G, 50G, and 100G interfaces of the Z9100–ON.
9.14(0.0)	Included the FEC counter details in the output for 25 and 50G interfaces of the S5048–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Added the OUI value in the command output for the Z9100–ON.
9.11(0.0)	Included the FEC BER details in the output for 100G interfaces of S6100–ON and Z9100–ON. Added support to display 10GBASE-T information on the S4048, S4048T, S6000, S6000-ON, S6100, Z9500, S6010, and Z9100. Included display information about EEE on the S3048–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON. Included display information about EEE on the S3100 series, S4820T, and S5000.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.2)	Added support for the tunnel interface type.
9.1(0.0)	Updated Management Ethernet output to include two global IPv6 addresses on S4810 and Z9000 and added output example showing OpenFlow instance ID.
8.3.12.1	Updated command output to support multiple IPv6 addresses on S4810.
8.3.11.4	Output expanded to support eSR4 optics in Z9000.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.2	Included SFP and SFP+ optics power detail in the E-Series and C-Series output.
8.2.1.0	Added support for 4093 VLANs on the E-Series. Prior releases supported 2094.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Output expanded to include SFP+ media on the C-Series.
7.6.1.0	Introduced on the S Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Changed the organization of the display output.
6.3.1.0	Added the Pluggable Media Type field in the E-Series output.

Usage Information

Use the `show interfaces` command for details on a specific interface.

NOTE: In the CLI output, the power value is rounded to a 3-digit value. For receive/transmit power that is less than 0.000, an `snmp query` returns the corresponding dbm value even though the CLI displays as 0.000.

NOTE: After the counters are cleared, the line-rate continues to increase until it reaches the maximum line rate. When the maximum line rate is reached, there is no change in the line-rate.

User Information

The following table describes the `show interfaces` command shown in the 10G example.

Line	Description
twentyFiveGigE 1/1...	Interface type and administrative and line protocol status.
Hardware is...	Interface hardware information, assigned MAC address, and current address.
Pluggable media present...	Present pluggable media wavelength, type, and rate. The error scenarios are: • Wavelength, unknown — Unable to determine the optics type • Unknown — If the wavelength is reading an error Dell EMC Networking allows unsupported SFP and XFP transceivers to be used, but Dell EMC Networking OS might not be able to retrieve some data about them. In that case, typically when the output of this field is “Pluggable media present, Media type is unknown”, the Medium and the XFP/SFP receive power reading data might not be present in the output.
Interface index...	Displays the interface index number the SNMP uses to identify the interface.
Internet address...	States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
MTU 1554...	Displays link and IP MTU information.
LineSpeed	Displays the interface’s line speed, duplex mode, and negotiation mode.

Line	Description
Energy Efficient Ethernet	Displays whether Energy Efficient Ethernet has been enabled or not.
ARP type:...	Displays the ARP type and the ARP timeout value for the interface.
Last clearing...	Displays the time when the `show interfaces` counters where cleared.
Queuing strategy...	States the packet queuing strategy. FIFO means first in first out.
Input Statistics:	Displays all the input statistics including: ● Number of packets and bytes into the interface ● Number of packets with VLAN tagged headers ● Packet size and the number of those packets inbound to the interface ● Number of Multicast and Broadcast packets: ○ Multicasts = number of MAC multicast packets ○ Broadcasts = number of MAC broadcast packets ● Number of runts, giants, and throttles packets: ○ runts = number of packets that are less than 64B ○ giants = packets that are greater than the MTU size ○ throttles = packets containing PAUSE frames ● Number of CRC, overrun, and discarded packets: ○ CRC = packets with CRC/FCS errors ○ overrun = number of packets discarded due to FIFO overrun conditions ○ discarded = the sum of runts, giants, CRC, and overrun packets discarded without any processing ● Number of FEC bit errors and uncorrected code words: ○ FEC bit errors = Number of Forward Error Correction Bit errors occurred. ○ FEC uncorrected code words = Number of uncorrected Forward Error Correction packets.
Output Statistics:	Displays output statistics sent out of the interface including: ● Number of packets, bytes, and underruns out of the interface ● Packet size and the number of the packets outbound to the interface ● Number of Multicast, Broadcast, and Unicast packets: ○ Multicasts = number of MAC multicast packets ○ Broadcasts = number of MAC broadcast packets ○ Unicasts = number of MAC unicast packets ● Number of VLANs, throttles, discards, and collisions: ○ Vlans = number of VLAN tagged packets ○ throttles = packets containing PAUSE frames ○ discarded = number of packets discarded without any processing ○ collisions = number of packet collisions ○ wred=count both packets discarded in the MAC and in the hardware-based queues
Rate information...	Estimate of the input and output traffic rate over a designated interval (30 to 299 seconds). Traffic rate is displayed in bits, packets per second, and percent of line rate.
Time since...	Elapsed time since the last interface status change (hh:mm:ss format).

Example

```
DellEMC#show interfaces
twentyFiveGigE 1/1 is down, line protocol is down
Hardware is DellEMCEth, address is 34:17:eb:2c:8c:82
    Current address is 34:17:eb:2c:8c:82
Pluggable media not present
    Forward Error Correction(FEC) configured is default
    FEC status is OFF
    OUI is 0x6a737d
```

```
Interface index is 2097164
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :3417eb2c8c82
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 25000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 3d9h37m
Queueing strategy: fifo
Input Statistics:
     0 packets, 0 bytes
     0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 0 Unicasts
     0 runts, 0 giants, 0 throttles
     0 CRC, 0 overrun, 0 discarded
     0 FEC corrected blocks, 0 FEC uncorrected blocks
Output Statistics:
     0 packets, 0 bytes, 0 underruns
     0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 0 Unicasts
     0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
     Input 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
     Output 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
Time since last interface status change: 3d9h37m
```

Example

Usage Information

The Management port is enabled by default (`no shutdown`). If necessary, use the `ip address` command to assign an IP address to the Management port. If two RPMs are installed in your system, use the `show redundancy` command to display which RPM is the Primary RPM.

Example

```
DellEMC#show interfaces twentyFiveGigE 1/1
twentyFiveGigE 1/1 is down, line protocol is down
Hardware is DellEMCEth, address is 34:17:eb:2c:8c:82
    Current address is 34:17:eb:2c:8c:82
Pluggable media not present
    Forward Error Correction(FEC) configured is default
    FEC status is OFF
    OUI is 0x6a737d
Interface index is 2097164
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :3417eb2c8c82
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 25000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 3d9h38m
Queueing strategy: fifo
Input Statistics:
     0 packets, 0 bytes
     0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 0 Unicasts
     0 runts, 0 giants, 0 throttles
```

```
DellEMC#show interfaces hundredGigE 1/49
hundredGigE 1/49 is up, line protocol is up
Hardware is DellEMCEth, address is 4c:76:25:ee:40:42
    Current address is 4c:76:25:ee:40:42
Pluggable media present, QSFP28 type is 100GBASE-CR4-5M
    AutoNegotiation is ON
    Forward Error Correction(FEC) configured is default
    FEC status is cl91
    Wavelength is 90nm
```

```
Interface index is 2100238
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :4c7625ee4042
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 100000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 00:00:50
Queueing strategy: fifo
Input Statistics:
     0 packets, 0 bytes
     0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 0 Unicasts
     0 runts, 0 giants, 0 throttles
     0 CRC, 0 overrun, 0 discarded
     0 FEC bit errors, 0 FEC uncorrected code words
Output Statistics:
     1 packets, 64 bytes, 0 underruns
     1 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     1 Multicasts, 0 Broadcasts, 0 Unicasts
     0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
     Input 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
     Output 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
Time since last interface status change: 00:00:03
```

Example (Management Ethernet)

```
DellEMC# show interfaces managementethernet 1/1

ManagementEthernet 1/1 is up, line protocol is up
Hardware is DellEMCEth, address is 00:01:e8:0b:a9:4c
  Current address is 00:01:e8:0b:a9:4c
Pluggable media not present
Interface index is 503595208
Internet address is 10.11.201.5/16
Link local IPv6 address: fe80::201:e8ff:fe0b:a94c/64
Global IPv6 address: 2222::5/64
Virtual-IP is not set
Virtual-IP IPv6 address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 10 Mbit, Mode full duplex
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 04:01:08
Queueing strategy: fifo
  Input 943 packets, 78347 bytes, 190 multicast
  Received 0 errors, 0 discarded
  Output 459 packets, 102388 bytes, 15 multicast
  Output 0 errors, 0 invalid protocol
Time since last interface status change: 00:03:09
```

Example (Management Ethernet, two IPv6 addresses)

```
DellEMC# show interfaces managementethernet 1/1
ManagementEthernet 1/1 is up, line protocol is up
Hardware is DellForce10Eth, address is 00:01:e8:a0:bf:f3
Current address is 00:01:e8:a0:bf:f3
Pluggable media not present
Interface index is 302006472
Internet address is 10.16.130.5/16
Link local IPv6 address: fe80::201:e8ff:fea0:bff3/64
Global IPv6 address: 1::1/
Global IPv6 address: 2::1/64
Virtual-IP is not set
```

```
Virtual-IP IPv6 address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 00:06:14
Queueing strategy: fifo
Input 791 packets, 62913 bytes, 775 multicast
Received 0 errors, 0 discarded
Output 21 packets, 3300 bytes, 20 multicast
Output 0 errors, 0 invalid protocol
Time since last interface status change: 00:06:03
```

Example (OpenFlow instance)

```
DellEMC# show interfaces vlan 6
Vlan 6 is down, line protocol is down
Address is 00:01:e8:8a:e1:8c,
        Current address is 00:01:e8:8a:e1:8c
Interface index is 1107525638
of-instance: 2
Internet address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 00:05:12
Queueing strategy: fifo
Time since last interface status change: 00:05:12
```

Example (Output with and without FEC enabled)

The following output shows that without FEC is disabled on the system, the CRC error count increases:

```
DellEMC#$ interfaces twentyFiveGigE 1/50/1
twentyFiveGigE 1/50/1 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:39:02
    Current address is 34:17:eb:37:39:02
Pluggable media present, QSFP28 type is 100GBASE-CR4-5M
    AutoNegotiation is OFF
    Forward Error Correction(FEC) configured is OFF
    FEC status is OFF
    OUI is 0x6a737d
    Wavelength is 90nm
Interface index is 2103820
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :3417eb373902
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 25000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 00:06:57
Queueing strategy: fifo
Input Statistics:
     5441807056 packets, 348275680676 bytes
     5441806949 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 5441798569 Unicasts
     25 runts, 0 giants, 0 throttles
     77 CRC, 0 overrun, 0 discarded
     0 FEC corrected blocks, 0 FEC uncorrected blocks
```

The following output shows that with FEC is enabled on the system, the FEC error count increases:

```
DellEMC#$ interfaces twentyFiveGigE 1/50/1
twentyFiveGigE 1/50/1 is up, line protocol is up
Hardware is DellEMCEth, address is 34:17:eb:37:39:02
```

```
    Current address is 34:17:eb:37:39:02
Pluggable media present, QSFP28 type is 100GBASE-CR4-5M
    AutoNegotiation is OFF
    Forward Error Correction(FEC) configured is cl74
    FEC status is cl74
    OUI is 0x6a737d
    Wavelength is 90nm
Interface index is 2103820
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :3417eb373902
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 25000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 00:07:16
Queueing strategy: fifo
Input Statistics:
     6125878165 packets, 392056231756 bytes
     6125878043 64-byte pkts, 1 over 64-byte pkts, 0 over 127-byte pkts
     0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
     0 Multicasts, 0 Broadcasts, 6125869387 Unicasts
     43 runts, 0 giants, 0 throttles
     157 CRC, 0 overrun, 0 discarded
     56 FEC corrected blocks, 3 FEC uncorrected blocks
```

Related Commands

- show interfaces configured – display any interface with a non-default configuration.
- show ip interface – display Layer 3 information about the interfaces.
- show range – display all interfaces configured using the interface range command.

show interfaces configured

Display any interface with a non-default configuration.

Syntax `show interfaces configured`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Changed the organization of the display output.

Example

```
DellEMC# show interfaces configured
twentyFiveGigE 1/18 is up, line protocol is up
Hardware is DellEMCEth, address is 00:01:e8:05:f7:fc
  Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
Input Statistics:
  10 packets, 10000 bytes
  0 Vlans
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 10 over 511-byte pkts, 0 over 1023-byte pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  1 packets, 64 bytes, 0 underruns
  1 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
  0 Multicasts, 1 Broadcasts, 0 Unicasts
  0 Vlans, 0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Time since last interface status change: 00:04:59
DellEMC#
```

show interfaces dampening

Display interface dampening information.

Syntax `show interfaces dampening [[interface] [summary] [detail]]`

Parameters

interface (Optional) Enter one of the following keywords and the interface information:

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1/1 - 1/1/4`.

summary (OPTIONAL) Enter the keyword `summary` to display the current summary of dampening data, including the number of interfaces configured and the number of interfaces suppressed, if any.

detail (OPTIONAL) Enter the keyword `detail` to display detailed interface dampening data.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced

Example

```
DellEMC# show interfaces dampening
Interface Supp   Flaps Penalty Half-Life Reuse Suppress Max-Sup
          State
Tw 1/2      Up     0     0        20       800   4500     120
Tw 1/10     Up     0     0        5        750   2500     20
DellEMC#
```

Related Commands

- dampening — configure dampening on an interface.
- show interfaces configured — display any interface with a non-default configuration.

show interfaces stack-unit

Display information on all interfaces on a specific S-Series or Z-Series stack member.

Syntax `show interfaces stack-unit unit-number`

Parameters

unit-number Enter the stack member number.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Example

```
DellEMC# show interfaces stack-unit 1
twentyFiveGigE 1/1 is down, line protocol is down
Hardware is DellEMCEth, address is 00:01:e8:4c:f2:82
  Current address is 00:01:e8:4c:f2:82
Pluggable media not present
Interface index is 34129154
Internet address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto, Mode auto
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 3w0d17h
Queueing strategy: fifo
Input Statistics:
  0 packets, 0 bytes
  5144 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  0 packets, 0 bytes, 0 underruns
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
```

```
   0 Multicasts, 0 Broadcasts, 0 Unicasts
   0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
   Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
   Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Time since last interface status change: 3w0d17h
 twentyFiveGigE 1/2 is down, line protocol is down
Hardware is DellEMCEth, address is 00:01:e8:4c:f2:83
   Current address is 00:01:e8:4c:f2:83
!-------------output truncated ----------------!
```

Related Commands

- show hardware stack-unit — display data plane and management plane input/output statistics.

show interfaces status

To display status information on a specific interface only, display a summary of interface information or specify a stack-unit slot and interface.

Syntax `show interfaces [interface | stack–unit slot-number] status`

Parameters

interface (OPTIONAL) Enter one of the following keywords the interface information:

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1/1 - 1/1/4`.

stack-unit *slot-number* (OPTIONAL) Enter the keyword `stack-unit` then the slot number. The range is from 0 to 5.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

Example

```
DellEMC#show interfaces status
Port         Description  Status Speed     Duplex Vlan
Hu 1/49                   Down   100000 Mbit Auto   --
Hu 1/50                   Down   100000 Mbit Auto   --
Hu 1/51                   Down   100000 Mbit Auto   --
Hu 1/52                   Down   100000 Mbit Auto   --
Tf 1/1                    Down   25000  Mbit Auto   --
Tf 1/2                    Down   25000  Mbit Auto   --
Tf 1/3                    Down   25000  Mbit Auto   --
Tf 1/4                    Down   25000  Mbit Auto   --
Hu 1/53                   Down   100000 Mbit Auto   --
Hu 1/54                   Down   100000 Mbit Auto   --
Tf 1/9                    Down   25000  Mbit Auto   --
Tf 1/7                    Down   25000  Mbit Auto   --
Tf 1/8                    Down   25000  Mbit Auto   --
Tf 1/5                    Down   25000  Mbit Auto   --
Tf 1/10                   Down   25000  Mbit Auto   --
Tf 1/11                   Down   25000  Mbit Auto   --
Tf 1/12                   Down   25000  Mbit Auto   --
Tf 1/13                   Down   25000  Mbit Auto   --
Tf 1/14                   Down   25000  Mbit Auto   --
Tf 1/15                   Down   25000  Mbit Auto   --
Tf 1/16                   Down   25000  Mbit Auto   --
Tf 1/17                   Down   25000  Mbit Auto   --
```

show interfaces vlan

Display VLAN statistics.

Syntax `show interfaces vlan {vlan-id} [LINE] {description}`

Parameters

vlan-id	Enter the interface VLAN number. The range is from 1 to 4094.

LINE	(OPTIONAL) Enter the name of the VLAN.
description	Displays the VLAN interface information with description.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

NOTE: This command also enables you to view information corresponding to a range of ports.

- You can specify multiple ports as `port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1 - 4`.

Example

```
DellEMC# show interfaces vlan 10
Vlan 10 is up, line protocol is down
Address is 90:b1:1c:f4:99:ce, Current address is 90:b1:1c:f4:99:ce
Interface index is 1107787786
Internet address is not set
Mode of IPv4 Address Assignment: NONE
DHCP Client-ID: 90b11cf499ce
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 2d17h26m
Queueing strategy: fifo
Time since last interface status change: 2d17h26m
Input Statistics:
     0 packets, 0 bytes
Output Statistics:
     0 packets, 0 bytes, 0 underruns
```

show system stack-unit fanout configured

Displays the details about the fanned-out ports.

Syntax `show system stack-unit stack-unit-number fanout configured`

Parameters

stack-unit *stack-unit-number*	The stack Unit ID of the device.

	fanout configured	Enter the keywords `fanout configured` to display the details about the fanned-out ports.

Defaults None.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(1.0)	Introduced on the Z9100-ON.

Example

```
DellEMC#show system stack-unit 1 fanout configured
Configured fan out ports in stack-unit 1
  Mod/Port             Mode            Speed
       1/1             Quad              10G
       1/3             Quad              10G
       1/5             Quad              10G
       1/7             Quad              10G
       1/9             Quad              10G
       1/11            Quad              10G
       1/13            Quad              10G
       1/15            Quad              10G
       2/1             Quad              10G
       2/3             Quad              10G
       2/5             Quad              10G
       2/7             Quad              10G
       2/9             Quad              10G
       2/11            Quad              10G
       2/13            Quad              10G
       2/15            Quad              10G
```

show interfaces switchport

Display only virtual and physical interfaces in Layer 2 mode. This command displays the Layer 2 mode interfaces' IEEE 802.1Q tag status and VLAN membership.

Syntax `show interfaces switchport [interface-type | stack-unit unit-id ]`

Parameters

interface-type	(OPTIONAL) Enter one of the following keywords and the interface information: • For a port channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

- For a backup interface for this interface, enter the keyword `backup`.

NOTE: This command also enables you to view information corresponding to a range of ports.

- For physical interfaces, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1 - 4`.
- For port–channel interfaces, you can specify multiple ports as `port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces port-channel 1 - 4`.

stack-unit *unit-id* (OPTIONAL) Enter the keywords `stack-unit` then the stack member number.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.2.1.0	Added support for 4093 VLANs on E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Support added for hybrid port/native VLAN, introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following describes the `show interfaces switchport` command for the following example.

Items	Description
Name	Displays the interface's type, slot/port number.

Items	Description
802.1QTagged	Displays whether if the VLAN tagged (“True”), untagged (“False”), or hybrid (“Hybrid”), which supports both untagged and tagged VLANs by the port.
Vlan membership	Lists the VLANs to which the interface is a member. Starting with Dell EMC Networking OS version 7.6.1, this field can display native VLAN membership by the port.

Example

```
DellEMC# show interfaces switchport
Name: twentyFiveGigE 1/1
802.1QTagged: Hybrid
Vlan membership:
Vlan   2, Vlan 20
Native VlanId: 20

Name: twentyFiveGigE 1/2
802.1QTagged: True
Vlan membership:
Vlan   2

Name: twentyFiveGigE 1/3
802.1QTagged: True
Vlan membership:
Vlan   2

Name: twentyFiveGigE 1/4
802.1QTagged: True
Vlan membership:
Vlan   2
--More--
```

Related Commands

- interface — configure a physical interface on the switch.
- show ip interface — display Layer 3 information about the interfaces.
- show interfaces transceiver — display the physical status and operational status of an installed transceiver. The output also displays the transceiver’s serial number.

show interfaces transceiver

Display the details of an installed transceiver.

Syntax `show interfaces [interface number] transceiver`

Parameters

interfaces ***interface number*** (OPTIONAL) Enter one of the following keywords and then the interface information:

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

NOTE: This command also enables you to view information corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces` *`interface-type`* `1/1/1 - 1/1/4`.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Added support to display 10GBASE-T information on the S4048, S4048T, S6000, S6000-ON, S6100, Z9500, S6010, and Z9100.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Output augmented with diagnostic data for pluggable media.
7.7.1.0	Removed three fields in the output: Vendor Name, Vendor OUI, and Vendor PN.
7.6.1.0	Introduced on the C-Series and S-Series.
6.5.4.0	Introduced on the E-Series.

Usage Information

Use the `show interfaces transceiver` command to view the status of transceivers on all the interfaces in the system.

The following describes the columns displayed in the output of the `show interfaces transceiver` command:

Line	Description
Rx Power measurement type	Output depends on the vendor, typically either “Average” or “OMA” (Receiver optical modulation amplitude).

Line	Description
Tx Power measurement type	Output depends on the vendor, typically either “Supported” or “Not supported”.
Temp High Alarm threshold	Factory-defined setting, typically in Centigrade. Value differs between SFPs and SFP+.
Voltage High Alarm threshold	Displays the interface index number used by SNMP to identify the interface.
Bias High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.

Line	Description
Power Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temperature	Current temperature of the SFPs. If this temperature crosses Temp High alarm/ warning thresholds, the temperature high alarm/warning flag is set to true.
Voltage	Current voltage of the SFPs. If this voltage crosses voltage high alarm/warning thresholds, the voltage high alarm/warning flag is set to true.
Tx Bias Current	Present transmission (Tx) bias current of the SFP. If this crosses bias high alarm/ warning thresholds, the TX bias high alarm/warning flag is set to true. If it falls below the low alarm/warning thresholds, the TX bias low alarm/warning flag is set to true.
Tx Power	Present Tx power of the SFP. If this crosses Tx power alarm/warning thresholds, the Tx power high alarm/warning flag is set to true. If it falls below the low alarm/ warning thresholds, the Tx power low alarm/ warning flag is set to true.
Rx Power	Present receiving (Rx) power of the SFP. This value is either average Rx power or OMA. This depends on the Rx Power measurement type displayed above. If this crosses Rx power alarm/warning thresholds, the Rx power high alarm/warning flag is set to true. If it falls below the low alarm/warning thresholds, the Rx power low alarm/warning flag is set to true.
Data Ready state Bar	This field indicates that the transceiver has achieved power up and data is ready. This is set to true if data is ready to be sent and set to false if data is being transmitted.
Rx LOS state	This is the digital state of the Rx_LOS output pin. This is set to true if the operating status is down.
Tx Fault state	This is the digital state of the Tx Fault output pin.
Rate Select state	This is the digital state of the SFP rate_select input pin.
RS state	This is the reserved digital state of the pin AS(1) per SFF-8079 and RS(1) per SFF-8431.
Tx Disable state	If the admin status of the port is down then this flag is set to true.
Temperature High Alarm Flag	This can be either true or false, depending on the Current voltage value displayed above.
Voltage High Alarm Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Tx Bias High Alarm Flag	This can be either true or false, depending on the present Tx bias current value displayed above.
Tx Power High Alarm Flag	This can be either true or false, depending on the Current Tx bias power value displayed above.
Rx Power High Alarm Flag	This can be either true or false, depending on the Current Rx power value displayed above.
Temperature Low Alarm Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage Low Alarm Flag	This can be either true or false, depending on the Current voltage value displayed above.
Tx Bias Low Alarm Flag	This can be either true or false, depending on the Tx bias current value displayed above.
Tx Power Low Alarm Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power Low Alarm Flag	This can be either true or false, depending on the Current Rx power value displayed above.

Line	Description
Temperature High Warning Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage High Warning Flag	This can be either true or false, depending on the Current Voltage value displayed above.
Tx Bias High Warning Flag	This can be either true or false, depending on the Tx bias current value displayed above.
Tx Power High Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power High Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Temperature Low Warning Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage Low Warning Flag	This can be either true or false, depending on the Current Voltage value displayed above.
Tx Bias Low Warning Flag	This can be either true or false, depending on the present Tx bias current value displayed above.
Tx Power Low Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power Low Warning Flag	This can be either true or false, depending on the Current Rx power value displayed above.

Example

```
DellEMC#show interfaces twentyFiveGigE 1/2 transceiver
Interface Name                : twentyFiveGigE 1/2
SFP is present
SFP+ 1/2 Serial Base ID fields
SFP+ 1/2 Id                                 = 0x03
SFP+ 1/2 Ext Id                             = 0x04
SFP+ 1/2 Connector                          = 0x22
SFP+ 1/2 Transceiver Code                   = 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00
SFP+ 1/2 Encoding                           = 0x00
SFP+ 1/2 BR Nominal                         = 0x64
SFP+ 1/2 Length(SFM)    Km                  = 0x00
SFP+ 1/2 Length(SFM)  100m                  = 0x00
SFP+ 1/2 Length(OM3)   10m                  = 0x00
SFP+ 1/2 Length(OM2)   10m                  = 0x00
SFP+ 1/2 Length(OM1)   10m                  = 0x00
SFP+ 1/2 Length(Copper-1m/AOC-1m/OM4-10m)   = 0x1e
SFP+ 1/2 Vendor Name                        = Methode Elec.
SFP+ 1/2 Vendor PN                          = SP7051-D
SFP+ 1/2 Trans Type                         = 10GBASE-T
SFP+ 1/2 Vendor Rev                         = - 33
SFP+ 1/2 Laser Wavelength                   = 3276.75 nm
SFP+ 1/2 CheckCodeBase                      = 0x49
SFP+ 1/2 Serial Extended ID fields
SFP+ 1/2 Options                            = 0x00 0x00
SFP+ 1/2 BR max                             = 0
SFP+ 1/2 BR min                             = 0
SFP+ 1/2 Vendor SN                          = 16140029
SFP+ 1/2 Datecode                           = 16032901
SFP+ 1/2 CheckCodeExt                       = 0x2d
SFP+ 1/2 Extended Transceiver Code          = 0x01

SFP+ 1/2 DOM is not supported
```

```
DellEMC#show interfaces fortygigabitethernet 1/49/1 transceiver
Interface Name                : fortyGigE 1/49/1
```

```
QSFP 49/1 Serial ID Base Fields
QSFP 49/1 Id                                = 0x0d
QSFP 49/1 Ext Id                            = 0x00
QSFP 49/1 Connector                         = 0x0c
QSFP 49/1 Transceiver Code                  = 0x04 0x00 0x00 0x00 0x00
0x00 0x00 0x00
QSFP 49/1 Encoding                          = 0x05
QSFP 49/1 Length(SFM)    Km                 = 0x00
QSFP 49/1 Length(OM3)    2m                 = 0x32
QSFP 49/1 Length(OM2)    1m                 = 0x00
QSFP 49/1 Length(OM1)    1m                 = 0x00
QSFP 49/1 Length(Copper-1m/AOC-1m/OM4-2m)   = 0x00
QSFP 49/1 Vendor Name                       = AVAGO
QSFP 49/1 Vendor PN                         = AFBR-79E4Z-D-FT1
QSFP 49/1 Trans Type                        = 40GBASE-SR4
QSFP 49/1 Vendor Rev                        = 01
QSFP 49/1 Laser Wavelength                  = 850.00 nm
QSFP 49/1 CheckCodeBase                     = 0x26
QSFP 49/1 Serial ID Extended Fields
QSFP 49/1 BR max                            = 0
QSFP 49/1 BR min                            = 0
QSFP 49/1 Vendor SN                         = 7503831P008C
QSFP 49/1 Datecode                          = 130124
QSFP 49/1 CheckCodeExt                      = 0x76
QSFP 49/1 Extended Transceiver Code         = 0x00

QSFP 49/1 Diagnostic Information
================================
QSFP 49/1 Free Side Properties(far end,near end) = 0
================================
QSFP 49/1 Rx Power measurement type         = Average
QSFP 49/1 Tx Power measurement              = Not-supported
================================
QSFP 49/1 Temp High Alarm threshold         = 75.000C
QSFP 49/1 Voltage High Alarm threshold      = 3.630V
QSFP 49/1 Bias High Alarm threshold         = 10.000mA
QSFP 49/1 RX Power High Alarm threshold     = 3.4001dBm
QSFP 49/1 Temp Low Alarm threshold          = -5.000C
QSFP 49/1 Voltage Low Alarm threshold       = 2.970V
QSFP 49/1 Bias Low Alarm threshold          = 0.500mA
QSFP 49/1 RX Power Low Alarm threshold      = -13.5067dBm
================================
QSFP 49/1 Temp High Warning threshold       = 70.000C
QSFP 49/1 Voltage High Warning threshold    = 3.465V
QSFP 49/1 Bias High Warning threshold       = 9.500mA
QSFP 49/1 RX Power High Warning threshold   = 2.4000dBm
QSFP 49/1 Temp Low Warning threshold        = 0.000C
QSFP 49/1 Voltage Low Warning threshold     = 3.135V
QSFP 49/1 Bias Low Warning threshold        = 1.000mA
QSFP 49/1 RX Power Low Warning threshold    = -9.5001dBm
================================
QSFP 49/1 Temperature                       = 25.781C
QSFP 49/1 Voltage                           = 3.320V
QSFP 49/1 TX1 Bias Current                  = 7.980mA
QSFP 49/1 TX2 Bias Current                  = 7.644mA
QSFP 49/1 TX3 Bias Current                  = 7.648mA
QSFP 49/1 TX4 Bias Current                  = 7.852mA
QSFP 49/1 RX1 Power                         = -1.0265dBm
QSFP 49/1 RX2 Power                         = -0.3021dBm
QSFP 49/1 RX3 Power                         = -0.4779dBm
QSFP 49/1 RX4 Power                         = -0.6900dBm
QSFP 49/1 TX1 Power                         = not available
QSFP 49/1 TX2 Power                         = not available
QSFP 49/1 TX3 Power                         = not available
QSFP 49/1 TX4 Power                         = not available
```

Related Commands

- interface — configure a physical interface on the switch.
- show ip interface — display Layer 3 information about the interfaces.

show range

Display all interfaces configured using the `interface range` command.

Syntax `show range`

Command Modes INTERFACE RANGE (config-if-range)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4093 VLANs on E-Series.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced.

Example

```
DellEMC(conf-if-range-tf-1/2,fo-1/49/1)# show range
1/2 - 0
1/49/1 - 0
```

Related Commands

- interface — configure a physical interface on the switch.
- show ip interface — display Layer 3 information about the interfaces.

shutdown

Disable an interface.

Syntax `shutdown`

To activate an interface, use the `no shutdown` command.

Defaults The interface is disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The `shutdown` command marks a physical interface as unavailable for traffic. To discover if an interface is disabled, use the `show ip interface brief` command. Disabled interfaces are listed as down.

Disabling a VLAN or a port channel causes different behavior. When a VLAN is disabled, the Layer 3 functions within that VLAN are disabled. Layer 2 traffic continues to flow. Entering the `shutdown` command on a port channel disables all traffic on the port channel and the individual interfaces within the port channel. To enable a port channel, enter `no shutdown` on the port channel interface and at least one interface within that port channel.

The `shutdown` and `description` commands are the only commands that you can configure on an interface that is a member of a port channel.

Related Commands

- interface port-channel — create a port channel interface.
- interface vlan — create a VLAN.
- show ip interface — display the interface routing status. Add the keyword `brief` to display a table of interfaces and their status.

speed (for 10/100/1000/10000 interfaces)

Set the speed for 10/100/1000/10000 interfaces. Set both sides of a link to the same speed (10/100/1000/10000) or to auto or the link may not come up.

Syntax

```
speed {10 | 100 | 1000 | 10000 | auto}
```

To return to the default setting, use the `no speed {10 | 100 | 1000 | 10000}` command.

Parameters

10 Enter the keyword `10` to set the interface's speed to 10 Mb/s.

NOTE: This interface speed is not supported on the LC-EH-GE-50P or the LC-EJ-GE-50P card. If the command is entered for these interfaces, an error message appears.

100 Enter the keyword `100` to set the interface's speed to 10/100 Mb/s.

NOTE: When this setting is enabled, only 100Base-FX optics are supported on the LC-EH-GE-50P or the LC-EJ-GE-50P card.

1000 Enter the keyword `1000` to set the interface's speed to 1000 Mb/s. Auto-negotiation is enabled. For more information, refer to `negotiation auto`.

NOTE: When this setting is enabled, only 1000Base-FX optics are supported on the LC-EH-GE-50P or the LC-EJ-GE-50P card.

10000 Enter the keyword `10000` to set the interface's speed to 10000 Mb/s. Auto-negotiation is enabled. For more information, refer to `negotiation auto`.

auto Enter the keyword `auto` to set the interface to auto-negotiate its speed. Auto-negotiation is enabled. For more information, refer to `negotiation auto`.

Defaults **auto**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14.1.2	Introduced the option `10000` speed setting on the S5048F-ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Added support for fanned–out 1 Gigabit SFP port.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Supported on LC-EH-GE-50P or the LC-EJ-GE-50P cards.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information This command is found on the 10/100/1000/10000 Base-T Ethernet interfaces.

When you enable `auto`, the system performs an automatic discovery to determine the optics installed and configure the appropriate speed.

When you configure a speed for the 10/100/1000/10000 interface, confirm the negotiation auto command setting. Both sides of the link must have auto-negotiation either enabled or disabled. For speed settings of 1000 or auto, the software sets the link to auto-negotiation and you cannot change that setting.

NOTE: Starting with Dell EMC Networking OS version 7.8.1.0, when you use a copper SFP2 module with catalog number GP-SFP2-1T in the S25P model of the S-Series, you can manually set its speed

with the `speed` command. When you set the speed to **10** or **100 Mbps**, you can also use the `duplex` command.

If you use an active optical cable (AOC), you can convert the QSFP+ port to a 10 Gigabit SFP+ port or 1 Gigabit SFP port. Use the `speed` command to enable the required speed.

Related Commands

- duplex (10/100 Interfaces) — configures duplex mode on physical interfaces.
- negotiation auto — enable or disable auto-negotiation on an interface.

speed (Management interface)

Set the speed for the Management interface.

Syntax

```
speed {10 | 100 | 1000 | auto}
```

To return to the default setting, use the `no speed` command.

Parameters

10	Enter the keyword `10` to set the interface's speed to 10 Mb/s.
100	Enter the keyword `100` to set the interface's speed to 100 Mb/s.
1000	Enter the keyword `1000` to set the interface's speed to 1000 Mb/s.
auto	Enter the keyword `auto` to set the interface to auto-negotiate its speed.

Defaults **auto**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.11.1	Introduced on the S55, S60, and S4810
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information This command is found on the Management interface only.

Related Commands

- interface ManagementEthernet — configure the Management port on the system (either the Primary or Standby RPM).

- management route — configure a static route that points to the Management interface or a forwarding router.

stack-unit portmode

Convert a single 40G port into 4x10G ports in a 16x40G module and a single 100G port into 2x50G ports, 1x40G port, 4x25G ports or 4x10G ports in an 8x100G module.

Syntax

```
stack-unit stack-unit-number port number portmode {dual speed 50G | quad speed {25G | 10G} | single speed 40G} [no-confirm]
```

Parameters

stack-unit	Enter the stack member unit identifier of the stack member to reset.
number	Enter the port number of the port to be split. The total number of ports are 32. The range is from 1 to 32.
port	Enter the keyword `port` then the port number to specify the port where fanout mode is specified.
single	Convert a single 100G port into one 40G port.
dual	Split a single 100G port into two 50G ports.
quad	Split a single 100G port into four 10G or four 25G ports or split a single 40G port into four 10G ports
no-confirm	(OPTIONAL) Enter the keywords `no-confirm` to reset any previous configuration and apply the new configuration immediately. If you this option, the system does not prompt you to confirm the deletion of any existing configuration.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.7(0.0)	Added support for dynamically fanning-out of interfaces on S6000. Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

Usage Information

You can split a 100G port into two 50G, one 40G, four 10G, or four 25G ports.

You can use the `stack-unit portmode` command to dynamically fan-out 100G ports into two 50G, one 40G, four 10G, or four 25G ports and vice-versa without reloading a switch.

The port must be in a default configuration before it can be split. As the 40G100G port is lost in the configuration when the port is split, ensure that you remove the port from other L2/L3 feature configurations.

You cannot use this command if you use an LR4 optics.

If you use a 40G LR4 or 40G LM4 optics, you can only convert a 100G port into a 1x40G port. LR4 and LM4 optics do not support dual mode or quad mode configurations.

To convert a fanned-out port back to 100G, use the `no` form of the `stack-unit portmode` command.

Example (stack unit – Warning message when 13 ports are configured in any port range)

```
DellEMC(conf)# stack-unit 0 port 48 portmode quad
Maximum number of ports that can be made Quad mode in the range <0-63>
is configured. Ports 52,56,60, will be disabled on reload.
Do you wish to continue? [confirm yes/no]:yes
Please save and reset unit 0 for the changes to take effect.
DellEMC(conf)#
```

Example

Example of converting a 100G port to 1x40G

```
DellEMC(conf)#stack-unit 1 module 1 port 1 portmode single speed 40G
Warning: Enabling Single mode on stack-unit 1 module 1 port 1. Please
verify whether the configs related to interface Hu 1/1/1 are cleaned up
before proceeding further.
[confirm yes/no]:yes
Single mode is enabled on stack-unit 1 module 1 port 1
DellEMC(conf)#Sep 18 05:16:49: %STKUNIT1-M:CP %IFMGR-5-DYNAMIC_FANOUT:
Port 1 in slot 1 has been fanned-out
```

switchport

Place an interface in Layer 2 mode.

Syntax

```
switchport [[backup interface {interface | port-channel number}] | mode
private-vlan {host | promisucous | trunk}]
```

To remove an interface from Layer 2 mode and place it in Layer 3 mode, enter the `no switchport` command. If a switchport backup interface is configured, first remove the backup configuration. To remove a switchport backup interface, enter the `no switchport backup interface` command.

Parameters

backup (OPTIONAL) Use this option to configure a redundant Layer 2 link without using Spanning Tree. The keyword `backup` configures a backup port so that if the primary port fails, the backup port changes to the up state. If the primary later comes up, it becomes the backup.

interface *interface* (OPTIONAL) Enter any of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

port-channel (OPTIONAL) Enter the keywords `port-channel` if the backup port is a static or dynamic port channel.

mode (OPTIONAL) Enter the keyword `mode` to set the interface mode.

private-vlan (OPTIONAL) Enter the keywords `private-vlan` to set the interface mode to private VLAN mode.

host (OPTIONAL) Enter the keyword `host` to set the private VLAN interface to host mode.

promiscuous (OPTIONAL) Enter the keyword `promiscuous` to set the private VLAN interface to promiscuous mode.

	trunk	(OPTIONAL) Enter the keyword `trunk` to set the private VLAN interface to trunk mode.

Defaults Disabled — interface is in Layer 3 mode.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.4.1.0	Added support for port-channel interfaces (the `port-channel number` option).
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Added the `backup interface` option.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information If an IP address or VRRP group is assigned to the interface, you cannot use the `switchport` command on the interface. To use the `switchport` command on an interface, only the `no ip address` and `no shutdown` statements must be listed in the `show config` output.

When you enter the `switchport` command, the interface is automatically added to the default VLAN.

To use the `switchport backup interface` command on a port, first enter the `switchport` command. For more information, see "Configuring Redundant Links" in the Layer 2 section in the *Dell EMC Networking OS Configuration Guide*.

wavelength

Set the wavelength for tunable 10–Gigabit SFP+ optics.

Syntax `wavelength`

To retain the existing wavelength, use the `no wavelength` command.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S5000, S4810, S4820T, S3048–ON, S4048–ON, M I/O Aggregator, FN I/O Module, MXL, C9010, S3100 series, and Z9100-ON.

Usage Information The wavelength can be configured only on a tunable 10–Gigabit SFP+ optic. The wavelength range is from 1528.3 nm to 1568.77nm.

If you configure the wavelength on a non-tunable optic, there is no change to the existing wavelength. The configured wavelength is saved in the running configuration and is applicable, when a tunable optic is used.

If you do not configure the wavelength on an inserted tunable optic, the existing wavelength is used.

Example The following example shows the wavelength set for a tunable 10–Gigabit SFP+ optic:

```
DellEMC(conf-if-tf-1/1)# wavelength 1528.30
```

Related Commands

- show config — displays the interface configuration.

Port Channel Commands

A Link Aggregation Group (LAG) is a group of links that appear to a MAC client as if they were a single link according to IEEE 802.3ad. In Dell EMC Networking OS, a LAG is referred to as a Port Channel.

- The platform supports 1284096 port channels and 16 members per port channel.

As each port can be assigned to only one Port Channel, and each Port Channel must have at least one port, some of those nominally available Port Channels might have no function because they could have no members if there are not enough ports installed. But stack members can provide those ports.

NOTE: The Dell EMC Networking OS implementation of LAG or Port Channel requires that you configure a LAG on both switches manually. For information about Dell EMC Networking OS link aggregation control protocol (LACP) for dynamic LAGs, refer to the Link Aggregation Control Protocol (LACP) chapter. For more information about configuring and using Port Channels, refer to the *Dell EMC Networking OS Configuration Guide*.

channel-member

Add an interface to the Port Channel, while in INTERFACE PORTCHANNEL mode.

Syntax `channel-member` *interface*

To delete an interface from a Port Channel, use the `no channel-member interface` command.

Parameters

interface (OPTIONAL) Enter any of the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults Not configured.

Command Modes INTERFACE PORTCHANNEL

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information Use the `interface port-channel` command to access this command.

You cannot add an interface to a Port Channel if the interface contains an IP address in its configuration. Only the `shutdown`, `description`, `mtu`, and `ip mtu` commands can be configured on an interface if it is added to a Port Channel. The `mtu` and `ip mtu` commands are only available when the chassis is in Jumbo mode.

Link MTU and IP MTU considerations for Port Channels are:

- All members must have the same link MTU value and the same IP MTU value.
- The Port Channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if the members have a link MTU of 2100 and an IP MTU 2000, the Port Channel's MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

When an interface is removed from a Port Channel with the `no channel-member` command, the interface reverts to its configuration prior to joining the Port Channel.

An interface can belong to only one Port Channel.

You can have 16 interfaces per port channel. The interfaces can be located on different line cards but must be the same physical type and speed (for example, all 10-Gigabit Ethernet interfaces).

For more information about Port Channels, refer to the *Dell EMC Networking OS Configuration Guide*.

Related Commands

- description — assign a descriptive text string to the interface.
- interface port-channel — create a Port Channel interface.
- shutdown — disable/enable the port channel.

group

Group two LAGs in a supergroup ("fate-sharing group" or "failover group").

Syntax

`group group_number port-channel number port-channel number`

To remove an existing LAG supergroup, use the `no group group_number` command.

Parameters

group_number	Enter an integer from 1 to 32 that uniquely identifies this LAG fate-sharing group.
port-channel *number*	Enter the keywords `port-channel` then an existing LAG number. Enter this keyword/variable combination twice, identifying the two paired LAGs.

Defaults

None

Command Modes

PORT-CHANNEL FAILOVER-GROUP (conf-po-failover-grp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Related Commands

- port-channel failover-group — access PORT-CHANNEL FAILOVER-GROUP mode to configure a LAG failover group.
- show interfaces port-channel — display information on configured Port Channel groups.

interface port-channel

Create a Port Channel interface, which is a link aggregation group (LAG) containing 16 physical interfaces on the S-Series.

Syntax

`interface port-channel` *`channel-number`*

To delete a Port Channel, use the `no interface port-channel` *`channel-number`* command.

Parameters

channel-number For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 1284096.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Increased the number of port channels to 4096.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on S4810.
8.3.11.1	Introduced on Z9000.
8.1.1.0	Introduced on E-Series.
7.6.1.0	Introduced on S-Series.
7.5.1.0	Introduced on C-Series.
pre-Version 6.2.1.0	Introduced on E-Series.

Usage Information

Port Channel interfaces are logical interfaces and can be either in Layer 2 mode (by using the `switchport` command) or Layer 3 mode (by configuring an IP address). You can add a Port Channel in Layer 2 mode to a VLAN.

The `shutdown`, `description`, and `name` commands are the only commands that you can configure on an interface while it is a member of a Port Channel. To add a physical interface to a Port Channel, the interface can only have the `shutdown`, `description`, and `name` commands configured. The Port Channel's configuration is applied to the interfaces within the Port Channel.

A Port Channel can contain any physical interface. Based on the first interface configured in the Port Channel and enabled, Dell EMC Networking OS determines the common speed. For more information, refer to channel-member.

If the line card is in a Jumbo mode chassis, you can also configure the `mtu` and `ip mtu` commands. The Link MTU and IP MTU values configured on the channel members must be greater than the Link MTU and IP MTU values configured on the Port Channel interface.

If the stack—unit card is in a Jumbo mode chassis, you can also configure the `mtu` and `ip mtu` commands. The Link MTU and IP MTU values configured on the channel members must be greater than the Link MTU and IP MTU values configured on the Port Channel interface.

NOTE: In a Jumbo-enabled system, all members of a Port Channel must be configured with the same link MTU values and the same IP MTU values.

Example

```
DellEMC(conf)# int port-channel 2
DellEMC(conf-if-po-2)#
```

Related Commands

- channel-member — add a physical interface to the LAG.
- interface — configure a physical interface.
- interface loopback — configure a Loopback interface.
- interface null — configure a null interface.
- interface vlan — configure a VLAN.
- shutdown — disable/enable the port channel.

minimum-links

Configure the minimum number of links in a LAG (Port Channel) that must be in "oper up" status for the LAG to be also in "oper up" status.

Syntax `minimum-links number`

Parameters

number	Enter the number of links in a LAG that must be in "oper up" status. The range is from 1 to 16. The default is **1**.

Defaults **1**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If you use this command to configure the minimum number of links in a LAG that must be in “oper up” status, the LAG must have at least that number of “oper up” links before it can be declared as up. For example, if the required minimum is four, and only three are up, the LAG is considered down.

port-channel failover-group

To configure a LAG failover group, access PORT-CHANNEL FAILOVER-GROUP mode.

Syntax

```
port-channel failover-group
```

To remove all LAG failover groups, use the `no port-channel failover-group` command.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.

Usage Information

This feature groups two LAGs to work in tandem as a supergroup. For example, if one LAG goes down, the other LAG is taken down automatically, providing an alternate path to reroute traffic, avoiding oversubscription on the other LAG. You can use both static and dynamic (LACP) LAGs to configure failover groups. For more information, see the “Port Channel” section in the *Dell EMC Networking OS Configuration Guide*.

Related Command

- group — group two LAGs in a supergroup (“fate-sharing group”).
- show interfaces port-channel — display information on configured Port Channel groups.

show interfaces port-channel

Display information on configured Port Channel groups.

`

Syntax `show interfaces port-channel [channel-number] [brief] [description]`

Parameters

channel-number For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 1284096.

NOTE: This command also enables you to view information corresponding to a range of ports.

- For port-channel interfaces, you can specify multiple ports as `port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces port-channel 1 - 4`.

brief (OPTIONAL) Enter the keyword `brief` to display only the port channel number, the state of the port channel, and the number of interfaces in the port channel.

description (OPTIONAL) Displays the port-channel information with description.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Increased the number of port channels to 4096.
9.9(0.0)	Added support to display the interface configurations corresponding to a range of ports.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series. Modified to display the LAG failover group status.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information The following describes the `show interfaces port-channel` command shown in the following example.

Field	Description
Port-Channel 1...	Displays the LAG's status. In the Example, the status of the LAG's LAG fate-sharing group ("Failover-group") is listed.
Hardware is...	Displays the interface's hardware information and its assigned MAC address.
Port-channel is part...	Indicates whether the LAG is part of a LAG fate-sharing group ("Failover-group").
Internet address...	States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
MTU 1554...	Displays link and IP MTU.
LineSpeed	Displays the interface's line speed. For a port channel interface, it is the line speed of the interfaces in the port channel.
Members in this...	Displays the interfaces belonging to this port channel.
ARP type:...	Displays the ARP type and the ARP timeout value for the interface.
Last clearing...	Displays the time when the `show interfaces` counters were cleared.
Queueing strategy.	States the packet queuing strategy. FIFO means first in first out.
packets input...	Displays the number of packets and bytes into the interface.
Input 0 IP packets...	Displays the number of packets with IP headers, VLAN tagged headers, and MPLS headers. The number of packets may not add correctly because a VLAN tagged IP packet counts as both a VLAN packet and an IP packet.
0 64-byte...	Displays the size of packets and the number of those packets entering that interface. This information is displayed over two lines.
Received 0...	Displays the type and number of errors or other specific packets received. This information is displayed over three lines.
Output 0...	Displays the type and number of packets sent out the interface. This information is displayed over three lines.
Rate information...	Displays the traffic rate information into and out of the interface. Traffic rate is displayed in bits and packets per second.
Time since...	Displays the time since the last change in the configuration of this interface.

Example

```
DellEMC# show interfaces port-channel 20
Port-channel 20 is up, line protocol is up (Failover-group 1 is down)
Hardware address is 00:01:e8:01:46:fa
Port-channel is part of failover-group 1
Internet address is 1.1.120.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 2000 Mbit
Members in this channel: Hu 1/5 Hu 1/18
ARP type: ARPA, ARP timeout 04:00:00
Last clearing of "show interfaces" counters 00:00:00
Queueing strategy: fifo
  44507301 packets input, 3563070343 bytes
  Input 44506754 IP Packets, 0 Vlans 0 MPLS
  41 64-byte pkts, 44502871 over 64-byte pkts, 249 over 127-byte pkts
  407 over 255-byte pkts, 3127 over 511-byte pkts, 606 over 1023-byte
pkts
  Received 0 input symbol errors, 0 runts, 0 giants, 0 throttles
  0 CRC, 0 IP Checksum, 0 overrun, 0 discarded
  1218120 packets output, 100745130 bytes, 0 underruns
  Output 5428 Multicasts, 4 Broadcasts, 1212688 Unicasts
  1216142 IP Packets, 0 Vlans, 0 MPLS
  0 throttles, 0 discarded
Rate info (interval 299 sec):
  Input 01.50Mbits/sec, 2433 packets/sec
```

```
  Output 00.02Mbits/sec,4 packets/sec
Time since last interface status change: 00:22:34

DellEMC#
```

User Information

The following describes the `show interfaces port-channel brief` command shown in the following example.

Field	Description
LAG	Lists the port channel number.
Mode	Lists the mode: • L3 — for Layer 3 • L2 — for Layer 2
Status	Displays the status of the port channel. • down — if the port channel is disabled (`shutdown`) • up — if the port channel is enabled (`no shutdown`)
Uptime	Displays the age of the port channel in hours:minutes:seconds.
Ports	Lists the interfaces assigned to this port channel.
(untitled)	Displays the status of the physical interfaces (up or down). • In Layer 2 port channels, an * (asterisk) indicates which interface is the primary port of the port channel. The primary port sends out interface PDU. • In Layer 3 port channels, the primary port is not indicated.

Example

```
DellEMC# show interfaces port-channel 1 brief

LAG Mode Status Uptime    Ports
1   L2   up     00:00:08  Tf 1/1    (Up) *
                          Tf 1/2    (Down)
                          Tf 1/3    (Up)
DellEMC#
```

Related Commands

- show lacp — display the LACP matrix.

show port-channel-flow

Display an egress port in a given port-channel flow.

Syntax

```
show port-channel-flow outgoing-port-channel number incoming-interface
interface {source-ip address destination-ip address} | {source-port number
destination-port number} | {source-mac address destination-mac address
{vlan vlanid | ether-type}}
```

Parameters

outgoing-port-channel *number*	Enter the keywords `outgoing-port-channel` then the number of the port channel to display flow information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 1284096.
incoming-interface *interface*	Enter the keywords `incoming-interface` then the interface type and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.

- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

source-ip *address*	Enter the keywords `source-ip` then the IP source address in IP address format.
destination-ip *address*	Enter the keywords `destination-ip` then the IP destination address in IP address format.
source-port *number*	Enter the keywords `source-port` then the source port number. The range is from 1 to 65536. The default is **None**.
destination-port *number*	Enter the keywords `destination-port` then the destination port number. The range is from 1 to 65536. The default is **None**.
source-mac *address*	Enter the keywords `source-mac` then the MAC source address in the nn:nn:nn:nn:nn:nn format.
destination-mac *address*	Enter the keywords `destination-mac` then the MAC destination address in the nn:nn:nn:nn:nn:nn format.
vlan *vlan-id*	Enter the keywords `vlan` then the VLAN-id. The range is from 0 to 4094.
ether-type	Enter the keywords `ether-type` in the XX:XX format.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Increased the number of port channels to 4096.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.

Usage Information Because this command calculates based on a Layer 2 hash algorithm, use this command to display flows for switched Layer 2 packets, not for routed packets (use the `show ip flow` command to display routed packets).

The `show port-channel-flow` command returns the egress port identification in a given port-channel if a valid flow is entered. A mismatched flow error occurs if MAC-based hashing is configured for a Layer 2 interface and you are trying to display a Layer 3 flow.

The output displays three entries:

- Egress port for unfragmented packets.
- In the event of fragmented packets, the egress port of the first fragment.
- In the event of fragmented packets, the egress port of the subsequent fragments.

NOTE: In the `show port channel flow` command output, the egress port for an unknown unicast, multicast, or broadcast traffic is not displayed.

The following example shows the `show port-channel-flow outgoing-port-channel` *number* `incoming-interface` *interface* `source-mac` *address* `destination-mac` *address*

- Load-balance is configured for MAC
- Load-balance is configured for IP 4-tuple/2-tuple
- A non-IP payload is going out of Layer 2 LAG interface that is a member of VLAN with an IP address

Example

```
DellEMC# show port-channel-flow outgoing-port-channel 1 incoming-
interface tw 1/3
source-mac 00:00:50:00:00:00 destination-mac 00:00:a0:00:00:00

    Egress Port for port-channel 1, for the given flow, is Tf 1/2
```

Enhanced Validation of Interface Ranges

You can avoid specifying spaces between the range of interfaces, separated by commas, that you configure by using the `interface range` command. For example, if you enter a list of interface ranges, such as `interface range hu 1/49,fo 1/50/1`, this configuration is considered valid. The comma-separated list is not required to be separated by spaces in between the ranges. You can associate multicast MAC or hardware addresses to an interface range and VLANs by using the `mac-address-table static` *multicast-mac-address* `vlan` *vlan-id* `output-range` *interface* command.

ip http source-interface

Specify an interface as the source interface for HTTP connections.

Syntax **ip http source-interface** *interface*

To delete an interface, use the**no ip http source-interface** *interface* command.

Parameters

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.1)	Introduced on the S4810, S4820T, S6000, and Z9000.
8.3.11.1	Introduced on the Z9000
8.2.1.0	Increased number of VLANs to 4094 (was 2094)
8.1.1.0	Introduced on E-Series
7.6.1.0	Support added for S-Series
7.5.1.0	Introduced on C-Series

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IPv4 Routing

The basic IPv4 commands are supported by Dell EMC Networking OS on the platform.

Topics:

- arp
- arp backoff-time
- arp learn-enable
- arp max-entries
- arp retries
- arp timeout
- clear arp-cache
- clear host
- clear ip fib stack-unit
- clear ip route
- clear tcp statistics
- debug arp
- debug ip dhcp
- debug ip icmp
- debug ip packet
- icmp6-redirect enable
- ip address
- ip directed-broadcast
- ip domain-list
- ip domain-lookup
- ip domain-name
- ip helper-address
- ip helper-address hop-count disable
- ip host
- ip icmp source-interface
- ipv6 icmp source-interface
- ip max-frag-count
- ip name-server
- ip proxy-arp
- ip route
- ip source-route
- ip tcp initial-time
- ip unknown-unicast
- ipv4 unicast-host-route
- show ip tcp initial-time
- ip unreachables
- load-balance
- load-balance hg
- management route
- show arp
- show arp retries
- show hosts
- show ip cam stack-unit
- show ip fib stack-unit
- show ip flow
- show ip interface

- show ip management-route
- show ipv6 management-route
- show ip protocols
- show ip route
- show ip route list
- show ip route summary
- show ip traffic
- show tcp statistics

arp

To associate an IP address with a MAC address in the switch, use address resolution protocol (ARP).

Syntax

`arp [vrf vrf-name] ip-address mac-address interface`

To remove an ARP address, use the `no arp ip-address` command.

Parameters

vrf *vrf-name*	Enter a VRF name to configure an ARP entry for that VRF. Use the VRF option after the keyword `arp` to configure a static arp on that particular VRF.
ip-address	Enter an IP address in dotted decimal format.
mac-address	Enter a MAC address in nnnn.nnnn.nnnn format.
interface	Enter any of the following keywords and the interface information: ● For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. ● For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. ● For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. ● For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. ● For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. ● For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information. ● For a port channel interface, enter the keywords `port-channel` then a number.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information

You cannot use Class D or Class E IP addresses or zero IP address (0.0.0.0) when creating a static ARP. Zero MAC addresses (00:00:00:00:00:00) are also invalid.

You can use the `vrf` attribute of this command to create a static ARP entry on either a default or a non-default VRF. You cannot use this parameter to create any static ARPs corresponding to management VRFs. When a VRF is deleted using the `no ip vrf` command, all the static ARP configurations that belong to that VRF are removed automatically.

Although static ARP entries take precedence over dynamically-learnt ARP entries, a static ARP entry that points to a wrong port is not included in the FIB or ARP entries.

Related Commands

- clear arp-cache — clear dynamic ARP entries from the ARP table.
- show arp — display the ARP table.

arp backoff-time

Set the exponential timer for resending unresolved ARPs.

Syntax `arp backoff-time seconds`

Parameters

seconds	Enter the number of seconds an ARP entry is black-holed. The range is from 1 to 3600. The default is **30**.

Defaults **30**

Command Mode CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information

This timer is an exponential backoff timer. Over the specified period, the time between ARP requests increases. This behavior reduces the potential for the system to slow down while waiting for a multitude of ARP responses.

Related Commands

- show arp retries — display the configured number of ARP retries.

arp learn-enable

Enable ARP learning using gratuitous ARP.

Syntax

```
arp learn-enable
```

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced.

Usage Information

In Dell EMC Networking OS versions prior to 8.3.1.0, if a gratuitous ARP is received some time after an ARP request is sent, only RP2 installs the ARP information. For example:

1. At time t=0, Dell EMC Networking OS sends an ARP request for IP *A.B.C.D*.
2. At time t=1, Dell EMC Networking OS receives an ARP request for IP *A.B.C.D*.
3. At time t=2, Dell EMC Networking OS installs an ARP entry for *A.B.C.D* only on RP2.

Beginning with Dell EMC Networking OS version 8.3.1.0, when a gratuitous ARP is received, Dell EMC Networking OS installs an ARP entry on all three CPUs.

arp max-entries

Enables you to configure the maximum number of ARP entries per VRF that are allowed for IPv4..

Syntax

```
arp max-entries [vrf vrf-name] max-number
```

Parameters

vrf *vrf-name*	Enter the name of a specific VRF for which you want to configure maximum number of ARP entries that IPv4 allows.
max-number	Enter the maximum number of ARP entries that a VRF RTM can hold. The range is from 0 to 65535.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S4810 and S4820T.

Usage Information Use this command to specify the maximum number of ARP entries that the Route Table Manager can hold for a specific VRF. This command does not apply to the management VRFs.

arp retries

Set the number of ARP retries in case the system does not receive an ARP reply in response to an ARP request.

Syntax

```
arp retries number
```

Parameters

number	Enter the number of retries. The range is from 1 to 20. The default is **5**.

Defaults **5**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced.

Usage Information Retries are 20 seconds apart.

Related Commands

- show arp retries — display the configured number of ARP retries.

arp timeout

Set the time interval for an ARP entry to remain in the ARP cache.

Syntax `arp timeout minutes`

Parameters

minutes	Enter the number of minutes. The range is from 0 to 35790. The default is **240 minutes**.

Defaults **240 minutes** (4 hours)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

clear arp-cache

Clear the dynamic ARP entries from a specific interface or optionally delete (`no-refresh`) ARP entries from the content addressable memory (CAM).

Syntax `clear arp-cache [vrf vrf-name | interface | ip ip-address] [no-refresh]`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to clear the ARP cache corresponding to that VRF.

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

ip *ip-address* (OPTIONAL) Enter the keyword `ip` then the IP address of the ARP entry you wish to clear.

no-refresh (OPTIONAL) Enter the keywords `no-refresh` to delete the ARP entry from CAM. Or use this option with *`interface`* or `ip` *`ip-address`* to specify which dynamic ARP entries you want to delete.

NOTE: Transit traffic may not be forwarded during the period when deleted ARP entries are resolved again and re-installed in CAM. Use this option with extreme caution.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series (the prior limit was 2094).
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

clear host

Remove one or all dynamically learned host table entries.

Syntax `clear host name`

Parameters

name	Enter the name of the host to delete. Enter * to delete all host table entries.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

clear ip fib stack-unit

Clear all FIB entries in the specified stack unit (use this command with caution, refer to *Usage Information*.)

Syntax `clear ip fib stack-unit` *`unit-number`* `vrf` *`vrf-name`*

Parameters

unit-number	Enter the number of the stack unit.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to clear all FIB entries corresponding to that VRF.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF.

Version	Description
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.19.0	Introduced on the S4820T.

Usage Information

To clear Layer 3 CAM inconsistencies, use this command.

CAUTION: Executing this command causes traffic disruption.

Related Commands

- show ip fib stack-unit — show FIB entries on a specified stack-unit.

clear ip route

Clear one or all routes in the routing table.

Syntax

```
clear ip route [vrf vrf-name] {* | ip-address mask}
```

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF to clear the routes corresponding to that VRF.
*	Enter an asterisk (*) to clear all learned IP routes.
ip-address mask	Enter a specific IP address and mask in dotted decimal format to clear that IP address from the routing table.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

Use the `vrf vrf-name` attribute of this command to clear routes corresponding to either a specific VRF or the default VRF.

You cannot use this attribute to clear routes corresponding to a management VRF.

Related Commands

- ip route — assign an IP route to the switch.
- show ip route — view the routing table.
- show ip route summary — view a summary of the routing table.

clear tcp statistics

Clear TCP counters.

Syntax

```
clear tcp statistics [all | cp]
```

Parameters

all	Enter the keyword `all` to clear all TCP statistics maintained on all switch processors.
cp	(OPTIONAL) Enter the `cp` to clear only statistics from the Control Processor.
rp	(OPTIONAL) Enter the keyword `rp` to clear only the statistics from Route Processor.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Version	Description
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

debug arp

View information on ARP transactions.

Syntax `debug arp [interface] [count value]`

To stop debugging ARP transactions, use the `no debug arp` command.

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

count *value* (OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series(the prior limit was 2094).
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Added the `count` option.

Usage Information To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

debug ip dhcp

Enable debug information for dynamic host configuration protocol (DHCP) relay transactions and display the information on the console.

Syntax `debug ip dhcp`

To disable debug, use the `no debug ip dhcp` command.

Defaults Debug disabled

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.10	Introduced on the E-Series.

Example

```
DellEMC# debug ip dhcp
00:12:21 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at
interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xbf05140f, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:21 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:26 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at
interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xbf05140f, secs = 5, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:26 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:40 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at
interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:40 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at interface
14.4.4.1 BOOTP Reply,
hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr
= 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for 00:60:CF:20:7B:8C
to 113.3.3.254
00:12:42 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at
interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:42 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at interface
14.4.4.1 BOOTP Reply,
hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr
= 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for 00:60:CF:20:7B:8C
to 113.3.3.254
DellEMC#
```

Related Commands

- ip helper-address – specify the destination broadcast or host address for the DHCP server request.
- ip helper-address hop-count disable – disable the hop-count increment for the DHCP relay agent.

debug ip icmp

View information on the internal control message protocol (ICMP).

Syntax

```
debug ip icmp [interface] [count value]
```

To disable debugging, use the `no debug ip icmp` command.

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

count *value* (OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534. The default is **Infinity**.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series (the prior limit was 2094).
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Added the `count` option.

Example

```
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
```

```
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40
```

Usage Information To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

debug ip packet

View a log of IP packets sent and received.

Syntax `debug ip packet [access-group name] [count value] [interface]`

To disable debugging, use the `no debug ip packet [access-group name] [count value] [interface]` command.

Parameters

access-group *name*	Enter the keyword `access-group` then the access list name (maximum 16 characters) to limit the debug output based on the defined rules in the ACL.
count *value*	(OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534. The default is `Infinity`.
interface	(OPTIONAL) Enter the following keywords and the interface information: • • For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series (the prior limit was 2094).

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Added the `access-group` option.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Added the `count` option.

Usage Information

The following describes the `debug ip packet` command in the following example.

Field	Description
s=	Lists the source address of the packet and the name of the interface (in parentheses) that received the packet.
d=	Lists the destination address of the packet and the name of the interface (in parentheses) through which the packet is being sent out on the network.
len	Displays the packet's length.
sending, rcvd, fragment, sending broad/ multicast proto, unroutable	The last part of each line lists the status of the packet.
TCP src=	Displays the source and destination ports, the sequence number, the acknowledgement number, and the window size of the packets in that TCP packets.
UDP src=	Displays the source and destination ports for the UDP packets.
ICMP type=	Displays the ICMP type and code.
IP Fragment	States that it is a fragment and displays the unique number identifying the fragment (Ident) and the offset (in 8-byte units) of this fragment (fragment offset) from the beginning of the original datagram.

Example

```
IP: s=10.1.2.62 (local), d=10.1.2.206 (Ma 1/1), len 54, sending
    TCP src=23, dst=40869, seq=2112994894, ack=606901739, win=8191 ACK
PUSH
IP: s=10.1.2.206 (Ma 1/1), d=10.1.2.62, len 40, rcvd
    TCP src=0, dst=0, seq=0, ack=0, win=0
IP: s=10.1.2.62 (local), d=10.1.2.206 (Ma 1/1), len 226, sending
    TCP src=23, dst=40869, seq=2112994896, ack=606901739, win=8192 ACK
PUSH
IP: s=10.1.2.216 (Ma 1/1), d=10.1.2.255, len 78, rcvd
    UDP src=0, dst=0
IP: s=10.1.2.62 (local), d=10.1.2.3 (Ma 1/1), len 1500, sending fragment
    IP Fragment, Ident = 4741, fragment offset = 0
    ICMP type=0, code=0
IP: s=10.1.2.62 (local), d=10.1.2.3 (Ma 1/1), len 1500, sending fragment
    IP Fragment, Ident = 4741, fragment offset = 1480
IP: s=40.40.40.40 (local), d=224.0.0.5 (Tf 1/11), len 64, sending broad/
multicast
proto=89
IP: s=40.40.40.40 (local), d=224.0.0.6 (Tf 1/11), len 28, sending broad/
multicast
proto=2
IP: s=0.0.0.0, d=30.30.30.30, len 100, unroutable
   ICMP type=8, code=0
IP: s=0.0.0.0, d=30.30.30.30, len 100, unroutable
   ICMP type=8, code=0
```

Usage Information

To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

The `access-group` option supports only the equal to (`eq`) operator in TCP ACL rules. Port operators not equal to (`neq`), greater than (`gt`), less than (`lt`), or `range` are not supported in access-group option (refer to the following example). ARP packets (`arp`) and Ether-type (`ether-type`) are also not supported in the `access-group` option. The entire rule is skipped to compose the filter.

The `access-group` option pertains to:

- IP protocol number: from 0 to 255
- Internet control message protocol (`icmp`) but not the ICMP message type (from 0 to 255)
- Any internet protocol (`ip`)
- Transmission Control Protocol (`tcp`) but not on the `rst`, `syn`, or `urg` bits
- User Datagram Protocol (`udp`)

In the case of ambiguous access control list rules, the `debug ip packet access-control` command is disabled. A message appears identifying the error (refer to the Example below).

Example (Error Messages)

```
DellEMC# debug ip packet access-group test
%Error: port operator GT not supported in access-list debug
%Error: port operator LT not supported in access-list debug
%Error: port operator RANGE not supported in access-list debug
%Error: port operator NEQ not supported in access-list debug

DellEMC#00:10:45: %RPM0-P:CP
%IPMGR-3-DEBUG_IP_PACKET_ACL_AMBIGUOUS_EXP: Ambiguous rules not
supported in access-list debug, access-list debugging is turned off
DellEMC#
```

icmp6-redirect enable

Enable ICMP and ICMP6 redirects.

Syntax `icmp6-redirect enable`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
Legacy command	Legacy command

Usage Information Use this command to notify hosts on the same network that a better route is available for a specific destination.

The `icmp6-redirect enable` command is applicable for both IP and IPv6 routes.

ip address

Assign a primary and secondary IP address to the interface.

Syntax `ip address ip-address mask [secondary]`

To delete an IP address from an interface, use the `no ip address [ip-address]` command.

Parameters

ip-address	Enter an IP address in dotted decimal format.
mask	Enter the mask of the IP address in slash prefix format (for example, /24).

secondary	(OPTIONAL) Enter the keyword `secondary` to designate the IP address as the secondary address.

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information You must be in INTERFACE mode before you add an IP address to an interface. Assign an IP address to an interface prior to entering ROUTER OSPF mode.

ip directed-broadcast

Enables the interface to receive directed broadcast packets.

Syntax `ip directed-broadcast`

To disable the interface from receiving directed broadcast packets, use the `no ip directed-broadcast` command.

Defaults Disabled (that is, the interface does not receive directed broadcast packets)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

ip domain-list

Configure names to complete unqualified host names.

Syntax `ip domain-list name`

To remove the name, use the `no ip domain-list name` command.

Parameters

name	Enter a domain name to be used to complete unqualified names (that is, incomplete domain names that cannot be resolved).

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

To configure a list of possible domain names, configure the `ip domain-list` command up to six times.

If you configure both the `ip domain-name` and `ip domain-list` commands, the software tries to resolve the name using the `ip domain-name` command. If the name is not resolved, the software goes through the list of names configured with the `ip domain-list` command to find a match.

To enable dynamic resolution of hosts, use the following steps:

- specify a domain name server with the `ip name-server` command
- enable DNS with the `ip domain-lookup` command

To view current bindings, use the `show hosts` command. To view a DNS-related configuration, use the `show running-config resolve` command.

Related Commands

- ip domain-name — specify a DNS server.

ip domain-lookup

To address resolution (that is, DNS), enable dynamic host-name.

Syntax

```
ip domain-lookup
```

To disable DNS lookup, use the `no ip domain-lookup` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

To fully enable DNS, also specify one or more domain name servers with the `ip name-server` command.

Dell EMC Networking OS does not support sending DNS queries over a VLAN. DNS queries are sent out all other interfaces, including the Management port.

To view current bindings, use the `show hosts` command.

Related Commands

- ip name-server — specify a DNS server.
- show hosts — view the current bindings.

ip domain-name

Configure one domain name for the switch.

Syntax

`ip domain-name` *name*

To remove the domain name, use the `no ip domain-name` command.

Parameters

name	Enter one domain name to be used to complete unqualified names (that is, incomplete domain names that cannot be resolved).

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

You can only configure one domain name with the `ip domain-name` command. To configure more than one domain name, configure the `ip domain-list` command up to six times.

To enable dynamic resolution of hosts, use the following steps:

- specify a domain name server with the `ip name-server` command
- enable DNS with the `ip domain-lookup` command

To view current bindings, use the `show hosts` command.

Related Commands

- ip domain-list — configure additional names.

ip helper-address

Specify the address of a DHCP server so that DHCP broadcast messages can be forwarded when the DHCP server is not on the same subnet as the client.

Syntax

`ip helper-address` *`ip-address`*

To remove a DHCP server address, use the `no ip helper-address` command.

Parameters

ip-address	Enter an IP address in dotted decimal format (A.B.C.D).

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
9.0.0.0	Added support for IPv6.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

You can add multiple DHCP servers by entering the `ip helper-address` command multiple times. If multiple servers are defined, an incoming request is sent simultaneously to all configured servers and the reply is forwarded to the DHCP client.

Dell EMC Networking OS uses standard DHCP ports, that is UDP ports 67 (server) and 68 (client) for DHCP relay services. It listens on port 67 and if it receives a broadcast, the software converts it to unicast, and forwards to it to the DHCP-server with source port=68 and destination port=67.

The server replies with source port=67, destination port=67 and Dell EMC Networking OS forwards to the client with source port=67, destination port=68.

ip helper-address hop-count disable

Disable the hop-count increment for the DHCP relay agent.

Syntax

```
ip helper-address hop-count disable
```

To re-enable the hop-count increment, use the `no ip helper-address hop-count disable` command.

Defaults

Enabled; the hops field in the DHCP message header is incremented by default.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced for the E-Series.

Usage Information

This command disables the incrementing of the hops field when boot requests are relayed to a DHCP server through Dell EMC Networking OS. If the incoming boot request already has a non-zero hops field, the message is relayed with the same value for hops. However, the message is discarded if the hops field exceeds 16, to comply with the relay agent behavior specified in RFC 1542.

Related Commands

- ip helper-address — specify the destination broadcast or host address for DHCP server requests.
- show running-config — display the current configuration and changes from the default values.

ip host

Assign a name and an IP address to the host-to-IP address mapping table.

Syntax

`ip host name ip-address`

To remove an IP host, use the `no ip host name [ip-address]` command.

Parameters

name	Enter a text string to associate with one IP address.
ip address	Enter an IP address, in dotted decimal format, to be mapped to the name.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced for the E-Series.

ip icmp source-interface

Enable the ICMP error and unreachable messages to be sent with the source interface IP address, such as the loopback address, instead of the hops of the preceding devices along the network path to be used for easy debugging and diagnosis of network disconnections and reachability problems with IPv4 packets.

Syntax `ip icmp source-interface interface`

Parameters

interface Enter one of the following keywords and slot/port or number information:

- For a Management Ethernet interface, enter the keyword `managementethernet`.

  NOTE:
  - When you configure the capability to enable the loopback IP address to be sent for easy debugging and diagnosis (IP addresses of the devices for which the ICMP source interface is configured), the source IP address of the outgoing ICMP error message is modified, although the packets are not sent out using the configured interface. Because the management interface is configured without any parameters such as the IP address, it is treated to the management interface of the primary unit or the existing unit.
  - For ICMP, a user can specify one source-interface for each VRF and let it be the default, management or any other VRF created. For other protocols (Telnet, SSH, FTP, TFTP), where the source interface can be specified, only one interface can be chosen. This is for all VRFs combined.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

You can enable the mechanism to configure the source or the originating interface from which the packet (the device that generates the ICMP error messages) is received by the switch to send the loopback address instead of its source IP address to be used in the ICMP unreachable messages and in the `traceroute` command output. The loopback address must be unique in a particular domain.

In network environments that contain a large number of devices, ranging up to thousands of systems, and with each device configured for equal-cost multipath (ECMP) links, you cannot effectively and optimally use the traceroute and ping applications to examine the network reachablity and identify any broken links for diagnostic purposes. In such cases, if the reply that is obtained from each hop on the network path contains the IP address of the adjacent, neighboring interface from which the packet is received, it is difficult to employ the ping and traceroute utilites. You can enable the ICMP unreachable messages to contain the loopback address of the source device instead of the previous hop's IP address to be able to easily and quickly identify the device and devices along the path because the DNS server maps the loopback IP address to the hostname and does not translate the IP address of every interface of the switch to the hostname.

Example

```
DellEMC(conf)# ip icmp source-interface twentyFiveGigE 1/1
DellEMC(conf)#
```

ipv6 icmp source-interface

Enable the ICMP error and unreachable messages to be sent with the source interface IP address, such as the loopback address, instead of the hops of the preceding devices along the network path to be used for easy debugging and diagnosis of network disconnections and reachability problems with IPv6 packets.

Syntax `ipv6 icmp source-interface` *`interface`*

Parameters

interface Enter one of the following keywords and slot/port or number information:

- For a Management Ethernet interface, enter the keyword `managementethernet`.

  NOTE: When you configure the capability to enable the loopback IP address to be sent for easy debugging and diagnosis (IP addresses of the devices for which the ICMP source interface is configured), the source IP address of the outgoing ICMP error message is modified, although the packets are not sent out using the configured interface. Because the management interface is configurable only without any parameters such as the IP address, it is treated to the management interface of the primary unit or the existing unit.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information You can enable the mechanism to configure the source or the originating interface from which the packet (the device that generates the ICMP error messages) is received by the switch to send the loopback address instead of its source IP address to be used in the ICMP unreachable messages and in the `traceroute` command output. The loopback address must be unique in a particular domain.

In network environments that contain a large number of devices, ranging up to thousands of systems, and with each device configured for equal-cost multipath (ECMP) links, you cannot effectively and optimally use the traceroute and ping applications to examine the network reachablity and identify any broken links for diagnostic purposes. In such cases, if the reply that is obtained from each hop on the network path contains the IP address of the adjacent, neighboring interface from which the packet is received, it is difficult to employ the ping and traceroute utilites. You can enable the ICMP unreachable messages to contain the loopback address of the source device instead of the previous hop's IP address to be able to easily and quickly identify the device and devices along the path because the DNS server maps the loopback IP address to the hostname and does not translate the IP address of every interface of the switch to the hostname

Example

```
DellEMC(conf)# ipv6 icmp source-interface twentyFiveGigE 1/1
DellEMC(conf)#
```

ip max-frag-count

Set the maximum number of fragments allowed in one packet for packet re-assembly.

Syntax

`ip max-frag-count count`

To place no limit on the number of fragments allowed, use the `no ip max-frag-count` command.

Parameters

count	Enter a number for the number of fragments allowed for re-assembly. The range is from 2 to 256.

Defaults

No limit is set on number of fragments allowed.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced for the E-Series.

Usage Information

To avoid denial of service (DOS) attacks, keep the number of fragments allowed for re-assembly low.

ip name-server

Enter up to six IPv4 addresses of name servers. The order you enter the addresses determines the order of their use.

Syntax

`ip name-server ipv4-address [ipv4-address2...ipv4-address6]`

To remove a name server, use the `no ip name-server ip-address` command.

Parameters

ipv4-address	Enter the IPv4 address, in dotted decimal format, of the name server to be used.
ipv4-address2... ipv4-address6	(OPTIONAL) Enter up five more IPv4 addresses, in dotted decimal format, of name servers to be used. Separate the addresses with a space.

Defaults No name servers are configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information Dell EMC Networking OS does not support sending DNS queries over a VLAN. DNS queries are sent out on all other interfaces, including the Management port.

You can separately configure both IPv4 and IPv6 domain name servers.

In a dual stack setup, the system sends both A (request for IPv4 — RFC 1035) and AAAA (request for IPv6 — RFC 3596) record requests to a DNS server even if only the ip name-server command is configured.

ip proxy-arp

Enable proxy ARP on an interface.

Syntax `ip proxy-arp`

To disable proxy ARP, use the `no ip proxy-arp` command.

Defaults Enabled.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Related Commands

- show ip interface — display the interface routing status and configuration.

ip route

Assign a static route to the switch.

Syntax

`ip route [vrf vrf-name] ip-address mask {ip-address | interface [ip-address]} [distance] [name description] [permanent] [tag tag-value] [vrf vrf-name] [weight weight-value]`

To delete a specific static route, use the `no ip route destination mask` command.

To delete all routes matching a certain route, use the `no ip route destination mask` command.

Parameters

vrf *vrf-name*	(Optoinal) Enter the keyword `vrf` and then the name of the VRF to configure a static route corresponding to that VRF. Use this VRF option after the `ip route` keyword to configure a static route on that particular VRF.
destination	Enter the IP address in dotted decimal format of the destination device.
mask	Enter the mask in the slash prefix format (`/x`) of the destination IP address.
ip-address	Enter the IP address of the forwarding router in dotted decimal format.
interface	Enter one of the following keyword followed by the interface information • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a tunnel interface, enter the keyword tunnel then the tunnel interface number. The range is from 1 to 16383.

If you configure a static IPv6 route using an egress interface and enter the ping command to reach the destination IPv6 address, the ping operation may not work. Configure the IPv6 route using a next-hop IPv6 address in order for the ping command to detect the destination address.

interface *ip-address* Enter the keyword `interface` then the IP address.

distance (OPTIONAL) Enter the value of the distance metric assigned to the route. The range is from 1 to 255.

name *description* (OPTIONAL) Enter the keyword `name` and the description for the IPv4 static route configuration.

permanent (OPTIONAL) Enter the keyword `permanent` to specify that the route must not be removed even if the interface assigned to that route goes down. The route must be currently active to be installed in the routing table. If you disable the interface, the route is removed from the routing table.

tag *tag-value* (OPTIONAL) Enter the keyword `tag` then a number to assign to the route. The range is from 1 to 4294967295.

vrf *vrf-name* Enter the keyword `vrf` followed by the name of the VRF. Use this VRF option after the next hop to specify which VRF the next hop belongs to. This setting is used in route leaking cases. See "R"oute Leaking VRFs" in the Virtual Routing and Forwarding (VRF) section of the Configuration guide.

weight *weight-value* Enter the keyword `weight` followed by a weight value. The range is from 0 to 255.

NOTE: Weight for a static route can be added only for the destination address and not for the route pointing to destination a interface.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.2)	Added the keyword `name` for static routes.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Included the `weighted` parameter to support weighted ECMP feature.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2.(0.0)	Added support for tunnel interface type.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series (the prior limit was 2094).
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

Using the following example of a static route: ip route 33.33.33.0 /24 twentyfiveGigE 1/1 172.31.5.43

- The software installs a next hop that is not on the directly connected subnet but which recursively resolves to a next hop on the interface's configured subnet. In the example, if twentyfiveGigE 1/1 has an ip address on subnet 2.2.2.0 and if 172.31.5.43 recursively resolves to 2.2.2.0, Dell EMC Networking OS installs the static route.
- When the interface goes down, Dell EMC Networking OS withdraws the route.
- When the interface comes up, Dell EMC Networking OS re-installs the route.
- When recursive resolution is "broken," Dell EMC Networking OS withdraws the route.
- When recursive resolution is satisfied, Dell EMC Networking OS re-installs the route.

You can specify a weight for an IPv4 or IPv6 static route. If the weight value of a path is 0, then that path is not used for forwarding when weighted ECMP is in effect. Also, if a path corresponding to a static route (destination) has a non-zero weight assigned to it and other paths do not have any weight configured, then regular ECMP is used for forwarding.

You can specify the weight value only to destination address and not on the egress port.

A route is considered for weighted ECMP calculations only if each paths corresponding to that route is configured with a weight.

You cannot use the VRF attribute of this command to configure routes in a management VRF. When a specific VRF is deleted, all the configured static routes corresponding to that VRF are automatically removed.

Example

```
DellEMC(conf)# ip route 1.1.1.0/24 4.4.4.2 weight 100
DellEMC(conf)# ip route 1.1.1.0/24 6.6.6.2 weight 200
DellEMC(conf)# do show running-config | grep route ip route 1.1.1.0/24
4.4.4.2 weight 100 ip route 1.1.1.0/24 6.6.6.2 weight 200
DellEMC(conf)# ip route  vrf test 1.1.1.0/24 4.4.4.2 weight 100
DellEMC(conf)# ip route vrf test  1.1.1.0/24 6.6.6.2 weight 200
```

```
DellEMC(conf)#
DellEMC(conf)# do show running-config | grep route ip route vrf test
 1.1.1.0/24 4.4.4.2 weight 100 ip route vrf test  1.1.1.0/24 6.6.6.2
weight 200
```

Related Commands

- show ip route — view the switch routing table.

ip source-route

Enable Dell EMC Networking OS to forward IP packets with source route information in the header.

Syntax `ip source-route`

To drop packets with source route information, use the `no ip route-source` command.

Defaults Enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

ip tcp initial-time

Define the wait duration in seconds for the TCP connection to be established. This command is supported on the , , , and platforms.

Syntax `ip tcp initial-time <8-75>`

To restore the default behavior, which causes the wait period to be set as 8 seconds, use the `no ip tcp initial-time` command.

Parameters

<8-75>	Wait duration in seconds for the TCP connection to be established.

Command Modes CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information You can configure the amount of time for which the device must wait before it attempts to establish a TCP connection. Using this capability, you can limit the wait times for TCP connection requests. Upon responding to the initial SYN packet that requests a connection to the router for a specific service (such as SSH or BGP) with a SYN ACK, the router waits for a period of time for the ACK packet to be sent from the requesting host that will establish the TCP connection.

ip unknown-unicast

Enable IPv4 catch-all route.

Syntax `ip unknown-unicast [vrf vrf-name]`

To remove the IPv4 catch-all route (0.0.0.0/0) from the LPM route forwarding table in hardware which gets added as a default configuration after the initialization of FIB Agent module, use the `no ip unknown-unicast` command.

Defaults None

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF to enable catch-all routes corresponding to that VRF.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S–Series.

Usage Information Use this command to add the IPv4 catch-all route (0.0.0.0/0) in the LPM route forwarding table if it was deleted using the `no ip unknown-unicast` command previously. This will be the default configuration after reload.

ipv4 unicast-host-route

Enable programming of IPv4 /32 route prefixes in L3 host table.

Syntax `[no] ipv4 unicast-host-route`

Defaults Disabled by default. By default, all the IPv4 route prefixes are installed only in the LPM table.

Command Modes CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.1)	Introduced on the S6000.
9.2(1.0)	Introduced on the Z9500.

Usage Information A warning message is displayed when you enter this command stating that this setting takes effect for existing routes only when IPv4 route prefixes are cleared from the routing table (RTM). To disable this functionality, use no ipv4 unicast-host-route command.

Example

```
DellEMC(conf)#ip unicast-host-route
Warning: Command will take effect for existing routes only when IPv4
route prefixes are cleared from RTM
DellEMC(conf)#no ip unicast-host-route
```

show ip tcp initial-time

Displays the interval that you configured for the device to wait before the TCP connection is attempted to be established.

Syntax `show ip tcp initial-time`

Command Modes EXEC

EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.7(0.1)	Introduced on the S3048-ON.
9.7(0.1)	Introduced on the S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL platforms.

ip unreachables

Enable the generation of internet control message protocol (ICMP) unreachable messages.

Syntax `ip unreachables`

To disable the generation of ICMP messages, use the `no ip unreachables` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

load-balance

By default, for C-Series and S-Series, Dell EMC Networking OS uses an IP 4-tuple (IP SA, IP DA, Source Port, and Destination Port) to distribute IP traffic over members of a Port Channel as well as equal-cost paths. To designate another method to balance traffic over Port Channel members, use the `load-balance` command.

Syntax

```
load-balance {ip-selection [dest-ip | source-ip]} | {mac [dest-mac | source-dest-mac | source-mac]} | {tcp-udp | ingress-port [enable]}
```

To return to the default setting (IP 4-tuple), use the `no load-balance {ip-selection [dest-ip | source-ip]} | {mac [dest-mac | source-dest-mac | source-mac]} | {tcp-udp | ingress-port [enable]}`command.

Parameters

ip-selection {dest-ip | source-ip}
Enter the keywords to distribute IP traffic based on the following criteria:
- `dest-ip` — Uses destination IP address and destination port fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.
- `source-ip` — Uses source IP address and source port fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.

mac {dest-mac | source-dest-mac | source-mac}
Enter the keywords to distribute MAC traffic based on the following criteria:
- `dest-mac` — Uses the destination MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.
- `source-dest-mac` — Uses the destination and source MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.
- `source-mac` — Uses the source MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.

tcp-udp enable
Enter the keywords to distribute traffic based on the following:
- `enable` — Takes the TCP/UDP source and destination ports into consideration when doing hash computations. This option is enabled by default.

ingress-port enable
Enter the keywords to distribute traffic based on the following:
- `enable` — Takes the source port into consideration when doing hash computations. This option is disabled by default.

Defaults
IP 4-tuple (IP source address, IP destination address, VLAN, Protocol, Source Port, Destination Port)

Command Modes
CONFIGURATION

Command History
This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Added the `ingress-port` parameter for the S4810.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Usage Information

By default, Dell EMC Networking OS distributes incoming traffic based on a hash algorithm using the following criteria:

- IP source address
- IP destination address
- VLAN
- Protocol
- TCP/UDP source port
- TCP/UDP destination port

load-balance hg

Choose the traffic flow parameters the hash calculation uses while distributing the traffic across internal higig links.

Syntax

```
[no] load-balance hg {ip-selection | ipv6-selection [source-ip | source-ipv6 | source-port-id | source-module-id | dest-ip | dest-ipv6 | dest-port-id | dest-module-id | protocol | vlan | L4-source-port | L4-dest-port ] | mac [source-mac | source-port-id | source-module-id | dest-mac | dest-port-id | dest-module-id | vlan | ethertype | source-dest-mac ] | tunnel [ipv4-over-ipv4 | ipv4-over-gre-ipv4 | mac-in-mac]}
```

Parameters

{{ip-selection| ipv6-selection [*source-ip* | *source-ipv6* | *source-port-id* | *source-module-id* | *dest-ip* | *dest-ipv6* | *dest-port-id* | *dest-module-id* | *protocol* | *vlan* | *L4-source-port* | *L4-dest-port*]

To use IPv4 key fields in hash computation, enter the keyword `ip-selection` then one of the parameters. To use IPv6 key fields in hash computation, enter the keyword `ipv6-selection` then one of the parameters.

- source-ip — Use IPv4 src-ip field in hash calculation.
- source-ipv6 — Use IPv6 src-ip field in hash calculation
- source-port-id — Use src-port-id field in hash calculation.
- source-module-id — Use src-module-id field in hash calculation.
- dest-ip — Use IPv4 dest-ip field in hash calculation.
- dest-ipv6 — Use IPv6 dest-ip field in hash calculation
- dest-port-id — Use dest-port-id field in hash calculation.
- dest-module-id — Use dest-module-id field in hash calculation.
- protocol — Use IPv4 protocol field in hash calculation.
- vlan — Use vlan field in hash calculation.
- L4-source-port — Use IPv4 L4-source-port field in hash calculation.
- L4-dest-port — Use IPv4 L4-dest-port field in hash calculation.

mac [*source-mac* | *source-port-id* | *source-module-id* | *dest-mac* | *dest-port-id* | *dest-module-id* | *vlan* | *ethertype*

To use MAC key fields in hash computation, enter the keyword `mac` then one of the parameters:

- source-mac — Use source-mac field in hash calculation.
- source-port-id — Use src-port-id field in hash calculation.
- source-module-id — Use src-module-id field in hash calculation.
- dest-mac — Use dest-mac field in hash calculation.

| *source-dest-mac*]	• dest-port-id — Use dest-port-id field in hash calculation. • dest-module-id — Use dest-module-id field in hash calculation. • vlan — Use vlan field in hash calculation . • ethertype — Use Ethertype field in hash calculation. • source-dest-mac — Use SMAC and DMAC fields in hash calculation.
tunnel [*ipv4-over-ipv4* | *ipv4-over-gre-ipv4* | *mac-in-mac*]}	To use tunnel key fields in hash computation, enter the keyword `tunnel` then one of the parameters: • ipv4-over-ipv4 — Use ipv4-over-ipv4 field in hash calculation. • ipv4-over-gre-ipv4 — Use ipv4-over-gre-ipv4 field in hash calculation. • mac-in-mac — Use mac-in-mac field in hash calculation.

Defaults IP selection 5-tuples (source-ip dest-ip vlan protocol L4-source-port L4-dest-port).

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Added support for IPv6.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

management route

Configure a static route that points to the Management interface or a forwarding router.

Syntax

```
management route {ip-address mask | ipv6-address 1.1.1.1prefix-length}
{forwarding-router-address | managementethernet | fortyGigE | vlan |
tengigabitethernet fiftyGigE | twentyFiveGigE | hundredGigE}
```

To remove a static route, use the `no management route` command.

Parameters

ip-address mask	Enter an IP address (dotted decimal format) and mask (/prefix format) of the destination subnet.
ipv6-address prefix-length	Enter an IPv6 address (x:x:x:x::x format) and mask (/prefix format) of the destination subnet. Enter the IPv6 address in the x:x:x:x::x format followed by the prefix length in the /x format.

The range is from /0 to /128.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

forwarding-router-address	Enter an IP address (dotted decimal format) or an IPv6 address (x:x:x:x::x format) of a forwarding router.
managementethernet	Enter the keyword `managementethernet` for the Management interface on the Primary RPM.
fortyGigE	Enter the keyword `fortyGigE` to specify a forty Gigbit Ethernet interface.
vlan	Enter the keyword `vlan` to specify a vlan interface.
tengigabitethernet	Enter the keyword tengigabitethernet to specify a ten Gigabit Ethernet interface.
fiftyGigE	Enter the keyword fiftyGigE to specify a 50 Gigabit Ethernet interface.
hundredGigE	Enter the keyword hundredGigE to specify a 100 Gigabit Ethernet interface.
twentyFiveGigE	Enter the keyword twentyFiveGigE to specify a 25 Gigabit Ethernet interface.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for forty gigabit, vlan, and tengigabit ethernet interfaces. Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000 and added support for IPv6.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information When a static route (or a protocol route) overlaps with Management static route, the static route (or a protocol route) is preferred over the Management Static route. Also, Management static routes and the Management Connected prefix are not reflected in the hardware routing tables. Separate routing tables are maintained for IPv4 and IPv6 management routes. This command manages both tables.

Related Commands

- interface ManagementEthernet — configure the Management port on the system (either the Primary or Standby RPM).
- speed (Management interface) — set the speed for the Management interface.

show arp

Display the ARP table.

Syntax

```
show arp [vrf vrf-name] [interface interface | ip ip-address [mask] |
macaddress mac-address [mac-address mask]] [retries] [static | dynamic]
[inspection {database | statistics][summary]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF. **NOTE:** Use this attribute to start a BGP instance for either a specific address family corresponding to the default VRF or an IPv4 address family corresponding to a non-default VRF.
interface *interface*	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
ip *ip-address mask*	(OPTIONAL) Enter the keyword `ip` then an IP address in the dotted decimal format. Enter the optional IP address mask in the slash prefix format (`/ x`).
inspection	Enter the keyword `inspection` with one of the following keywords to view ARP entries: • `database` — view a list of ARP entries learned using DAI • `statistics` — view DAI statistics
macaddress *mac-address mask*	(OPTIONAL) Enter the keyword `macaddress` then a MAC address in nn:nn:nn:nn:nn:nn format. Enter the optional MAC address mask in nn:nn:nn:nn:nn:nn format also.
static	(OPTIONAL) Enter the keyword `static` to view entries entered manually.
retries	(OPTIONAL) Enter the keyword `retries` to show the number of ARP retries before a 20–second back off.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to view dynamic entries.
summary	(OPTIONAL) Enter the keyword `summary` to view a summary of ARP entries.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF and added usage information for the `clear arp-cache` command.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added support for 4094 VLANs on the E-Series (the prior limit was 2094).
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.8.1.0	Augmented to display local ARP entries learned from private VLANs (PVLANs).
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following example shows two VLANs that are associated with a private VLAN (PVLAN) (refer to Private VLAN (PVLAN)).

If you have entered the `clear arp-cache` command to remove a large number of ARP entries and the command is still being processed in the background, an error message display if you attempt to enter the `show arp` command:

```
Clear arp in-progress. Please try after sometime!
```

The following describes the `show arp` command shown in the following example.

Description	
Protocol	Displays the protocol type.
Address	Displays the IP address of the ARP entry.
Age(min)	Displays the age (in minutes) of the ARP entry.
Hardware Address	Displays the MAC address associated with the ARP entry.
Interface	Displays the first two letters of the interfaces type and the slot/port associated with the ARP entry.
VLAN	Displays the VLAN ID, if any, associated with the ARP entry.
CPU	Lists which CPU the entries are stored on.

Example

```
DellEMC> show arp
Protocol  Address  Age(min) Hardware Address Interface VLAN CPU
-----------------------------------------------------------------
Internet  192.2.1.254 1  00:00:c0:02:01:02  Tf 1/1     -    CP
```

```
Internet  192.2.1.253 1   00:00:c0:02:01:02  Tf 1/2      -     CP
Internet  192.2.1.252 1   00:00:c0:02:01:02  Tf 1/3      -     CP
Internet  192.2.1.251 1   00:00:c0:02:01:02  Tf 1/4      -     CP
Internet  192.2.1.250 1   00:00:c0:02:01:02  Tf 1/5      -     CP
Internet  192.2.1.251 1   00:00:c0:02:01:02  Tf 1/6      -     CP
Internet  192.2.1.250 1   00:00:c0:02:01:02  Tf 1/7      -     CP
Internet  192.2.1.249 1   00:00:c0:02:01:02  Tf 1/8      -     CP
Internet  192.2.1.248 1   00:00:c0:02:01:02  Tf 1/9      -     CP
Internet  192.2.1.247 1   00:00:c0:02:01:02  Tf 1/10     -     CP
Internet  192.2.1.246 1   00:00:c0:02:01:02  Tf 1/11     -     CP
Internet  192.2.1.245 1   00:00:c0:02:01:02  Tf 1/12     -     CP
```

Example (Private VLAN)

NOTE: In this example, Line 1 shows community VLAN 200 (in primary VLAN 10) in a PVLAN. Line 2 shows primary VLAN 10.

```
DellEMC# show arp
Protocol Address  Age(min) Hardware Address  Interface VLAN  CPU
-----------------------------------------------------------------
Internet 5.5.5.1       -  00:01:e8:43:96:5e  -      Vl 10 pv 200 CP
Internet 5.5.5.10      -  00:01:e8:44:99:55  -      Vl 10        CP
Internet 10.1.2.4      1  00:01:e8:d5:9e:e2  Ma 1/1 -            CP
Internet 10.10.10.4    1  00:01:e8:d5:9e:e2  Ma 1/1 -            CP
Internet 10.16.127.53  1  00:01:e8:d5:9e:e2  Ma 1/1 -            CP
Internet 10.16.134.254 20 00:01:e8:d5:9e:e2  Ma 1/1 -            CP
Internet 133.33.33.4   1  00:01:e8:d5:9e:e2  Ma 1/1 -            CP
```

Usage Information

The following describes the `show arp summary` command shown in the following example.

Description	
Total Entries	Lists the total number of ARP entries in the ARP table.
Static Entries	Lists the total number of configured or static ARP entries.
Dynamic Entries	Lists the total number of learned or dynamic ARP entries.
CPU	Lists which CPU the entries are stored on.

Example (Summary)

```
DellEMC# show arp summary

TotalEntries Static Entries Dynamic Entries CPU
-----------------------------------------------
83             0               83           CP
DellEMC#
```

Related Commands

- ip local-proxy-arp — enable/disable Layer 3 communication in secondary VLANs.
- switchport mode private-vlan — set PVLAN mode of the selected port.

show arp retries

Display the configured number of ARP retries.

Syntax `show arp retries`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced.

Related Commands

- arp retries — set the number of ARP retries in case the system does not receive an ARP reply in response to an ARP request.

show hosts

View the host table and DNS configuration.

Syntax

```
show hosts
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Added support for IPv6 addresses.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show hosts` command in the following example.

Field	Description
Default domain...	Displays the domain name (if configured).
Name/address lookup...	States if DNS is enabled on the system. • If DNS is enabled, the Name/Address lookup is domain service. • If DNS is not enabled, the Name/Address lookup is static mapping
Name servers are...	Lists the name servers, if configured.
Host	Displays the host name assigned to the IP address.
Flags	Classifies the entry as one of the following: • perm — the entry was manually configured and will not time out • temp — the entry was learned and will time out after 72 hours of inactivity. Also included in the flag is an indication of the validity of the route: • ok — the entry is valid. • ex — the entry expired. • ?? — the entry is suspect.
TTL	Displays the amount of time until the entry ages out of the cache. For dynamically learned entries only.
Type	Displays IP as the type of entry.
Address	Displays the IP addresses assigned to the host.

Example

```
DellEMC# show hosts
Default domain is not set
Name/address lookup uses static mappings
Name servers are not set
Host      Flags      TTL   Type   Address
--------  -----      ----  ----   -------
ks        (perm, OK) -     IP     2.2.2.2
4200-1    (perm, OK) -     IP     192.68.69.2
1230-3    (perm, OK) -     IP     192.68.99.2
ZZr       (perm, OK) -     IP     192.71.18.2
Z10-3     (perm, OK) -     IP     192.71.23.1
DellEMC#
```

Related Commands

- traceroute — view the DNS resolution.
- ip host — configure a host.

show ip cam stack-unit

Display CAM entries for a port-pipe of a stack-unit on a S-Series or Z-Series switch.

Syntax

```
show ip cam stack-unit {stack-unit-number} [port-set {pipe-number} | vrf
vrf-name {ip-address mask [longer-prefixes [ecmp-group detail]]}| ecmp-group
{detail | member-info [detail [group-index index-number]]}| summary]
```

Parameters

stack-unit-number	Enter the stack-unit ID. The unit ID range is from 1 to 6.
port-set *pipe-number*	Enter the keyword `port-set` then the number of the stack unit's port-pipe.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display CAM entries corresponding to that VRF.
***network mask* [longer-prefixes [ecmp-group detail]]**	(OPTIONAL) Enter the IP address and mask of a route to CAM entries for that route only. You can enter one of the following keywords to filter results. ● Enter the keyword `longer-prefixes` to view routes with a common prefix. ● Enter the keyword `ecmp-group detail` to view the ECMP group index.
ecmp-group {detail | member-info [detail [group-index *index-number*]]}	(OPTIONAL) Enter the keyword `ecmp-group` then one of the following keywords to filter results. ● Enter the keyword `detail` to view the ECMP group index. ● Enter the keyword `member-info` to view the member information for the ECMP group. ● Enter the keyword `member-info detail` to view detailed ECMP membership and n-hop information. ● Enter the keyword `group-index` then the index number to show ECMP membership per group. The range is from 0 to 1022.
summary	(OPTIONAL) Enter the keyword `summary` to view a table listing route prefixes and the total number routes which can be entered in to CAM.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Increased the stacking range to 12 units in S3100 series.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added support for up to seven stack members.
7.6.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip cam` command shown in the following example.

Field	Description
Destination	Displays the destination route of the index.
EC	Displays 1 if the route is an ECMP route. Else, displays 0.

Field	Description
C	This is the CPU bit. If it displays 1, then it indicates that a packet hitting this entry will be forwarded to the CPU.
V Id	Displays the VLAN ID. If the entry is 0, the entry is not part of a VLAN.
Mac Addr	Displays the next-hop router's MAC address.
Port	Displays the egress interface. ● CP = control processor ● Gi = Gigabit Ethernet interface ● Te = 10–Gigabit Ethernet interface

Example

```
DellEMC# show ip cam stack-unit 3 po 0 1.1.1.0/24 longer-prefixes

Destination            EC  C    VId   Mac-Addr             Port
-------------------------------------------------------------------
1.1.1.2/32              0  0   3000   00:05:00:00:00:02    Tw 1/14
1.1.1.1/32              0  1      0   00:00:00:00:00:00      CP
1.1.1.0/24              0  1      0   00:00:00:00:00:00      CP
DellEMC#
```

Example (ECMP-Group)

```
DellEMC# show ip cam stack-unit 3 po 0 ecmp-group detail

Destination         EC  C    VId   Mac-Addr             Port      ECMP Group-Index
-------------------------------------------------------------------------------
1.1.1.2/32           0  0   1000   00:01:00:00:00:02    Tw 1/12             -
2.1.1.2/32           0  0     20   00:03:00:00:00:02    Po 10               -
2.1.1.1/32           0  1      0   00:00:00:00:00:00      CP                -
1.1.1.1/32           0  1      0   00:00:00:00:00:00      CP                -
2.1.1.0/24           0  1      0   00:00:00:00:00:00      CP                -
1.1.1.0/24           0  1      0   00:00:00:00:00:00      CP                -
100.1.1.0/24         1  0     20   00:03:00:00:00:02    Po 10               0
100.1.1.0/24         1  0   1000   00:01:00:00:00:02    Tf 1/12             0
0.0.0.0/0            0  1      0   00:00:00:00:00:00      CP                -
DellEMC#
```

Example (Member-Info)

```
DellEMC# show ip cam stack-unit 3 po 0 ecmp-group member-info detail

Group Index  Member Count   Mac-Addr                  Port        VLan ID
-------------------------------------------------------------------------
0                  2        00:03:00:00:00:02         Po 10            20
                            00:01:00:00:00:02         Tw 1/12          1000
DellEMC#
```

show ip fib stack-unit

View all Forwarding Information Base (FIB) entries of a specific stack-unit.

Syntax

`show ip fib stack-unit` *`stack-unit-number`* `vrf` *`vrf-name`* `[`*`ip-address`* `[`*`mask`*`] [longer-prefixes] | summary]`

Parameters

stack-unit-number	Enter the stack unit ID.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view FIB entries corresponding to that VRF.
ip-address mask	(OPTIONAL) Enter the IP address of the network destination to view only information on that destination. Enter the IP address in dotted decimal format (A.B.C.D). Enter the mask in slash prefix format (/X).

longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.
summary	(OPTIONAL) Enter the keyword `summary` to view the total number of prefixes in the FIB.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added support for up to seven stack members.
7.6.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip fib stack-unit` command shown in the following example.

Field	Description
Destination	Lists the destination IP address.
Gateway	Displays either the word “direct” and an interface for a directly connected route or the remote IP address used to forward the traffic.
First-Hop	Displays the first hop IP address.
Mac-Addr	Displays the MAC address.
Port	Displays the egress-port information.
VId	Displays the VLAN ID. If no VLAN is assigned, zero (0) is listed.
EC	Displays the number of ECMP paths.

If weighted ECMP is enabled, then the `show ip fib stack-unit` command display a new column named W-EC (Weighted ECMP). This column displays either a value of *1* or *0* depending on whether or not a route is assigned with a weight.

Example

```
DellEMC# show ip fib stack-unit 1
Destination   Gateway                 First-Hop  Mac-Addr           Port       VId    EC
-------------------------------------------------------------------------------------------
1.1.1.2/32    via 1.1.1.2, Vl 1000    1.1.1.2    00:01:00:00:00:02  Tf 1/12    1000   0
2.1.1.2/32    via 2.1.1.2, Vl 20      2.1.1.2    00:03:00:00:00:02  Po 10        20   0
0.0.0.0/0           -                 0.0.0.0    00:00:00:00:00:00  CP            0   0
```

```
1.1.1.0/24    Direct, Vl 1000          0.0.0.0    00:00:00:00:00:00   CP          1000   0
1.1.1.1/32    via 127.0.0.1            127.0.0.1  00:00:00:00:00:00   CP             0   0
2.1.1.0/24    Direct, Vl 20            0.0.0.0    00:00:00:00:00:00   CP            20   0
2.1.1.1/32    via 127.0.0.1            127.0.0.1  00:00:00:00:00:00   CP             0   0
100.1.1.0/24  via 1.1.1.2, Vl 1000     1.1.1.2    00:01:00:00:00:02   Tf 1/12     1000   1
100.1.1.0/24  via 2.1.1.2, Vl 20       2.1.1.2    00:03:00:00:00:02   Po 10         20   1
DellEMC#

 DellEMC#show ip route
S     10.1.1.0/24         via 1.1.1.2, Vl 10
                          via 2.1.1.2, Vl 20
S     20.1.1.0/24         via 3.1.1.2, Vl 30
S     100.1.1.0/24        via 10.1.1.0, weight 7
                          via 20.1.1.0, weight 1
```

Example (Show command output with Weighted ECMP Enabled)

```
DellEMC# show ip fib stack-unit 1
Destination  Gateway      First-Hop    Mac-Addr          Port   VId   EC  RC W
-------------------------------------------------------------------------------
0.0.0.0/0      -            0.0.0.0    00:00:00:00:00:00   CP    0    0    - -
1.1.0/24    Direct, Lo 0    0.0.0.0    00:00:00:00:00:00   CP    0    0    - -
1.1.1.1/32  via 127.0.0.1 127.0.0.1    00:00:00:00:00:00   CP    0    0    - -
```

The RC and W columns in the show output appear only if the weighted ECMP is enabled using the `ip ecmp weighted` command.

Related Commands

- clear ip fib stack-unit — clear FIB entries on a specified stack-unit.
- ip ecmp weighted— enable weighted ECMP calculations.

show ip flow

Show how a Layer 3 packet is forwarded when it arrives at a particular interface.

Syntax

`show ip flow interface` *`interface`* `{source-ip` *`address`* `destination-ip` *`address`*`}` `{protocol` *`number`* `[tcp | udp]} {src-port` *`number`* `destination-port` *`number`*`}`

Parameters

interface *interface*	Enter the keyword *interface* then one of the following interface keywords. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
source-ip *address*	Enter the keywords `source-ip` then the IP source address in IP address format.
destination-ip *address*	Enter the keywords `destination-ip` then the IP destination address in IP address format.
protocol *number* [tcp | udp]	Enter the keyword `protocol` then one of the protocol type keywords: `tcp`, `udp`, or `protocol` *`number`* The protocol number range is from 0 to 255. .
src-port *number*	Enter the keywords *src-port* then the source port number.
destination-port *number*	Enter the keywords *destination-port* then the destination port number.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

This command provides egress port information for a given IP flow. This information is useful in identifying which interface the packet follows in the case of Port-channel and Equal Cost Multi Paths. Use this command for routed packed only. For switched packets, use the `show port-channel-flow` command.

The `show ip flow` command does not compute the egress port information when `load-balance mac hashing` is also configured due to insufficient information (the egress MAC is not available).

S-Series produces the following error message: `%Error: Unable to read IP route table`.

Example

```
DellEMC# show ip flow interface Tf 1/4 20.1.1.1 100.1.1.2 protocol tcp
Flow: 20.1.1.1 100.1.1.2 6
Ingress interface: Tf 1/4
Egress Interface: Tf 1/5
DellEMC#
```

show ip interface

View IP-related information on all interfaces.

Syntax

```
show ip interface [interface | brief] [configured]
```

Parameters

interface (OPTIONAL)

Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a stack-unit interface, enter the keyword `stack-unit` then the stack unit number.
- For a tunnel interface, enter the keyword `tunnel` then the tunnel interface number. The range is from 1 to 16383.

brief (OPTIONAL) Enter the keyword `brief` to view a brief summary of the interfaces and whether an IP address is assigned.

configured (OPTIONAL) Enter the keyword `configured` to display the physical interfaces with non-default configurations only.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Updated the command output to include the unicast reverse path forwarding (uRPF) status.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
8.1.1.2	Supported on the E-Series E600i.

Version	Description
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip interface twentyFiveGigE 1/1
twentyFiveGigE 1/1 is down, line protocol is down
Internet address is not set
IP MTU is 1500 bytes
Directed broadcast forwarding is disabled
Proxy ARP is enabled
Split Horizon is enabled
Poison Reverse is disabled
ICMP redirects are not sent
ICMP unreachables are not sent
IP unicast RPF check is not supported
DellEMC#
```

```
DellEMC# show ip interface port-channel 128
Port-channel 128 is down, line protocol is down
Internet address is 10.1.1.1/16
Broadcast address is 10.1.255.255
Address determined by user input
IP MTU is 1500 bytes
Directed broadcast forwarding is disabled
Proxy ARP is enabled
Split Horizon is enabled
Poison Reverse is disabled
ICMP redirects are not sent
ICMP unreachables are not sent
IP unicast RPF check is not supported
DellEMC#
```

```
DellEMC#show ip interface vlan 1
Vlan 1 is down, line protocol is down
Internet address is not set
IP MTU is 1500 bytes
Directed broadcast forwarding is disabled
Proxy ARP is enabled
Split Horizon is enabled
Poison Reverse is disabled
ICMP redirects are not sent
ICMP unreachables are not sent
IP unicast RPF check is not supported
DellEMC#
```

Usage Information

The following describes the `show ip interface brief` command shown in the following example.

Fields	Description
Interface	Displays type of interface and the associated slot and port number.
IP-Address	Displays the IP address for the interface, if configured.
Ok?	Indicates if the hardware is functioning properly.
Method	Displays “Manual” if the configuration is read from the saved configuration.
Status	States whether the interface is enabled (up) or disabled (administratively down).
Protocol	States whether IP is enabled (up) or disabled (down) on the interface.

Example (Brief)

```
DellEMC# show ip interface brief
Interface                IP-Address  OK? Method  Status
```

```
Protocol
twentyFiveGigE 1/1    unassigned  NO  Manual  administratively down down
twentyFiveGigE 1/2    unassigned  NO  Manual  administratively down down
twentyFiveGigE 1/3    unassigned  YES Manual  up                    up
twentyFiveGigE 1/4    unassigned  YES Manual  up                    up
twentyFiveGigE 1/5    unassigned  YES Manual  up                    up
twentyFiveGigE 1/6    10.10.10.1  YES Manual  up                    up
twentyFiveGigE 1/7    unassigned  NO  Manual  administratively down down
```

show ip management-route

View the IP addresses assigned to the Management interface.

Syntax `show ip management-route [all | connected | summary | static]`

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all IP addresses assigned to all Management interfaces on the switch.
connected	(OPTIONAL) Enter the keyword `connected` to view only routes directly connected to the Management interface.
summary	(OPTIONAL) Enter the keyword `summary` to view a table listing the number of active and non-active routes and their sources.
static	(OPTIONAL) Enter the keyword `static` to view non-active routes also.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip management-route

Destination     Gateway                   State
-----------     -------                   -----
10.1.2.0/24     ManagementEthernet 0/0    Connected
172.16.1.0/24   10.1.2.4                  Active
DellEMC#
```

show ipv6 management-route

Display the IPv6 static routes configured for the management interface.

Syntax `show ipv6 management-route [all | connected | summary | static]`

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all IP addresses assigned to all Management interfaces on the switch.
connected	(OPTIONAL) Enter the keyword `connected` to view only routes directly connected to the Management interface.
summary	(OPTIONAL) Enter the keyword `summary` to view a table listing the number of active and non-active routes and their sources.
static	(OPTIONAL) Enter the keyword `static` to view non-active routes also.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.4.1.0	Introduced on the C- and E-Series.
8.3.7.0	Introduced on the S4810.

Example

```
DellEMC# show ipv6 management-route
IPv6 Destination   Gateway                 State
----------------    -------                -----
2001:34::0/64      ManagementEthernet 1/1  Connected
```

```
2001:68::0/64      2001:34::16             Active
DellEMC#
```

show ip protocols

View information on all routing protocols enabled and active on the switch.

Syntax `show ip protocols`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Regular evaluation optimization enabled/disabled added to display output.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip protocols
Routing Protocol is "bgp 1"
  Cluster Id is set to 20.20.20.3
  Router Id is set to 20.20.20.3
  Fast-external-fallover enabled
  Regular expression evaluation optimization enabled
  Capable of ROUTE_REFRESH
  For Address Family IPv4 Unicast
   BGP table version is 0, main routing table version 0
   Distance: external 20 internal 200 local 200
   Neighbor(s):
     Address : 20.20.20.2
     Filter-list in : foo
     Route-map in : foo
```

```
     Weight : 0
   Address : 5::6
     Weight : 0
DellEMC#
```

show ip route

View information, including how they were learned, about the IP routes on the switch.

Syntax

```
show ip route [vrf vrf-name] hostname | ip-address [mask] [longer-prefixes]
| list prefix-list | protocol [process-id | routing-tag] | all | connected
| static | summary]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the VRF name to list the routes in the route table of a specific VRF.
ip-address	(OPTIONAL) Specify a name of a device or the IP address of the device to view more detailed information about the route.
mask	(OPTIONAL) Specify the network mask of the route. Use this parameter with the IP address parameter.
longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.
list *prefix-list*	(OPTIONAL) Enter the keyword `list` and the name of a configured prefix list. For more information, refer to the show ip route list command.
protocol	(OPTIONAL) Enter the name of a routing protocol (`bgp`, `isis`, `ospf`, `rip`) or the keywords connected or static. **NOTE:** `bgp`, `isis`, `ospf`, and `rip`. • If you enter `bgp`, you can include the BGP *`as-number`* . • If you enter `isis`, you can include the ISIS *`routing-tag`*. • If you enter `ospf`, you can include the OSPF *`process-id`*.
process-id	(OPTIONAL) Specify that only OSPF routes with a certain process ID must be displayed.
routing-tag	(OPTIONAL) Specify that only ISIS routes with a certain routing tag must be displayed.
connected	(OPTIONAL) Enter the keyword `connected` to view only the directly connected routes.
all	(OPTIONAL) Enter the keyword `all` to view both active and non-active routes.
static	(OPTIONAL) Enter the keyword `static` to view only routes the `ip route` command configures.
summary	(OPTIONAL) Enter the keyword `summary`. For more information, refer to the show ip route summary command.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.9.1.0	Introduced VRF on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip route all` command in the following example.

Field	Description
(undefined)	Identifies the type of route: ● C = connected ● S = static ● R = RIP ● B = BGP ● IN = internal BGP ● EX = external BGP ● LO = Locally Originated ● O = OSPF ● IA = OSPF inter area ● N1 = OSPF NSSA external type 1 ● N2 = OSPF NSSA external type 2 ● E1 = OSPF external type 1 ● E2 = OSPF external type 2 ● i = IS-IS ● L1 = IS-IS level-1 ● L2 = IS-IS level-2 ● IA = IS-IS inter-area ● * = candidate default ● > = non-active route ● + = summary routes The weight for weighted ECMP route calculations is displayed for each path in the route in `show ip route` command. The ECMP weight is displayed only if weighted ECMP is enabled using the `ip ecmp weighted` command is enabled.

Field	Description
	If weighted ECMP is disabled, the `show ip route` command does not show the weighted ECMP route information.
Destination	Identifies the route's destination IP address
Gateway	Identifies whether the route is directly connected and on which interface the route is configured.
Dist/Metric	Identifies if the route has a specified distance or metric.
Last Change	Identifies when the route was last changed or configured.

Example

```
DellEMC# show ip route all

Codes:C- connected, S - static, R - RIP
      B- BGP, IN - internal BGP, EX - external BGP, LO - Locally
Originated
      O- OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1
      N2- OSPF NSSA external type 2, E1 - OSPF external type 1
      E2- OSPF external type 2, i - IS-IS, L1 - IS-IS level-1
      L2- IS-IS level-2, IA - IS-IS inter area, * - candidate default
      >- non-active route + - summary route

Gateway of last resort is not set

     Destination     Gateway            Dist/Metric Last Change
----------- ------- ----------- -----------
R   3.0.0.0/8       via 100.10.10.10, Tf 1/8 120/1   00:07:12
                    via 101.10.10.10, Tf 1/9
    100.10.10.0/24  Direct, Tf 1/8          0/0     00:08:54
> R 100.10.10.0/24  Direct, Tf 1/8          120/0   00:08:54
C   101.10.10.0/24  Direct, Tf 1/8       0/0     00:09:15
> R 101.10.10.0/24  Direct, Tf 1/8       120/0   00:09:15
DellEMC#
```

Example (Summary)

```
DellEMC# show ip route summary

Route Source  Active Routes   Non-active Routes
connected     2               0
static        1               0
Total         3               0
Total 3 active route(s) using 612 bytes
R1_E600i>show ip route static ?
|                    Pipe through a command
<cr>
R1_E600i>show ip route static
    Destination   Gateway            Dist/Metric Last Change
----------- ------- ----------- -----------
*S  0.0.0.0/0     via 10.10.91.9, Tf 1/2     1/0        3d2h
DellEMC>
```

Example (vrf)

```
DellEMC# show ip route vrf test1

Codes: C - connected, S - static, R - RIP,
       B - BGP, IN - internal BGP, EX - external BGP,LO - Locally
Originated,
       O - OSPF, IA - OSPF inter area, N1 - OSPF NSSA external type 1,
N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
E2 - OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
       L2 - IS-IS level-2, IA - IS-IS inter area, * - candidate default,
> - non-active route, + - summary route

Gateway of last resort is not set

   Destination    Gateway         Dist/Metric Last Change
```

```
    -----------     -------          ----------- -----------
C   13.0.0.0/24     Direct, Tf 1/17       0/0     00:00:04
```

Example (With Weighted ECMP Enabled)

```
DellEMC(conf)# ip route 1.1.1.0/24 6.6.6.2 weight 100
DellEMC(conf)# ip route 1.1.1.0/24 6.6.6.2 weight 200
DellEMC(conf)# do show ip route
Codes: C - connected, S - static, R - RIP,
       B - BGP, IN - internal BGP, EX - external BGP,LO - Locally Originated,
       O - OSPF, IA - OSPF inter area, N1 - OSPF NSSA external type 1,
       N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
       E2 - OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
       L2 - IS-IS level-2, IA - IS-IS inter area, * - candidate default,
       > - non-active route, + - summary route
Gateway of last resort is not set
       Destination            Gateway
Dist/Metric Last Change
       -----------                    -------
----------- -----------
  S    1.1.1.0/24         4.4.4.2, via Tf 1/4 , weight 100                  1/0
00:00:01
                                 6.6.6.2, via Tf 1/16,  weight 200
  C    4.4.4.0/24         Direct, Tf 1/4/                                   0/0
00:01:32
  C    6.6.6.0/24         Direct, Tf 1/16                                   0/0
00:01:25


DellEMC# show ip route 1.1.1.0/24
Routing entry for 1.1.1.0/24
    Known via "static", distance 1, metric 0
    Last update 00:05:01 ago
    Routing Descriptor Blocks:
    * 4.4.4.2, via twentyFiveGigE 1/4 weight 100
    * 6.6.6.2, via twentyFiveGigE 1/16 weight 200
DellEMC(conf)#
```

Example (With Weighted ECMP Disabled)

```
DellEMC(conf)# ip route 1.1.1.0/24 6.6.6.2 weight 100
DellEMC(conf)# ip route 1.1.1.0/24 6.6.6.2 weight 200
DellEMC(conf)# do show ip route
Codes: C - connected, S - static, R - RIP,
       B - BGP, IN - internal BGP, EX - external BGP,LO - Locally Originated,
       O - OSPF, IA - OSPF inter area, N1 - OSPF NSSA external type 1,
       N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
       E2 - OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
       L2 - IS-IS level-2, IA - IS-IS inter area, * - candidate default,
       > - non-active route, + - summary route
Gateway of last resort is not set
       Destination            Gateway                                  Dist/Metric Last
Change
       -----------                    -------                                  -----------
-----------
  S    1.1.1.0/24         4.4.4.2, via Tf 1/4                          1/0    00:00:01
                                 6.6.6.2, via Tf 1/16
  C    4.4.4.0/24         Direct, Tf 1/4                               0/0    00:01:32
  C    6.6.6.0/24         Direct, Tf 1/16                              0/0    00:01:25

DellEMC(conf)# do show ip route 1.1.1.0/24
Routing entry for 1.1.1.0/24
    Known via "static", distance 1, metric 0
    Last update 00:05:01 ago
    Routing Descriptor Blocks:
    * 4.4.4.2, via twentyFiveGigE 1/4
    * 6.6.6.2, via twentyFiveGigE 1/16
DellEMC(conf)#
```

show ip route list

Display IP routes in an IP prefix list.

Syntax `show ip route [vrf vrf-name] list prefix-list`

Parameters

prefix-list	Enter the name of a configured prefix list.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display IP routes in an IP prefix list corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip route list test

Codes:C- connected, S - static, R - RIP,
      B- BGP, IN - internal BGP, EX - external BGP,LO - Locally
Originated,
      O- OSPF, IA - OSPF inter area, N1 - OSPF NSSA external type 1,
      N2- OSPF NSSA external type 2, E1 - OSPF external type 1,
      E2- OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
      L2- IS-IS level-2, IA - IS-IS inter area, * - candidate default,
      >- non-active route, + - summary route

Gateway of last resort is not set

    Destination   Gateway             Dist/Metric Last Change
    -----------   -------             ----------- -----------
R   2.1.0.0/24    via 2.1.4.1, Tf 1/13   120/2       3d0h
R   2.1.1.0/24    via 2.1.4.1, Tf 1/13   120/2       3d1h
R   2.1.2.0/24    via 2.1.4.1, Tf 1/13   120/1       3d0h
R   2.1.3.0/24    via 2.1.4.1, Tf 1/13   120/1       3d1h
C   2.1.4.0/24    Direct, Tf 1/13          0/0       3d1h
```

Related Commands

- ip prefix-list — enter CONFIGURATION-IP PREFIX-LIST mode and configures a prefix list.
- show ip prefix-list summary — display a summary of the configured prefix lists.

show ip route summary

View a table summarizing the IP routes in the switch.

Syntax

```
show ip route [vrf vrf-name] [summary]
```

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on the IP routes corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip route summary` shown in the following example.

Column Heading	Description
Route Source	Identifies how the route is configured in Dell EMC Networking OS.
Active Routes	Identifies the best route if a route is learned from two protocol sources.
Non-active Routes	Identifies the back-up routes when a route is learned by two different protocols. If the best route or active route goes down, the non-active route becomes the best route.
ospf 100	If routing protocols (OSPF, RIP) are configured and routes are advertised, then information on those routes is displayed.

Column Heading	Description
Total 1388 active...	Displays the number of active and non-active routes and the memory usage of those routes. If there are no routes configured in the Dell EMC Networking OS, this line does not appear.

Example

```
DellEMC> show ip route summary

Route Source    Active Routes    Non-active Routes
connected       17               0
static          3                0
ospf 100        1368             2
Intra-area: 762 Inter-area: 1 External-1: 600 External-2: 5
Total           1388             2
Total 1388 active route(s) using 222440 bytes
Total 2 non-active route(s) using 128 bytes
DellEMC>
```

Related Commands

- show ip route — display information about the routes found in the switch.

show ip traffic

View IP, ICMP, UDP, TCP and ARP traffic statistics.

Syntax

```
show ip traffic [all | cp | rp1 | rp2]
```

NOTE: These options are supported only on the E-Series.

Parameters

all	(OPTIONAL) Enter the keyword `all` to view statistics from all processors. If you do not enter a keyword, you also view all statistics from all processors.
cp	(OPTIONAL) Enter the keyword `cp` to view only statistics from the Control Processor.
rp1	(OPTIONAL) Enter the keyword `rp1` to view only the statistics from Route Processor 1.
rp2	(OPTIONAL) Enter the keyword `rp2` to view only the statistics from Route Processor 2.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	F10 Monitoring MIB available for the `ip traffic statistics` command.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip traffic` summary shown in the following example.

Keyword	Definition
unknown protocol...	No receiver for these packets. Counts packets whose protocol type field is not recognized by Dell EMC Networking OS.
not a gateway...	Packets can not be routed; the host/network is unreachable.
security failures...	Counts the number of received unicast/multicast packets that could not be forwarded due to: • route not found for unicast/multicast; ingress interfaces do not belong to the destination multicast group • destination IP address belongs to reserved prefixes; the host/network is unreachable
bad options...	Unrecognized IP option on a received packet.
Frags:	IP fragments received.
... reassembled	Number of IP fragments that were reassembled.
... timeouts	Number of times a timer expired on a reassembled queue.
... too big	Number of invalid IP fragments received.
... couldn't fragment	Number of packets that could not be fragmented and forwarded.
...encapsulation failed	Counts packets which could not be forwarded due to ARP resolution failure. Dell EMC Networking OS sends an arp request prior to forwarding an IP packet. If a reply is not received, Dell EMC Networking OS repeats the request three times. These packets are counted in encapsulation failed.
Rcvd:	
...short packets	The number of bytes in the packet are too small.
...bad length	The length of the packet was not correct.
...no port broadcasts	The incoming broadcast/multicast packet did not have any listener.
...socket full	The applications buffer is full and the incoming packet are dropped.

The Dell Monitoring MIB provides access to the following statistics.

- **IP Statistics: Bcast: Received:** Object = f10BcastPktRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.1
- **IP Statistics: Bcast: Sent:** Object = f10BcastPktSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.2
- **IP Statistics: Mcast: Received:** Object = f10McastPktRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.3

- **IP Statistics: Mcast: Sent:** Object = f10McastPktSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.4
- **ARP Statistics: Rcvd: Request:** Object = f10ArpReqRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.1
- **ARP Statistics: Rcvd: Replies:** Object = f10ArpReplyRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.3
- **ARP Statistics: Sent: Request:** Object = f10ArpReqSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.2
- **ARP Statistics: Sent: Replies:** Object = f10ArpReplySent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.4
- **ARP Statistics: Sent: Proxy:** Object = f10ArpProxySent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.5

Example

```
DellEMC# show ip traffic
Control Processor IP Traffic:

IP statistics:
  Rcvd: 23857 total, 23829 local destination
    0 format errors, 0 checksum errors, 0 bad hop count
    0 unknown protocol, 0 not a gateway
    0 security failures, 0 bad options
  Frags: 0 reassembled, 0 timeouts, 0 too big
    0 fragmented, 0 couldn't fragment
  Bcast: 28 received, 0 sent; Mcast: 0 received, 0 sent
  Sent: 16048 generated, 0 forwarded
    21 encapsulation failed, 0 no route
ICMP statistics:
  Rcvd: 0 format errors, 0 checksum errors, 0 redirects, 0 unreachable
    0 echo, 0 echo reply, 0 mask requests, 0 mask replies, 0 quench
    0 parameter, 0 timestamp, 0 info request, 0 other
  Sent: 0 redirects, 0 unreachable, 0 echo, 0 echo reply
    0 mask requests, 0 mask replies, 0 quench, 0 timestamp
    0 info reply, 0 time exceeded, 0 parameter problem
UDP statistics:
  Rcvd: 0 total, 0 checksum errors, 0 no port
    0 short packets, 0 bad length, 0 no port broadcasts, 0 socket full
  Sent: 0 total, 0 forwarded broadcasts
TCP statistics:
  Rcvd: 23829 total, 0 checksum errors, 0 no port
  Sent: 16048 total
ARP statistics:
  Rcvd: 156 requests, 11 replies
  Sent: 21 requests, 10 replies (0 proxy)
Routing Processor1 IP Traffic:
```

show tcp statistics

View information on TCP traffic through the switch.

Syntax `show tcp statistics {all | cp}`

Parameters

all	Enter the keyword all to view `all` TCP information.
cp	Enter the keyword `cp` to view only TCP information from the Control Processor.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
6.4.1.0	Introduced

Usage Information

The following describes the `show tcp statistics cp` command shown in the following example.

Field	Description
Rcvd:	Displays the number and types of TCP packets received by the switch. ● Total = total packets received ● no port = number of packets received with no designated port
0 checksum error...	Displays the number of packets received with the following: ● checksum errors ● bad offset to data ● too short
329 packets...	Displays the number of packets and bytes received in sequence.
17 dup...	Displays the number of duplicate packets and bytes received.
0 partially...	Displays the number of partially duplicated packets and bytes received.
7 out-of-order...	Displays the number of packets and bytes received out of order.
0 packets with data after window	Displays the number of packets and bytes received that exceed the switch's window size.
0 packets after close	Displays the number of packet received after the TCP connection was closed.
0 window probe packets...	Displays the number of window probe and update packets received.
41 dup ack...	Displays the number of duplicate acknowledgement packets and acknowledgement packets with data received.
10184 ack...	Displays the number of acknowledgement packets and bytes received.
Sent:	Displays the total number of TCP packets sent and the number of urgent packets sent.
25 control packets...	Displays the number of control packets sent and the number retransmitted.
11603 data packets...	Displays the number of data packets sent.
24 data packets retransmitted	Displays the number of data packets resent.

Field	Description
355 ack..	Displays the number of acknowledgement packets sent and the number of packet delayed.
0 window probe...	Displays the number of window probe and update packets sent.
7 Connections initiated...	Displays the number of TCP connections initiated, accepted, and established.
14 Connections closed...	Displays the number of TCP connections closed, dropped.
20 Total rxmt...	Displays the number of times the switch tried to re-send data and the number of connections dropped during the TCP retransmit timeout period.
0 Keepalive....	Lists the number of keepalive packets in timeout, the number keepalive probes and the number of TCP connections dropped during keepalive.

Example

```
DellEMC# show tcp stat cp

Control Processor TCP:
Rcvd: 10585 Total, 0 no port
   0 checksum error, 0 bad offset, 0 too short
   329 packets (1263 bytes) in sequence
   17 dup packets (6 bytes)
   0 partially dup packets (0 bytes)
   7 out-of-order packets (0 bytes)
   0 packets ( 0 bytes) with data after window
   0 packets after close
   0 window probe packets, 41 window update packets
   41 dup ack packets, 0 ack packets with unsend data
   10184 ack packets (12439508 bytes)
Sent: 12007 Total, 0 urgent packets
   25 control packets (including 24 retransmitted)
   11603 data packets (12439677 bytes)
   24 data packets (7638 bytes) retransmitted
   355 ack only packets (41 delayed)
   0 window probe packets, 0 window update packets
   7 Connections initiated, 8 connections accepted, 15 connections established
   14 Connections closed (including 0 dropped, 0 embryonic dropped)
   20 Total rxmt timeout, 0 connections dropped in rxmt timeout
   0 Keepalive timeout, 0 keepalive probe, 0 Connections dropped in keepalive
```

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IPv6 Basics

IPv6 basic commands are supported on the Dell EMC Networking OS.

NOTE: For information about the Dell EMC Networking OS version and platform that supports IPv6 in each software feature, see the *IPv6 Addressing* section in the *Dell EMC Networking OS Configuration Guide*.

Topics:

- cam-ipv6 extended-prefix
- clear ipv6 route
- maximum dynamic-routes-ipv6
- show cam-ipv6 extended-prefix
- ipv6 unicast-host-route
- ipv6 nd disable-reachable-timer
- ipv6 nd dns-server
- ipv6 route
- show ipv6 route

cam-ipv6 extended-prefix

Enable LPM partitioning to support IPv6 /65 to /128 route prefixes to be stored in Partition 1.

Syntax

`cam-ipv6 extended-prefix <Max-IPv6-prefixes>`

To remove LPM partitioning configuration, use no cam-ipv6 extended-prefix.

Parameters

Max-IPv6-Prefix Maximum number of IPv6 prefixes in the mask length of /65 to /128. The possible values are 1024, 2048, and 3072.

Defaults

LPM is not partitioned with Partition 1 and therefore /65 to /128 prefixes are not converted to /64 prefixes and are installed and saved in LPM. All the packets for those routes traverse through the default route path.

Command Modes

CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048–ON.
9.8(0.0P2)	Introduced on the S3048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.1)	Introduced on the S6000.

Usage Information

You can partition the LPM table to store IPv6 prefixes greater than /64 mask length. Requires reboot of the switch to take effect as the SDK handles this only during its initialization.

clear ipv6 route

Clear (refresh) all or a specific route from the IPv6 routing table.

Syntax `clear ipv6 route [vrf vrf-name] {* | ipv6-address prefix-length}`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to clear the IPv6 routes corresponding to that VRF.
*	Enter the * to clear (refresh) all routes from the IPv6 routing table.
ipv6-address prefix-length	Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

maximum dynamic-routes-ipv6

Specify the maximum number of dynamic (protocol) IPv6 routes a VRF can have.

Syntax `maximum dynamic-routes–ipv6 limit {warn-threshold threshold-value | warning-only}`

To remove the limit on the maximum number of IPv6 routes used, use the `no maximum dynamic-routes-ipv6` command.

Parameters

limit	Maximum number of IPv6 routes allowed in a VRF. Valid range is from 1 to 8000 (or maximum allowable for that platform if smaller value).

warning-threshold	Warning threshold value is expressed as a percentage of the limit value. When the number of IPv6 routes reaches the specified percentage of the limit, a warning message is generated. Valid range is 1 to 100. When warn-threshold is used, once the limit is reached, additional routes will not be allowed into the RTM (route table manager) itself.
warning-only	When the warning-only option is used, a syslog message will be thrown when maximum number of dynamic IPv6 routes reaches the limit. Additional dynamic IPv6 routes will still be allowed.

Defaults No limit is set on the maximum number of dynamic IPv6 routes for a VRF.

Command Modes CONFIGURATION-VRF

CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000-ON, and Z9500.

Usage Information If the maximum IPv6 route limit is not specified for a VRF (valid range is from 1 to 8000), then it has unlimited space that extends to the maximum number of entries allowed for the system. This command is not applicable to the default and management VRFs.

show cam-ipv6 extended-prefix

Display the current settings and next-boot settings for cam-ipv6 extended-prefix configuration. Display the cam-ipv6 extended-prefix configuration.

Syntax `show cam-ipv6 extended-prefix`

Defaults None

Command Modes EXEC

EXEC **Privilege**

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.3(0.1)	Introduced on the S6000.

Usage Information You can use this command to view the number of supported extended prefix entries in LPM configured. The output also displays the current applied value and the new value that is applicable after the reboot of the device.

Example

```
DellEMC# show cam-ipv6 extended-prefix
Cam-Ipv6-LPM Extended Prefix
--------------------------------
Current Settings
cam-ipv6-max-/65-to-/128-Prefix : 2048
DellEMC(conf)#
```

ipv6 unicast-host-route

Enable programming of IPv6 /128 route prefixes in L3 host table.

Syntax `[no] ipv6 unicast-host-route`

Defaults Enabled by default. By default, all the IPv6/128 route prefixes are installed only in L3 host table.

Command Modes CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.1)	Introduced on the S6000.

Usage Information You can use this command to enable programming of /128 route prefixes in L3 host table or in LPM table. A warning message is displayed when you enter this command stating that this setting takes effect for existing routes only when IPv6 route prefixes are cleared from the routing table (RTM). To enable programming of /128 route prefixes in LPM table, use no ipv6 unicast-host-route command.

Example

```
DellEMC(conf)# ipv6 unicast-host-route
Warning: Command will take effect for existing routes only when IPv6
route prefixes are cleared from RTM
DellEMC(conf)#no ipv6 unicast-host-route
Warning: Command will take effect for existing routes only when IPv6
route prefixes are cleared from RTM
DellEMC(conf)#
```

ipv6 nd disable-reachable-timer

Keep the learnt neighbor discovery entries stateless so that the entries do not time out.

Syntax `ipv6 nd disable-reachable-timer`

To restore to default, use the `no ipv6 nd disable-reachable-timer` command.

Default Disabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.1	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S4810, S4820, S5000, S6000, S6010–ON, S6000–ON, S6100–ON, Z9100–ON, C9010, Z9500, MXL, and FN IOM.

ipv6 nd dns-server

Configures Recursive DNS Server (RDNSS) addresses to be distributed via IPv6 router advertisements to an IPv6 device.

Syntax `ipv6 nd dns-server {ipv6-RDNSS-address} {lifetime | infinite}`

To remove the IPv6 RDSS configuration, use `no ipv6 nd dns-server {ipv6-RDNSS-address} {lifetime | infinite}`

Parameters

ipv6-RDNSS-address	Enter the IPv6 Recursive DNS Server's (RDNSS) address. You can specify up to 4 IPv6 RDNSS server addresses.
lifetime	Enter the lifetime in seconds. The amount of time the IPv6 host can use the IPv6 RDNSS address for name resolution. The range is `0` to `4294967295` seconds. When you specify the maximum lifetime value of `4294967295` or `infinite`, the lifetime does not expire. A value of `0` indicates to the host that the RDNSS address should not be used. You must specify a lifetime using the `lifetime` or `infinite` parameter.
infinite	Enter the keyword `infinite` to specify that the RDNSS lifetime does not expire.

Defaults Not Configured

Command Modes INTERFACE CONFIG

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Introduced on the Z9000, S6000, S4810, S4820T, and MXL..

Usage Information Use this command to add, edit, or delete an IPv6 RDNSS address and lifetime value. You can configure up to four IPv6 RDNSS addresses. You must specify a lifetime using the lifetime or infinite parameter.

Example

```
DellEMC(conf-if-tf-1/1)# ipv6 nd dns-server 1000::1 1
```

ipv6 route

Establish a static IPv6 route.

Syntax

```
ipv6 route [vrf vrf-name] ipv6-address prefix-length {ipv6-address | interface | interface ipv6-address} [distance] [name description] [tag value] [permanent] [weight weight-value]
```

To remove the IPv6 route, use the `no ipv6 route` command.

Parameters

vrf *vrf-name*
(Optional) Enter the keyword vrf followed by the name of the VRF to install IPv6 routes in that VRF.

ipv6-address prefix-length
Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

interface
(OPTIONAL) Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a tunnel interface, enter the keyword `tunnel` then the tunnel interface number. The range is from 1 to 16383.
- For a VLAN interface, enter the keyword `VLAN` then the vlan number. The range is from 1 to 4094.

If you configure a static IPv6 route using an egress interface and enter the `ping` command to reach the destination IPv6 address, the ping operation may not work. Configure the IPv6 route using a next-hop IPv6 address in order for the `ping` command to detect the destination address.

ipv6-address
(OPTIONAL) Enter the forwarding router IPv6 address in the x:x:x:x::x format.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

distance
(OPTIONAL) Enter a number as the metric distance assigned to the route. The range is from 1 to 255.

name *description*
(OPTIONAL) Enter the keyword `name` and the description for the IPv6 static route configuration.

tag *value*
(OPTIONAL) Enter the keyword `tag` then a tag value number. The range is from 1 to 4294967295.

permanent	(OPTIONAL) Enter the keyword `permanent` to specify that the route is not to be removed, even if the interface assigned to that route goes down. **NOTE:** If you disable the interface with an IPv6 address associated with the keyword `permanent`, the route disappears from the routing table.
weight *weight-value*	Enter the keyword `weight` followed by a weight value. The range is from 0 to 255. **NOTE:** Weight for a static route can be added only for the destination address and not for the route pointing to destination a interface.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.2)	Added the keyword `name` for static routes.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Also included the `weight` parameter to support weighted ECMP feature. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.2.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

When the interface goes down, Dell EMC Networking OS withdraws the route. The route is re-installed, by Dell EMC Networking OS, when the interface comes back up. When a recursive resolution is "broken," Dell EMC Networking OS withdraws the route. The route is re-installed, by Dell EMC Networking OS, when the recursive resolution is satisfied.

After an IPv6 static route interface is created, if an IP address is not assigned to a peer interface, the peer must be manually pinged to resolve the neighbor information.

You can specify a weight for an IPv4 or IPv6 static route. If the weight value of a path is 0, then that path is not used for forwarding when weighted ECMP is in effect. Also, if a path corresponding to a static route (destination) has a non-zero weight assigned to it and other paths do not have any weight configured, then regular ECMP is used for forwarding.

You can specify the weight value only to destination address and not on the egress port.

A route is considered for weighted ECMP calculations only if each paths corresponding to that route is configured with a weight.

Example

```
DellEMC(conf)# ipv6 route 44::/64 33::1 weight 100
DellEMC(conf)# ipv6 route 44::/64 33::2 weight 200
DellEMC(conf)# do show running-config | grep ipv6 route
DellEMC(conf)# ipv6 route vrf vrf_test 44::/64 33::1 weight 100
DellEMC(conf)# ipv6 route vrf vrf_test 44::/64 33::2 weight 200
DellEMC(conf)# do show running-config | grep ipv6 route vrf
```

Related Commands

- show ipv6 route — view the IPv6 configured routes.

show ipv6 route

Displays the IPv6 routes.

Syntax

```
show ipv6 route [ipv6-address prefix-length] [vrf vrf-name] [hostname]
[all] [bgp as number] [connected] [isis tag] [list prefix-list name] [ospf
process-id] [rip] [static] [summary]
```

Parameters

ipv6-address prefix-length	(OPTIONAL) Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to display IPv6 routes corresponding to that VRF. **NOTE:** If you do not specify this option, routes corresponding to the default VRF are displayed.
hostname	(OPTIONAL) View information for this IPv6 routes with Host Name.
all	(OPTIONAL) View information for all IPv6 routes.
bgp	(OPTIONAL) View information for all IPv6 BGP routes.
connected	(OPTIONAL) View only the directly connected IPv6 routes.
isis	(OPTIONAL) View information for all IPv6 IS-IS routes.
list	(OPTIONAL) View the IPv6 prefix list.
ospf	(OPTIONAL) View information for all IPv6 OSPF routes.
rip	(OPTIONAL for E-Series only) View information for all IPv6 RIP routes.
static	(OPTIONAL) View only routes configured by the `ipv6 route` command.
summary	(OPTIONAL) View a brief list of the configured IPv6 routes.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ipv6 route` command shown in the following examples.

Field	Description
(undefined)	Identifies the type of route: ● L = Local ● C = connected ● S = static ● R = RIP ● B = BGP ● IN = internal BGP ● EX = external BGP ● LO = Locally Originated ● O = OSPF ● IA = OSPF inter-area ● N1 = OSPF NSSA external type 1 ● N2 = OSPF NSSA external type 2 ● E1 = OSPF external type 1 ● E2 = OSPF external type 2 ● i = IS-IS ● L1 = IS-IS level-1 ● L2 = IS-IS level-2 ● IA = IS-IS inter-area ● * = candidate default ● > = non-active route ● + = summary routes
Destination	Identifies the route's destination IPv6 address.
Gateway	Identifies whether the route is directly connected and on which interface the route is configured.
Dist/Metric	Identifies if the route has a specified distance or metric.
Last Change	Identifies when the route was last changed or configured.

Example (S-Series)

```
DellEMC# show ipv6 route

Codes: C - connected, L - local, S - static, R - RIP,
       B - BGP, IN - internal BGP, EX - external BGP,LO - Locally
Originated,
```

```
       O - OSPF, IA - OSPF inter area, N1 - OSPF NSSA external type 1,
       N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
       E2 - OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
       L2 - IS-IS level-2, IA - IS-IS inter area, * - candidate default,
Gateway of last resort is not set

       Destination  Dist/Metric,      Gateway,   Last Change
       ------------------------------------------------------
  C    100::/64 [0/0]
          Direct, Tf 1/12, 20:00:18
  C    400::/64 [0/0]
          Direct, Tu 1, 00:09:02
  S    800::/64 [1/0]
          via 100::1, Tf 1/12, 00:00:50
  L    fe80::/10 [0/0]
          Direct, Nu 0, 20:00:18
DellEMC#
```

Example (Summary)

```
show ipv6 route summary:
====================================
DellEMC# show ipv6 route summary

Route Source              Active Routes   Non-active Routes
connected                 3               0
static                    1               0
Total                     4               0
Total 4 active route(s) using 928 bytes
DellEMC#
```

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IPv6 Access Control Lists (IPv6 ACLs)

IPv6 ACLs and IPv6 Route Map commands are supported on Dell EMC Networking OS.

NOTE: For IPv4 ACL commands, see Access Control Lists (ACL).

Important Points to Remember

- Certain platforms require manual CAM usage space allotment. For more information, see cam-acl.
- Egress IPv6 ACL and IPv6 ACL on the Loopback interface is not supported.
- Reference to an empty ACL permits any traffic.
- ACLs are not applied to self-originated traffic (for example, Control Protocol traffic not affected by IPv6 ACL because the routed bit is not set for Control Protocol traffic and for egress ACLs the routed bit must be set).
- You can use the same access list name for both IPv4 and IPv6 ACLs.
- You can apply both IPv4 and IPv6 ACLs on an interface at the same time.
- You can apply IPv6 ACLs on physical interfaces and a logical interfaces (Port-channel/VLAN).
- Non-contiguous masks are not supported in source or destination addresses in IPv6 ACL entries.
- Because the prefix mask is specified in /x format in IPv6 ACLs, inverse mask is not supported.

Topics:

- show cam-acl-egress
- show cam-acl
- show ipv6 accounting access-list
- permit icmp
- permit
- ipv6 control-plane egress-filter
- ipv6 access-list
- cam-acl-egress
- cam-acl

show cam-acl-egress

Show information on FP groups allocated for egress ACLs.

Syntax

```
show cam-acl-egress
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.4.2.1	Introduced on the S-Series.
8.4.2.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series.

Example

Related Commands

- cam-acl — configure CAM profiles to support IPv6 ACLs.

show cam-acl

Show space allocated for IPv6 ACLs.

Syntax

```
show cam-acl
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.4.2.1	Introduced on the S-Series.
8.4.2.0	Introduced on the E-Series.

Version	Description
7.8.1.0	Introduced on the C-Series.

Example

Example (Manual Profiles)

```
DellEMC# show cam-acl

-- Chassis Cam ACL --
         Current Settings(in block sizes)
L2Acl   :          2
Ipv4Acl :          2
Ipv6Acl :          4
Ipv4Qos :          2
L2Qos   :          3

-- Line card 4 --
          Current Settings(in block sizes)
L2Acl   :          2
Ipv4Acl :          2
Ipv6Acl :          4
Ipv4Qos :          2
L2Qos   :          3

DellEMC#
```

Related Commands

- cam-acl — configure CAM profiles to support IPv6 ACLs.

show ipv6 accounting access-list

View the IPv6 access-lists created on the E-Series and the sequence of filters.

Syntax

```
show ipv6 accounting access-list [access-list-name [cam_count | interface interface {in | out}]
```

Parameters

access-list-name	Enter the name of the ACL to be displayed, up to 140 characters.
cam_count	List the count of the CAM rules for this ACL.
interface *interface*	Enter the keyword `interface` followed by the interface type and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` followed by a number. For the C-Series and S-Series, the range is 1 to 128. For the E-Series, the range is 1 to 255 for TeraScale and 1 to 512 for ExaScale. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` followed by the slot/port information. • For a 25-Gigabit interface, enter the keyword `twentyfiveGigE` then the slot/port/subport information. • For a 50-Gigabit interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit interface, enter the keyword `hundredGigE` then the slot/port information.
in | out	Identify whether ACL is applied on ingress or egress side.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.0.2.0	Introduced on the S6000.
8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
8.4.2.1	Introduced on the S-Series.
8.2.1.0	Introduced on the E-Series ExaScale.
7.8.1.0	Introduced on the C-Series. Increased the name string to accept up to 140 characters. Prior to version 7.8.1.0, names are up to 16 characters long.
7.4.1.0	Introduced on the E-Series TeraScale.

Usage Information

Field	Description
"Ingress IPv6..."	Displays the name of the IPv6 ACL, in this Example "AclList1".
"seq 10..."	Displays the filter. If the keywords `count` or `byte` were configured in the filter, the number of packets or bytes processed by the filter is displayed at the end of the line.

Example

```
DellEMC#show ipv6 accounting access-list
!
Ingress IPv6 access list AclList1 on GigabitEthernet 9/0
Total cam count 15
  seq 10 permit icmp host 3333:: any mobile-advertisement log
  seq 15 deny tcp any any rst
  seq 20 permit udp any any gt 101 count (0 packets)
!
DellEMC#
```

permit icmp

To allow all or specific internet control message protocol (ICMP) messages, configure a filter.

Syntax

`permit icmp {`*`source address mask`* `| any | host` *`ipv6-address`*`} {`*`destination address`* `| any | host` *`ipv6-address`*`} [count [byte]]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {`*`source address mask`* `| any | host` *`ipv6-address`*`} {`*`destination address`* `| any | host` *`ipv6-address`*`}` command.

Parameters

source address	Enter the IPv6 address of the network or host from which the packets were sent in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. The :: notation specifies successive hexadecimal fields of zero.
mask	Enter a network mask in /prefix format (/x).
host *ipv6-address*	Enter the keyword `host` then the IPv6 address of the host in the x:x:x:x::x format. The :: notation specifies successive hexadecimal fields of zero.

destination address	Enter the IPv6 address of the network or host to which the packets are sent in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. The :: notation specifies successive hexadecimal fields of zero.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL) Enter the keyword `log` to have the information kept in an ACL log file.
monitor	(OPTIONAL) Enter the keyword `monitor` to monitor traffic on the monitoring interface specified in the flow-based monitoring session along with the filter operation.

Defaults Not configured.

Command Modes ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.4.2.1	Introduced on the S-Series.
8.2.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series. Added the `monitor` option.

permit

To configure a filter that matches the filter criteria, select an IPv6 protocol number, ICMP, IPv6, TCP, or UDP.

Syntax `permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp}`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp}` command

Parameters

ip-protocol-number	Enter an IPv6 protocol number. The range is from 0 to 255.
icmp	Enter the keyword `icmp` to filter internet Control Message Protocol version 6.

	ipv6	Enter the keyword `ipv6` to filter any internet Protocol version 6.
	tcp	Enter the keyword `tcp` to filter the Transmission Control protocol.
	udp	Enter the keyword `udp` to filter the User Datagram Protocol.

Defaults Not configured.

Command Modes ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.

ipv6 control-plane egress-filter

Enable egress Layer 3 ACL lookup for IPv6 CPU traffic.

Syntax `ipv6 control-plane egress-filter`

Defaults Not enabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.

ipv6 access-list

Configure an access list based on IPv6 addresses or protocols.

Syntax `ipv6 access-list` *`access-list-name`* `cpu-qos`

To delete an access list, use the `no ipv6 access-list` *`access-list-name`* command.

Parameters

access-list-name	Enter the access list name as a string, up to 140 characters.
cpu-qos	Enter the keyword `cpu-qos` to assign this ACL to control plane traffic only (CoPP).
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this condition.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
ospfv3	Specify that this ACL is for OSPFv3 control plane traffic

Defaults All access lists contain an implicit “deny any”; that is, if no match occurs, the packet is dropped.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Added support for CoPP for OSPFv3 on the S4810, S4820T, S6000, and Z9000 platforms.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000
8.3.11.1	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.

Version	Description
8.4.2.1	Introduced on the S-Series.
8.2.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series. Increased the name string to accept up to 140 characters. Prior to version 7.8.1.0, names are up to 16 characters long.
7.4.1.0	Introduced on the E-Series.

Usage Information The number of entries allowed per ACL is hardware-dependent. For detailed specification on entries allowed per ACL, refer to your line card documentation. You can create an IPv6 ACL for control-plane traffic policing for OSPFv3, in addition to the CoPP support for VRRP, BGP, and ICMP.

cam-acl-egress

Allocate space for IPv6 egress ACLs.

Syntax `cam-acl-egress {default | l2acl 1-4 ipv4acl 1-4 ipv6acl 0-4}`

Parameters

default	Use the default CAM profile settings, and set the CAM as follows: • L2 ACL(l2acl): **1** • L3 ACL (ipv4acl: **1** • IPv6 L3 ACL (ipv6acl): **2**
l2acl *1-4* ipv4acl *1- 4* ipv6acl *0-4*	Allocate space to support IPv6 ACLs. Enter all of the profiles and a range. Enter the CAM profile name then the amount to be allotted. The total space allocated must equal 4. The `ipv6acl` range must be a factor of 2.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.2.0	Introduced on the E-Series.
8.2.1.0	Introduced on the S-Series.

Version	Description
7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`), then reload the system.

The total amount of space allowed is 4 FP Blocks.

Example

```
DellEMC# configure
DellEMC(conf)# cam-acl-egress ?
default      Reset Egress CAM ACL entries to default setting
l2acl        Set L2-ACL entries
DellEMC(conf)# cam-acl-egress l2acl ?
<1-4>        Number of FP blocks for l2acl
DellEMC(conf)# cam-acl-egress l2acl 1 ?
ipv4acl      Set IPV4-ACL entries
DellEMC(conf)# cam-acl-egress l2acl 1 ipv4acl 1 ?
ipv6acl      Set IPV6-ACL entries
DellEMC(conf)# cam-acl-egress l2acl 1 ipv4acl 1 ipv6acl ?
<0-4>        Number of FP blocks for IPV6 (multiples of 2)
DellEMC(conf)# cam-acl-egress l2acl 1 ipv4acl 1 ipv6acl 2
DellEMC(conf)#
```

cam-acl

Allocate space for IPv6 ACLs.

Syntax

`cam-acl {default | l2acl` *`1-10`* `ipv4acl` *`1-10`* `ipv6acl` *`0-10`* `ipv4qos` *`1-10`* `l2qos` *`1-10`*`}`

Parameters

default	Use the default CAM profile settings, and set the CAM as follows: • L3 ACL (ipv4acl): **62** • L2 ACL(l2acl): **52** • IPv6 L3 ACL (ipv6acl): **0** • L3 QoS (ipv4qos): **12** • L2 QoS (l2qos): **12**
l2acl ***1-10*** **ipv4acl** ***1-10*** **ipv6acl** ***0-10*** **ipv4qos** ***1-10*** **l2qos** ***1-10***	Allocate space to support IPv6 ACLs. Enter all of the profiles and a range. Enter the CAM profile name then the amount to be allotted. The total space allocated must equal 139. The `ipv6acl` range must be a factor of 2 (2, 4, 6, 8, 10)3 (0,3,6,9).

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.2.0	Introduced on the E-Series.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`) then reload the system.

The total amount of space allowed is 16 FP Blocks. System flow requires three blocks and these blocks cannot be reallocated. The `ipv4acl` profile range is from 1 to 40 to 8.

When configuring space for IPv6 ACLs, the total number of Blocks must equal 139.

Ranges for the CAM profiles are from 1 to 10, except for the `ipv6acl` profile which is from 0 to 10. The `ipv6acl` allocation must be a factor of 2 (2, 4, 6, 8, 10)3 (0,3,6,9).

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Intermediate System to Intermediate System (IS-IS)

IS-IS is an interior gateway protocol that uses shortest-path-first algorithm. IS-IS facilitates the communication between open systems, supporting routers passing through both IP and OSI traffic.

A router is considered as an intermediate system. Networks are partitioned into manageable routing domains called areas. Intermediate systems send, receive, and forward packets to other routers within their area (Level 1 and Level 1-2 devices). Only Level 1-2 and Level 2 devices communicate with other areas.

IS-IS protocol standards are listed in the Standard Compliance chapter in the *Dell EMC Networking OS Configuration Guide*.

NOTE: The fundamental mechanisms of IS-IS are the same for IPv4 and IPv6. However some command modes might vary when applied to IPV4 and IPV6. These variations have been explicitly explained for such commands. If the variation is not mentioned, then the information applies to both the protocol versions.

Topics:

- adjacency-check
- advertise
- area-password
- clear config
- clear isis
- clns host
- debug isis
- debug isis adj-packets
- debug isis local-updates
- debug isis snp-packets
- debug isis spf-triggers
- debug isis update-packets
- default-information originate
- description
- distance
- distribute-list in
- distribute-list out
- distribute-list redistributed-override
- domain-password
- graceful-restart ietf
- graceful-restart interval
- graceful-restart restart-wait
- graceful-restart t1
- graceful-restart t2
- graceful-restart t3
- hello padding
- hostname dynamic
- ignore-lsp-errors
- ip router isis
- ipv6 router isis
- isis circuit-type
- isis csnp-interval
- isis hello-interval
- isis hello-multiplier
- isis hello padding

- isis ipv6 metric
- isis metric
- isis network point-to-point
- isis password
- isis priority
- is-type
- log-adjacency-changes
- lsp-gen-interval
- lsp-mtu
- lsp-refresh-interval
- max-area-addresses
- max-lsp-lifetime
- maximum-paths
- metric-style
- multi-topology
- net
- passive-interface
- redistribute
- redistribute bgp
- redistribute ospf
- router isis
- set-overload-bit
- show config
- show isis database
- show isis graceful-restart detail
- show isis hostname
- show isis interface
- show isis neighbors
- show isis protocol
- show isis traffic
- spf-interval

adjacency-check

Verify that the “protocols supported” field of the IS-IS neighbor contains matching values to this router.

Syntax

`adjacency-check`

To disable adjacency check, use the `no adjacency-check` command.

Defaults

Enabled.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Introduced on the E-Series.

Usage Information

To perform protocol-support consistency checks on hello packets, use this command. The adjacency-check is enabled by default.

If a BFD session goes down indicating that IPv4 or IPv6 connectivity to its neighbor is lost, it does not imply that the adjacency is lost altogether. The hello adjacency runs over Layer 2, and does not require IP connectivity. However, if IPv4 connectivity is lost to a neighbor, then when the next SPF calculation is performed, the system ensures that it does not calculate any IPv4 or IPv6 routes through that neighbor.

advertise

Leak routes between levels (distribute IP prefixes between Level 1 and Level 2 and vice versa).

Syntax

`advertise {level1-into-level2 | level2-into-level1} prefix-list-name`

To return to the default, use the `no advertise {level1-into-level2 | level2-into-level1}[prefix-list-name]` command.

Parameters

level1-into-level2	Enter the keywords `level1-into-level2` to advertise Level 1 routes into Level 2 LSPs. This setting is the default.
level2-into-level1	Enter the keywords `level2-into-level1` to advertise Level 2 inter-area routes into Level 1 LSPs. This behavior is described in RFC 2966.
prefix-list-name	Enter the name of a configured IP prefix list. Routes meeting the criteria of the IP Prefix list are leaked.

Defaults

level1-into-level2 (Level 1 to Level 2 leaking is enabled.)

level2–into-level1 (Level 2 to Level 1) leaking is disabled.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added IPv6 ISIS support.
6.3.1.0	Version 6.3.1.0 Introduced

Usage Information

You cannot disable leaking from Level 1 to Level 2. Also, you cannot enable leaking from Level 2 to Level 1. However, you can regulate the rate flow from one level to another using an IP Prefix list. If you do not configure the IP Prefix list, all Level 1 routes are leaked.

You can find more information in IETF RFC 2966, *Domain-wide Prefix Distribution with Two-Level IS-IS*.

area-password

Configure a hash message authentication code (HMAC) password for an area.

Syntax

```
area-password [hmac-md5 | encryption-type] password
```

To delete a password, use the `no area-password` command.

Parameters

hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password.
encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
password	Enter a 1 to 16-character length alphanumeric string to prevent unauthorized access or incorrect routing information corrupting the link state database. The password is processed as plain text, which only provides limited security.

Defaults

Not configured.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

To prevent the link state database from receiving incorrect routing information from unauthorized routers, use the `area-password` command on routers within an area.

The configured password injects into Level 1 LSPs, CSNPs, and PSNPs.

Related Commands

- domain-password — set the authentication password for a routing domain.
- isis password — configure an authentication password for an interface.

clear config

Clear IS-IS configurations that display under the *router isis* heading of the `show running-config` command output.

Syntax `clear config`

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

Usage Information

CAUTION: Use caution when you enter this command. Back up your configuration prior to using this command or your IS-IS configuration will be erased.

clear isis

Restart the IS-IS process. All IS-IS data is cleared.

Syntax `clear isis [vrf vrf-name] [tag] {* | database | traffic}`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to restart the IS-IS process corresponding to that VRF.
tag	(Optional) Enter an alphanumeric string to specify the IS-IS routing tag area.
*	Enter the keyword * to clear all IS-IS information and restart the IS-IS process. This command removes IS-IS neighbor information and IS-IS LSP database information and the full SPF calculation is done.
database	Clears IS-IS LSP database information.
traffic	Clears IS-IS counters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

clns host

Define a name-to-network service mapping point (NSAP) that you use with commands that require NSAPs and system IDs.

Syntax `clns host name nsap`

Parameters

name	Enter an alphanumeric string to identify the name-to-NSAP mapping.
nsap	Enter a specific NSAP address that is associated with the name parameter.

Defaults Not configured.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information To configure a shortcut name that you can use instead of entering a long string of numbers associated with an NSAP address, use this command.

Related Commands

- hostname dynamic — enable dynamic learning of host names from routers in the domain and allows the routers to advertise the host names in LSPs.

debug isis

Enable debugging for all IS-IS operations.

Syntax `debug isis`

To disable debugging of IS-IS, use the `no debug isis` command.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

Entering `debug isis` enables all debugging parameters.

To display all debugging information in one output, use this command. To turn off debugging, you normally enter separate `no` forms of each command. To disable all debug messages for IS-IS at once, enter the `no debug isis` command.

debug isis adj-packets

Enable debugging on adjacency-related activity such as hello packets that are sent and received on IS-IS adjacencies.

Syntax

`debug isis [vrf vrf-name] adj-packets [interface]`

To turn off debugging, use the `no debug isis [vrf vrf-name]adj-packets [interface]` command.

Parameters

vrf *vrf-name* (Optional) Enter the keyword vrf followed by the name of the VRF to enable the debug information on IS-IS for an adjacency tied to that VRF. This command displays the IIH related debug details.

interface (OPTIONAL) Identifies the interface type and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

debug isis local-updates

To debug IS-IS local update packets, enable debugging on a specific interface and provides diagnostic information.

Syntax

`debug isis [vrf vrf-name] local-updates [interface]`

To turn off debugging, use the `no debug isis [vrf vrf–name] updates [interface]` command.

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword vrf followed by the name of the VRF to enable the debugging information on IS-IS corresponding to that VRF. This information contains local updates tied to the VRF that you specify. This command displays the local LSP debugging details of the current unit.

interface (OPTIONAL) Identifies the interface type as one of the following:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
6.3.1.0	Introduced.

debug isis snp-packets

To debug IS-IS complete sequence number PDU (CSNP) and partial sequence number PDU (PSNP) packets, enable debugging on a specific interface and provides diagnostic information.

Syntax

`debug isis [vrf vrf-name] snp-packets [interface]`

To turn off debugging, use the `no debug isis [vrf vrf-name] snp-packets [interface]` command.

Parameters

vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to enable debugging information on ISIS for CSNP/PSNP packets tied to that VRF. The command displays the SNP (CSNP/PSNP) related debugging information.
interface	(OPTIONAL) Identifies the interface type as one of the following: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
6.3.1.0	Introduced.

debug isis spf-triggers

Enable debugging on the events that triggered IS-IS shortest path first (SPF) events for debugging purposes.

Syntax

`debug isis [vrf vrf-name] spf-triggers`

To turn off debugging, use the `no debug isis [vrf vrf-name] spf-triggers` command.

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to enable debugging information on IS-IS corresponding to that VRF. This information contains SPF trigger detail tied to the VRF that you specify. When SPF is triggered, this debugging information is displayed.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Version	Description
6.3.1.0	Introduced.

debug isis update-packets

Enable debugging on link state PDUs (LSPs) that a router detects.

Syntax

`debug isis [vrf vrf-name] update-packets [interface]`

To turn off debugging, use the `no debug isis update-packets [interface]` command.

Parameters

vrf *vrf-name*
(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to enable the debugging information on IS-IS. This information contains updates from neighbors tied to the VRF that you specify. This command displays the debugging details of the received LSPs from the neighbors.

interface
(OPTIONAL) Identifies the interface type and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
6.3.1.0	Introduced.

default-information originate

Generates a default route into an IS-IS routing domain and controls the distribution of default information.

Syntax

`default-information originate [always] [metric metric] [route-map map-name]`

To disable the generation of a default route into the specified IS-IS routing domain, use the `no default-information originate [always] [metric metric] [route-map map-name]` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to have the default route always advertised.
metric *metric*	(OPTIONAL) Enter the keyword `metric` then a number to assign to the route. The range is from 0 to 16777215.
route-map *map-name*	(OPTIONAL) A default route the routing process generates if the route map is satisfied.

Defaults

Not configured.

Command Modes

- ROUTER ISIS (for IPv4)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (for IPv6)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added IPv6 ISIS support.
6.3.1.0	Introduced.

Usage Information

When you use this command to redistribute routes into a routing domain, the router becomes an autonomous system (AS) boundary router. An AS boundary router does not always generate a default route into a routing domain. The router still requires its own default route before it can generate one.

How a metric value assigned to a default route advertises depends on the `metric-style` command configuration. If the `metric-style` command is set for Narrow mode and the metric value in the `default-information originate` command is set to a number higher than 63, the metric value advertised in the LSPs is 63. If the `metric-style` command is set for Wide mode, the metric value in the `default-information originate` command is advertised.

Related Commands

- redistribute — redistribute routes from one routing domain to another routing domain.

description

Enter a description of the IS-IS routing protocol.

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the IS-IS protocol (80 characters maximum).

Defaults

None

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
pre-7.7.1.0	Introduced.

Related Commands

- router isis — enter ROUTER mode on the switch.

distance

Define the administrative distance for learned routes.

Syntax

`distance weight [ip-address mask [prefix-list]]`

To return to the default values, use the `no distance weight` command.

Parameters

weight	The administrative distance value indicates the reliability of a routing information source. The range is from 1 to 255. (A higher relative value indicates lower reliability. Routes with smaller values are given preference.) The default is **115**.
ip-address mask	(OPTIONAL) Enter the next-hop address in dotted decimal format and enter a mask in either dotted decimal or /prefix format.
prefix-list	(OPTIONAL) Enter the name of a prefix list name.

Defaults weight = **115**

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
6.3.1.0	Introduced.

Usage Information The administrative distance indicates the trust value of incoming packets. A low administrative distance indicates a high trust rate. A high value indicates a lower trust rate. For example, a weight of 255 is interpreted that the routing information source is not trustworthy and should be ignored.

distribute-list in

Filter network prefixes received in updates.

Syntax `distribute-list` *`prefix-list-name`* `in [`*`interface`*`]`

To return to the default values, use the `no distribute-list` *`prefix-list-name`* `in [`*`interface`*`]` command.

Parameters

prefix-list-name	Specify the prefix list to filter prefixes in routing updates.
interface	(OPTIONAL) Identifies the interface type and the interface following: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
7.5.1.0	Added IPv6 ISIS support.
6.3.1.0	Introduced.

Related Commands
- distribute-list out — suppress networks from being advertised in updates.
- redistribute — redistribute routes from one routing domain to another routing domain.

distribute-list out

Suppress network prefixes from being advertised in outbound updates.

Syntax `distribute-list` *`prefix-list-name`* `out [connected | bgp` *`as number`* `| ospf` *`process-id`* `| rip | static]`

To return to the default values, use the `no distribute-list` *`prefix-list-name`* `out [bgp` *`as number`* `connected | ospf` *`process-id`* `| rip | static]` command.

Parameters

prefix-list-name Specify the prefix list to filter prefixes in routing updates.

connected	(OPTIONAL) Enter the keyword `connected` for directly connected routing process.
ospf *process-id*	(OPTIONAL) Enter the keyword `ospf` then the OSPF process-ID number. The range is from 1 to 65535.
bgp *as number*	(OPTIONAL) Enter the BGP then the AS Number. The range is from 1 to 65535.
rip	(OPTIONAL) Enter the keyword `rip` for RIP routes.
static	(OPTIONAL) Enter the keyword `static` for user-configured routing process.

Defaults Not configured.

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
7.5.1.0	Added IPv6 ISIS support.
6.3.1.0	Introduced.

Usage Information You can assign a name to a routing process so a prefix list IS applied to only the routes derived from the specified routing process.

Related Commands
- distribute-list in — filter the networks received in updates.
- redistribute — redistribute routes from one routing domain to another routing domain.

distribute-list redistributed-override

Suppress flapping of routes when the same route is redistributed into IS-IS from multiple routers in the network.

Syntax `distribute-list redistributed-override in`

To return to the default, use the `no distribute-list redistributed-override in` command.

Defaults none

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	Added IPv6 ISIS support.
6.3.1.0	Introduced.

Usage Information

When you execute this command, IS-IS does not download the route to the routing table if the same route was redistributed into IS-IS routing protocol on the same router.

domain-password

Set the authentication password for a routing domain.

Syntax

`domain-password [hmac-md5 | encryption-type] password`

To disable the password, use the `no domain-password` command.

Parameters

hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password using MD5.
encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
password	Enter an alphanumeric string up to 16 characters long. If you do not specify an `encryption type` or `hmac-md5` keywords, the password is processed as plain text which provides limited security.

Defaults

No default password.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
6.3.1.0	Introduced.

Usage Information The domain password is inserted in Level 2 link state PDUs (LSPs), complete sequence number PDUs (CSNPs), and partial sequence number PDUs (PSNPs).

Related Commands
- area-password — configure an IS-IS area authentication password.
- isis priority — configure the authentication password for an interface.

graceful-restart ietf

Enable graceful restart on an IS-IS router.

Syntax `graceful-restart ietf`

To return to the default, use the `no graceful-restart ietf` command.

Parameters

ietf	Enter `ietf` to enable graceful restart on the IS-IS router.

Defaults Graceful restart disabled.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
6.3.1.0	Introduced on the E-Series.

Usage Information

Every graceful restart enabled router's HELLO PDUs includes a restart TLV. This restart enables (re)starting as well as the existing ISIS peers to detect the GR capability of the routers on the connected network. A flag in the Restart TLV contains restart request (RR), restart acknowledge (RA) and suppress adjacency advertisement (SA) bit flags.

The ISIS graceful restart-enabled router can co-exist in mixed topologies where some routers are graceful restart-enabled and others are not. For neighbors that are not graceful restart-enabled, the restarting router brings up the adjacency per the usual methods.

graceful-restart interval

Set the graceful restart grace period, the time during that all graceful restart attempts are prevented.

Syntax `graceful-restart interval` *minutes*

To return to the default, use the `no graceful-restart interval` command.

Parameters

minutes	Enter the graceful-restart interval minutes. The range is from 1 to 20 minutes. The default is **5 minutes**.

Defaults **5 minutes**

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

graceful-restart restart-wait

Enable the graceful restart maximum wait time before a restarting peer comes up.

Syntax

NOTE: Set the t3 timer to `adjacency` on the restarting router when implementing this command.

```
graceful-restart restart-wait seconds
```

To return to the default, use the `no graceful-restart restart-wait` command.

Parameters

seconds	Enter the graceful restart time in seconds. The range is from 5 to 300 seconds. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

Related Commands

- graceful-restart t3 — configure the overall wait time before graceful restart completes.

graceful-restart t1

Set the graceful restart wait time before unacknowledged restart requests are generated. This wait time is the interval before the system sends a restart request (an IIH with RR bit set in Restart TLV) until the CSNP is received from the helping router.

Syntax

```
graceful-restart t1 {interval seconds | retry-times value}
```

To return to the default, use the `no graceful-restart t1` command.

Parameters

interval	Enter the keyword `interval` to set the wait time. The range is from 5 to 120 seconds. The default is **5 seconds**.

retry-times Enter the keywords `retry-times` to set the number of times the request interval is extended until a CSNP is received from the helping router. The range is from 1 to 10 attempts. The default is **1**.

Defaults See *Parameters*.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

graceful-restart t2

Configure the wait time for the graceful restart timer T2 that a restarting router uses as the wait time for each database to synchronize.

Syntax `graceful-restart t2 {level-1 | level-2} seconds`

To return to the default, use the `no graceful-restart t2` command.

Parameters

level-1, level-2 Enter the keywords `level-1` or `level-2` to identify the database instance type to which the wait interval applies.

seconds Enter the `gracefule-restart t2` time in seconds. The range is from 5 to 120 seconds. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

graceful-restart t3

Configure the overall wait time before graceful restart completes.

Syntax `graceful-restart t3 {adjacency | manual}` *seconds*

To return to the default, use the `no graceful-restart t3` command.

Parameters

adjacency	Enter the keyword `adjacency` so that the restarting router receives the remaining time value from its peer and adjusts its T3 value so if you have configured this option.
manual	Enter the keyword `manual` to specify a time value that the restarting router uses. The range is from 50 to 120 seconds. The default is **30 seconds**.

Defaults manual, **30 seconds**

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

Usage Information

The running router sets the remaining time value to the current adjacency hold time. You can override this setting by implementing this command.

Override the default restart-wait time by entering the `no graceful-restart restart-wait` command. When you disable `restart-wait`, the current adjacency hold time is used.

Set the t3 timer to `adjacency` on the restarting router when implementing this command. The restarting router gets the remaining time value from its peer and adjusts its T3 value so only when you have configured `graceful-restart t3 adjacency`.

Related Commands

- graceful-restart restart-wait — enable the graceful restart maximum wait time before a restarting peer comes up.

hello padding

Use to turn ON or OFF padding for LAN and point-to-point hello PDUs or to selectively turn padding ON or OFF for LAN or point-to-point hello PDUs.

Syntax

```
hello padding [multi-point | point-to-point]
```

To return to the default, use the `no hello padding [multi-point | point-to-point]` command.

Parameters

multi-point	(OPTIONAL) Enter the keywords `multi-point` to pad only LAN hello PDUs.
point-to-point	(OPTIONAL) Enter the keywords `point-to-point` to pad only point-to-point PDUs.

Defaults

Both LAN and point-to-point hello PDUs are padded.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information IS-IS hellos are padded to the full maximum transmission unit (MTU) size. Padding IS-IS Hellos (IIHS) to the full MTU provides early error detection of large frame transmission problems or mismatched MTUs on adjacent interfaces.

Related Commands
- isis hello padding — turn ON or OFF hello padding on an interface basis.

hostname dynamic

Enables dynamic learning of hostnames from routers in the domain and allows the routers to advertise the hostname in LSPs.

Syntax `hostname dynamic`

To disable this command, use the `no hostname dynamic` command.

Defaults Enabled.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information To build name-to-systemID mapping tables through the protocol, use this command. All `show` commands that display systems also display the hostname.

Related Commands
- clns host — define a name-to-NSAP mapping.

ignore-lsp-errors

Ignore LSPs with bad checksums instead of purging those LSPs.

Syntax `ignore-lsp-errors`

To return to the default values, use the `no ignore-lsp-errors` command.

Defaults In IS-IS, the default deletes LSPs with internal checksum errors (`no ignore-lsp-errors`).

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information IS-IS normally purges LSPs with an incorrect data link checksum causing the LSP source to regenerate the message. A cycle of purging and regenerating LSPs can occur when a network link continues to deliver accurate LSPs even though there is a link causing data corruption. This process could cause disruption to your system operation.

ip router isis

Configure IS-IS routing processes on an interface and attach an area tag name to the routing process.

Syntax `ip router isis [tag]`

To disable IS-IS on an interface, use the `no ip router isis [tag]` command.

Parameters

tag (OPTIONAL) The tag you specify identifies a specific area routing process. If you do not specify a tag, a null tag is assigned.

Defaults No processes are configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Introduced.

Usage Information

To assign a network entity title to enable IS-IS, use the `net` command.

This command accepts even if an IP address is not configured. This command is cached in the L3 Manager till the IP address is configured. When the IP address configuration reaches the L3Manager, the circuit add message is sent to IS-IS.

NOTE: IP address is not mandatory for forming IS-IS adjacency.

Related Commands

- net — configure an IS-IS network entity title (NET) for the routing process.
- router isis — enable the IS-IS routing protocol.

ipv6 router isis

Enable the IPv6 IS-IS routing protocol and specify an IPv6 IS-IS process.

Syntax

`ipv6 router isis [tag]`

To disable IS-IS routing, use the `no router isis [tag]` command.

Parameters

tag	(OPTIONAL) This parameter is a unique name for a routing process. A null tag is assumed if the tag option is not specified. The tag name must be unique for all IP router processes for a given router.

Defaults

Not configured.

Command Modes

ROUTER ISIS

Command History

s

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Introduced on the E-Series.

Usage Information

Configure a network entity title (the `net` command) to specify the area address and the router system ID.

To establish adjacencies and establish dynamic routing, enable routing on one or more interfaces.

You can configure only one IS-IS routing process to perform Level 2 routing. A `level-1-2` designation performs Level 1 and Level 2 routing at the same time.

Related Commands

- net — configure an IS-IS network entity title (NET) for the routing process.
- is-type — assign a type for a given area.

isis circuit-type

Configure the adjacency type on interfaces.

Syntax

```
isis circuit-type {level-1 | level-1-2 | level-2-only}
```

To return to the default values, use the `no isis circuit-type` command.

Parameters

level-1	You can form a Level 1 adjacency if there is at least one common area address between this system and neighbors. You cannot form Level 2 adjacencies on this interface.
level-1-2	You can form a Level 1 and Level 2 adjacencies when the neighbor is also configured as Level-1-2 and there is at least one common area, if not, a Level 2 adjacency is established. This setting is the default.
level-2-only	You can form a Level 2 adjacencies when other Level 2 or Level 1-2 routers and their interfaces are configured for Level 1-2 or Level 2. Level 1 adjacencies cannot be established on this interface.

Defaults **level-1-2**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

Because the default establishes Level 1 and Level 2 adjacencies, you do not need to configure this command. Routers in an IS-IS system must be configured as a Level 1-only, Level 1-2, or Level 2-only system.

Only configure interfaces as Level 1 or Level 2 on routers that are between areas (for example, a Level 1-2 router) to prevent the software from sending unused hello packets and wasting bandwidth.

isis csnp-interval

Configure the IS-IS complete sequence number PDU (CSNP) interval on an interface.

Syntax

```
isis csnp-interval seconds [level-1 | level-2]
```

To return to the default values, use the `no isis csnp-interval [seconds] [level-1 | level-2]` command.

Parameters

seconds	Interval of transmission time between CSNPs on multi-access networks for the designated intermediate system. The range is from 0 to 65535. The default is **10**.
level-1	(OPTIONAL) Independently configures the interval of time between transmission of CSNPs for Level 1.
level-2	(OPTIONAL) Independently configures the interval of time between transmission of CSNPs for Level 2.

Defaults seconds = **10**; **level-1** (if not otherwise specified)

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

The default values of this command are typically satisfactory transmission times for a specific interface on a designated intermediate system. To maintain database synchronization, the designated routers send CSNPs.

You can configure Level 1 and Level 2 CSNP intervals independently.

isis hello-interval

Specify the length of time between hello packets sent.

Syntax

```
isis hello-interval seconds [level-1 | level-2]
```

To return to the default values, use the `no isis hello-interval [seconds] [level-1 | level-2]` command.

Parameters

seconds	Allows you to set the length of time between hello packet transmissions. The range is from 1 to 65535. The default is **10**.
level-1	(OPTIONAL) Select this value to configure the hello interval for Level 1. This value is the default.
level-2	(OPTIONAL) Select this value to configure the hello interval for Level 2.

Defaults seconds = **10**; **level-1** (if not otherwise specified)

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

Hello packets are held for a length of three times the value of the hello interval. To conserve bandwidth and CPU usage, use a high hello interval seconds. Use a low hello interval seconds for faster convergence (but uses more bandwidth and CPU resources).

Related Commands

- isis hello-multiplier — specify the number of IS-IS hello packets a neighbor must miss before the router declares the adjacency as down.

isis hello-multiplier

Specify the number of IS-IS hello packets a neighbor must miss before the router declares the adjacency down.

Syntax

```
isis hello-multiplier multiplier [level-1 | level-2]
```

To return to the default values, use the `no isis hello-multiplier [multiplier] [level-1 | level-2]` command.

Parameters

multiplier	Specifies an integer that sets the multiplier for the hello holding time. Never configure a hello-multiplier lower than the default (3). The range is from 3 to 1000. The default is **3**.
level-1	(OPTIONAL) Select this value to configure the hello multiplier independently for Level 1 adjacencies. This value is the default.
level-2	(OPTONAL) Select this value to configure the hello multiplier independently for Level 2 adjacencies.

Defaults

multiplier = **3**; **level-1** (if not otherwise specified)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

The holdtime (the product of the hello-multiplier multiplied by the hello-interval) determines how long a neighbor waits for a hello packet before declaring the neighbor is down so routes can be recalculated.

Related Commands

- isis hello-interval — specify the length of time between hello packets.

isis hello padding

Turn ON or OFF padding of hello PDUs from INTERFACE mode.

Syntax

```
isis hello padding
```

To return to the default, use the `no isis hello padding` command.

Defaults Padding of hello PDUs is enabled (ON).

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information Hello PDUs are "padded" only when both the global and interface padding options are ON. Turning either one OFF disables padding for the corresponding interface.

Related Commands

- hello padding — turn ON or OFF padding for LAN and point-to-point hello PDUs.

isis ipv6 metric

Assign metric to an interface for use with IPv6 information.

Syntax

```
isis ipv6 metric default-metric [level-1 | level-2]
```

To return to the default values, use the `no ipv6 isis metric [default-metric] [level-1 | level-2]` command.

Parameters

default-metric	Metric assigned to the link and used to calculate the cost from each other router via the links in the network to other destinations. You can configure this metric for Level 1 or Level 2 routing. The range is from 0 to 16777215. The default is **10**.
level-1	(OPTIONAL) Enter the keywords `level-1` to configure the shortest path first (SPF) calculation for Level 1 (intra-area) routing. This value is the default.
level-2	(OPTIONAL) Enter the keywords `level-2` to configure the SPF calculation for Level 2 (inter-area) routing.

Defaults default-metric = **10**; **level-1** (if not otherwise specified)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Introduced on the E-Series.

Usage Information Dell EMC Networking recommends configuring metrics on all interfaces. Without configuring this command, the IS-IS metrics are similar to hop-count metrics.

isis metric

Assign a metric to an interface.

Syntax `isis metric default-metric [level-1 | level-2]`

To return to the default values, use the `no isis metric [default-metric] [level-1 | level-2]` command.

Parameters

default-metric Metric assigned to the link and used to calculate the cost from each other router via the links in the network to other destinations. You can configure this metric for Level 1 or Level 2 routing. The range is from 0 to 16777215 irrespective of the metric style. The default is **10**.

If metric value is configured to more than 63, system throughs the following warning:`Warning: for metrics greater than 63, 'metric-style wide' should be configured on level-1-2, or it will be capped at 63.`

If the metric style is WIDE, the metric values that are greater than 63 are only effective.

level-1 (OPTIONAL) Enter the keywords `level-1` to configure the shortest path first (SPF) calculation for Level 1 (intra-area) routing. This setting is the default.

level-2 (OPTIONAL) Enter the keywords `level-2` to configure the SPF calculation for Level 2 (inter-area) routing.

Defaults default-metric = **10**; **level-1** (if not otherwise specified)

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information Dell EMC Networking recommends configuring metrics on all interfaces. Without configuring this command, the IS-IS metrics are similar to hop-count metrics.

isis network point-to-point

Enable the software to treat a broadcast interface as a point-to-point interface.

Syntax `isis network point-to-point`

To disable the feature, use the `no isis network point-to-point` command.

Defaults Not enabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

isis password

Configure an authentication password for an interface.

Syntax

```
isis password [hmac-md5] password [level-1 | level-2]
```

To delete a password, use the `no isis password [password] [level-1 | level-2]` command.

Parameters

encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password using MD5.
password	Assign the interface authentication password.
level-1	(OPTIONAL) Independently configures the authentication password for Level 1. The router acts as a station router for Level 1 routing. This setting is the default.
level-2	(OPTIONAL) Independently configures the authentication password for Level 2. The router acts as an area router for Level 2 routing.

Defaults No default password. **level-1** (if not otherwise specified).

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information To protect your network from unauthorized access, use this command to prevent unauthorized routers from forming adjacencies.

You can assign different passwords for different routing levels by using the keywords `level-1` and `level-2`.

The `no` form of this command disables the password for Level 1 or Level 2 routing, using the respective keywords `level-1` or `level-2`.

This password provides limited security as it is processed as plain text.

isis priority

Set the priority of the designated router you select.

Syntax

`isis priority value [level-1 | level-2]`

To return to the default values, use the `no isis priority [value] [level-1 | level-2]` command.

Parameters

value	This value sets the router priority. The higher the value, the higher the priority. The range is from 0 to 127. The default is **64**.
level-1	(OPTIONAL) Specify the priority for Level 1. This setting is the default.
level-2	(OPTIONAL) Specify the priority for Level 2.

Defaults

value = **64**; **level-1** (if not otherwise specified).

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

You can configure priorities independently for Level 1 and Level 2. Priorities determine which router on a LAN is the designated router. Priorities are advertised within hellos. The router with the highest priority becomes the designated intermediate system (DIS).

NOTE: Routers with a priority of 0 cannot be a designated router.

Setting the priority to 0 lowers the chance of this system becoming the DIS, but does not prevent it. If all the routers have priority 0, one with highest MAC address becomes DIS even though its priority is 0.

is-type

Configure IS-IS operating level for a router.

Syntax

```
is-type {level-1 | level-1-2 | level-2-only}
```

To return to the default values, use the `no is-type` command.

Parameters

level-1	Allows a router to act as a Level 1 router.
level-1-2	Allows a router to act as both a Level 1 and Level 2 router. This setting is the default.
level-2-only	Allows a router to act as a Level 2 router.

Defaults **level-1-2**

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information The IS-IS protocol automatically determines area boundaries and are able to keep Level 1 and Level 2 routing separate. Poorly planned use of this feature may cause configuration errors, such as accidental area partitioning.

If you are configuring only one area in your network, you do not need to run both Level 1 and Level 2 routing algorithms. You can configure the IS type as Level 1.

log-adjacency-changes

Generate a log messages for adjacency state changes.

Syntax

```
log-adjacency-changes
```

To disable this function, use the `no log-adjacency-changes` command.

Defaults Adjacency changes are not logged.

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

This command allows you to monitor adjacency state changes, which are useful when you monitor large networks. Messages are logged in the system's error message facility.

lsp-gen-interval

Set the minimum interval between successive generations of link-state packets (LSPs).

Syntax

`lsp-gen-interval [level-1 | level-2] interval seconds [initial_wait_interval seconds [second_wait_interval seconds]]`

To restore default values, use the `no lsp-gen-interval [level-1 | level-2] interval seconds [initial_wait_interval seconds [second_wait_interval seconds]]` command.

Parameters

level-l	(OPTIONAL) Enter the keywords `level-1` to apply the configuration to generation of Level-1 LSPs.
level-2	(OPTIONAL) Enter the keywords `level-2` to apply the configuration to generation of Level-2 LSPs.
interval seconds	Enter the maximum number of seconds between LSP generations. The range is from 0 to 120 seconds. The default is **5 seconds**.
initial_wait_interval seconds	(OPTIONAL) Enter the initial wait time, in seconds, before running the first LSP generation. The range is from 0 to 120 seconds. The default is **1 second**.
second_wait_interval seconds	(OPTIONAL) Enter the wait interval, in seconds, between the first and second LSP generation. The range is from 0 to 120 seconds. The default is **5 seconds**.

Defaults

See *Parameters*.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information

LSP throttling slows down the frequency at which LSPs are generated during network instability. Even though throttling LSP generations slows down network convergence, no throttling can result in a network not functioning as expected. If network topology is unstable, throttling slows down the scheduling of LSP generations until the topology regains its stability.

The first generation is controlled by the initial wait interval and the second generation is controlled by the second wait interval. Each subsequent wait interval is twice as long as the previous one until the wait interval reaches the maximum wait time specified (`interval seconds`). After the network calms down and there are no triggers for two times the maximum interval, fast behavior is restored (the initial wait time).

lsp-mtu

Set the maximum transmission unit (MTU) of IS-IS link-state packets (LSPs). This command only limits the size of LSPs this router generates.

Syntax

`lsp-mtu` *size*

To return to the default values, use the `no lsp-mtu` command.

Parameters

size The maximum LSP size, in bytes. The range is from 512 to 16000 for Non-Jumbo mode and from 128 to 9195 for Jumbo mode. The default is **1497**.

NOTE: The appropriate interface circuit is brought down and removed.

Defaults **1497** bytes.

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information

The link MTU and the LSP MTU size must be the same.

Because each device can generate a maximum of 255 LSPs, consider carefully whether you use the `lsp-mtu` command.

lsp-refresh-interval

Set the link state PDU (LSP) refresh interval. LSPs must be refreshed before they expire. When the LSPs are not refreshed after a refresh interval, they are kept in a database until their `max-lsp-lifetime` reaches zero and then LSPs is purged.

Syntax

`lsp-refresh-interval` *seconds*

To restore the default refresh interval, use the `no lsp-refresh-interval` command.

Parameters

seconds	The LSP refresh interval, in seconds. This value must be 300 seconds less than the value specified in the `max-lsp-lifetime` command. The range is from 1 to 65535 seconds. The default is **900**.

Defaults **900** seconds

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information

The refresh interval determines the rate at which route topology information is transmitted preventing the information from becoming obsolete.

The refresh interval must be less than the LSP lifetime specified with the `max-lsp-lifetime` command. A low value reduces the amount of time that undetected link state database corruption can persist at the cost of increased link utilization. A higher value reduces the link utilization the flooding of refreshed packets causes.

Related Commands

- max-lsp-lifetime — set the maximum interval that LSPs persist without being refreshed.

max-area-addresses

Configure manual area addresses.

Syntax

`max-area-addresses` *number*

To return to the default values, use the `no max-area-addresses` command.

Parameters

number	Set the maximum number of manual area addresses. The range is from 3 to 6. The default is **3**.

Defaults

3 addresses

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Version	Description
8.3.11.1	Introduced on the Z9000.
7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information To configure the number of area addresses on router, use this command. This value must be consistent with routers in the same area, otherwise the router forms only Level 2 adjacencies. The value must be same among all the routers to form Level 1 adjacencies.

max-lsp-lifetime

Set the maximum time that link-state packets (LSPs) exist without being refreshed.

Syntax `max-lsp-lifetime seconds`

To restore the default time, use the `no max-lsp-lifetime` command.

Parameters

seconds	The maximum lifetime of LSP in seconds. This value must be greater than the `lsp-refresh-interval` command. The higher the value the longer the LSPs are kept. The range is from 1 to 65535. The default is **1200**.

Defaults **1200** seconds

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information Change the maximum LSP lifetime with this command. The maximum LSP lifetime must always be greater than the LSP refresh interval.

The `seconds` parameter enables the router to keep LSPs for the specified length of time. If the value is higher, the overhead is reduced on slower-speed links.

Related Commands

- lsp-refresh-interval — set the link-state packet (LSP) refresh interval.

maximum-paths

Allows you to configure the maximum number of equal cost paths allowed in a routing table.

NOTE: Enables you to configure a single system wide value that is common for both IPv4 and IPv6 addresses.

Syntax

```
maximum-paths number
```

To return to the default values, use the `no maximum-paths` command.

Parameters

number	Enter a number as the maximum number of parallel paths an IP routing installs in a routing table. The range is from 1 to 64. The default is **4**.

Defaults **4**

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	Added support for multi-topology ISIS.
6.3.1.0	Introduced.

metric-style

To generate and accept old-style, new-style, or both styles of type, length, and values (TLV), configure a router.

Syntax

```
metric-style {narrow [transition] | transition | wide [transition]}
[level-1 | level-2]
```

To return to the default values, use the `no metric-style {narrow [transition] | transition | wide [transition]} [level-1 | level-2]` command.

Parameters

narrow	Allows you to generate and accept old-style TLVs. The metric range is from 0 to 63.

transition	Allows you to generate both old-style and new-style TLVs. The metric range is from 0 to 63.
wide	Allows you to generate and accept only new-style TLVs. The metric range is from 0 to 16777215.
level-1	Enables the metric style on Level 1.
level-2	Enables the metric style on Level 2.

Defaults **narrow**; if no Level is specified, Level-1 and Level-2 are configured.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.

Usage Information If you enter the `metric-style wide` command, the Dell EMC Networking OS generates and accepts only new-style TLVs. The router uses less memory and other resources rather than generating both old-style and new-style TLVs.

The new-style TLVs have wider metric fields than old-style TLVs.

When wide transition is configured, narrow metric is sent for the narrow metric TLV and the actual wide metric is sent in wide metric TLV. The receiver can choose to use the metric that is requires.

Related Commands

- isis metric — configure a metric for an interface.

multi-topology

Enables multi-topology IS-IS. It also allows enabling/disabling of old and new style TLVs for IP prefix information in the LSPs.

Syntax `multi-topology [transition]`

To return to a single topology configuration, use the `no multi-topology [transition]` command.

Parameters

transition

Defaults Disabled

Command Modes CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.8.1.0	Introduced.

net

To configure an IS-IS network entity title (NET) for a routing process, use this mandatory command. If you did not configure a NET, the IS-IS process does not start.

Syntax `net network-entity-title`

To remove a net, use the `no net network-entity-title` command.

Parameters

network-entity-title	Specify the area address and system ID for an IS-IS routing process. The first 1 to 13 bytes identify the area address. The next 6 bytes identify the system ID. The last 1 byte is the selector byte, always identified as zero zero (00). This argument can be applied to an address or a name.

Defaults Not configured.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

passive-interface

Suppress routing updates on an interface. This command stops the router from sending updates on that interface.

Syntax `passive-interface` *interface*

To delete a passive interface configuration, use the `no passive-interface` *interface* command.

Parameters

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information Although the passive interface does not send nor receive routing updates, the network on that interface is still included in the IS-IS updates sent using other interfaces.

redistribute

Redistribute routes from one routing domain to another routing domain.

Syntax

```
redistribute {static | connected | rip} [level-1 | level-1-2 | level-2]
[metric metric-value] [metric-type {external | internal}] [route-map map-
name]
```

To end redistribution or disable any of the specified keywords, use the `no redistribute {static | connected | rip} [metric metric-value] [metric-type {external | internal}] [level-1 | level-1-2 | level-2] [route-map map-name]` command.

Parameters

connected	Enter the keyword `connected` to redistribute active routes into IS-IS.
rip	Enter the keyword `rip` to redistribute RIP routes into IS-IS.
static	Enter the keyword `static` to redistribute user-configured routes into IS-IS.
metric *metric-value*	(OPTIONAL) Assign a value to the redistributed route. The range is from 0 to 16777215. The default is **0**. Use a value that is consistent with the destination protocol.
metric-type {external | internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. Specify one of the following: • `external` • `internal`
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 1 routes.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level-1-2 routes.
level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes. This setting is the default.
route-map *map-name*	(OPTIONAL) If you do not enter the route-map argument, all routes are redistributed. If a map-name value is not specified, no routes are imported.

Defaults
- metric metric-value = **0**
- metric-type= internal; **level-2**

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.5.1.0	Added support for IPv6 ISIS.
6.3.1.0	Introduced.

Usage Information

To redistribute a default route (0.0.0.0/0), configure the `default-information originate` command.

Changing or disabling a keyword in this command does not affect the state of the other command keywords.

When an LSP with an internal metric is received, the Dell EMC Networking OS considers the route cost while considering the advertised cost to reach the destination.

Redistributed routing information is filtered with the `distribute-list out` command to ensure that the routes are properly passed to the receiving routing protocol.

How a metric value assigned to a redistributed route is advertised depends on how on the configuration of the `metric-style` command. If the `metric-style` command is set for Narrow or Transition mode and the metric value in the `redistribute` command is set to a number higher than 63, the metric value advertised in LSPs is 63. If the `metric-style` command is set for Wide mode, the metric value in the `redistribute` command is advertised.

Related Commands

- default-information originate — generate a default route for the IS-IS domain.
- distribute-list out — suppress networks from being advertised in updates. This command filters redistributed routing information.

redistribute bgp

Redistribute routing information from a BGP process.

Syntax

`redistribute bgp` *`AS number`* `[level-1| level-1-2 | level-2] [metric` *`metric-value`*`] [metric-type {external| internal}] [route-map` *`map-name`*`]`

To return to the default values, use the `no redistribute bgp` command with the appropriate parameters.

Parameters

AS number	Enter a number that corresponds to the autonomous system number. The range is from 1 to 65355.
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS Level 1 routes only.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS Level 1 and Level 2 routes.

level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes only. This setting is the default.
metric *metric-value*	(OPTIONAL) The value used for the redistributed route. Use a metric value that is consistent with the destination protocol. The range is from 0 to 16777215. The default is **0**.
metric-type {external| internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. The two options are: ● `external` ● `internal`
route-map *map-name*	`map-name` is an identifier for a configured route map. The route map filters imported routes from the source routing protocol to the current routing protocol. If you do not specify a map-name, all routes are redistributed. If you specify a keyword, but fail to list route map tags, no routes are imported.

Defaults **IS-IS Level 2** routes only

Command Modes
- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.5.1.0	Added support for IPv6 ISIS.
6.3.1.0	Introduced.

Usage Information BGP to IS-IS redistribution supports “match” options using route maps. You can set the metric value, level, and metric-type of redistributed routes by the redistribution command. You can “set” more advanced options using route maps.

Example

```
DellEMC(conf)# router is
DellEMC(conf-router_isis)# redistribute bgp 1 level-1 metric 32 metric-
type
external route-map rmap-isis-to-bgp
DellEMC(conf-router_bgp)#show running-config isis
!
router isis
```

```
redistribute bgp 1 level-1 metric 32 metric-type external route-map
rmap-isis-to-bgp
```

redistribute ospf

Redistribute routing information from an OSPF process.

Syntax

`redistribute ospf` *process-id* `[level-1| level-1-2 | level-2] [match {internal | external}] [metric` *metric-value*`] [metric-type {external | internal}] [route-map` *map-name*`]`

To return to the default values, use the `no redistribute ospf` *process-id* `[level-1| level-1-2 | level-2] [match {internal | external}] [metric` *metric-value*`] [metric-type {external | internal}] [route-map` *map-name*`]` command.

Parameters

process-id	Enter a number that corresponds to the OSPF process ID to be redistributed. The range is from 1 to 65355.
metric *metric-value*	(OPTIONAL) The value used for the redistributed route. Use a metric value that is consistent with the destination protocol. The range is from 0 to 16777215. The default is **0**.
metric-type {external | internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. The two options are: • `external` • `internal`
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 1 routes.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level-1-2 routes.
level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes. This setting is the default.
match {external | internal}	(OPTIONAL) The command used for OSPF to route and redistribute into other routing domains. The values are • `internal` • `external`
route-map *map-name*	`map-name` is an identifier for a configured route map. The route map should filter imported routes from the source routing protocol to the current routing protocol. If you do not specify a map-name, all routes are redistributed. If you specify a keyword, but fail to list route map tags, no routes are imported.

Defaults

See *Parameters*.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.5.1.0	Added support for IPv6 ISIS.
6.3.1.0	Introduced.

Usage Information

How a metric value assigned to a redistributed route is advertised depends on how on the configuration of the `metric-style` command. If the `metric-style` command is set for Narrow mode and the metric value in the `redistribute ospf` command is set to a number higher than 63, the metric value advertised in LSPs is 63. If the `metric-style` command is set for wide mode, the metric value in the `redistribute ospf` command is advertised.

router isis

Allows you to enable the IS-IS routing protocol and to specify an IP IS-IS process.

Syntax

`router isis [vrf vrf-name] [tag]`

To disable IS-IS routing, use the `no router isis [tag]` command.

Parameters

vrf *vrf-name*	Enter the keyword vrf followed by the name of the VRF to enable the IS-IS routing protocol and to specify an IP IS-IS process on that VRF.
tag	(OPTIONAL) This is a unique name for a routing process. A null tag is assumed if the `tag` option is not specified. The tag name must be unique for all IP router processes for a given router.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

Configure a network entity title (the `net` command) to specify the area address and the router system ID.

Enable routing on one or more interfaces to establish adjacencies and establish dynamic routing.

You can configure only one IS-IS routing process to perform Level 2 routing. A `level-1-2` designation performs Level 1 and Level 2 routing at the same time.

Related Commands

- ip router isis — configure IS-IS routing processes for IP on interfaces and attaches an area designator to the routing process.
- net — configure an IS-IS network entity title (NET) for a routing process.
- is-type — assign a type for a given area.

set-overload-bit

To set the overload bit in zeroth fragment of non-pseudonode LSPs on the router, configure the router. This setting prevents other routers from using it as an intermediate hop in their shortest path first (SPF) calculations.

Syntax

```
set-overload-bit
```

To return to the default values, use the `no set-overload-bit` command.

Defaults

Not set.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
7.8.1.0	Added support for multi-topology ISIS.

Version	Description
6.3.1.0	Introduced.

Usage Information

Set the overload bit when a router experiences problems, such as a memory shortage due to an incomplete link state database which can result in an incomplete or inaccurate routing table. If you set the overload bit in its LSPs, other routers ignore the unreliable router in their SPF calculations until the router has recovered.

NOTE: Enables you to configure a single system wide value that is common for both IPv4 and IPv6 address.

show config

Display the changes you made to the IS-IS configuration. Default values are not shown.

Syntax

```
show config
```

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

Example (Router-Isis)

The bold section identifies that Multi-Topology IS-IS is enabled in Transition mode.

```
DellEMC(conf-router_isis)# show config
!
router isis
clns host ISIS 49.0000.0001.F100.E120.0013.00
log-adjacency-changes
net 49.0000.0001.F100.E120.0013.00
!
address-family ipv6 unicast
maximum-paths 16
multi-topology transition
set-overload-bit
spf-interval level-1 100 15 20
```

```
spf-interval level-2 120 20 25
exit-address-family
```

Example (Address-Family_IPv6)

The bold section identifies that Multi-Topology IS-IS is enabled in Transition mode.

```
DellEMC(conf-router_isis-af_ipv6)# show conf
!
address-family ipv6 unicast
maximum-paths 16
multi-topology transition
set-overload-bit
spf-interval level-1 100 15 20
spf-interval level-2 120 20 25
exit-address-family
```

show isis database

Display the IS-IS link state database.

Syntax

```
show isis [vrf vrf-name] database [level-1 | level-2] [local] [detail | summary] [system-id] [lspid]
```

Parameters

vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to display IS-IS link state database corresponding to that VRF. **NOTE:** If you do not specify this option, the IS-IS link state database corresponding to the default VRF are displayed.
level-1	(OPTIONAL) Displays the Level 1 IS-IS link-state database.
level-2	(OPTIONAL) Displays the Level 2 IS-IS link-state database.
local	(OPTIONAL) Displays local link-state database information.
detail	(OPTIONAL) Displays the detailed link-state database information of each LSP when specified. If not specified, a summary displays.
summary	(OPTIONAL) Displays the summary of link-state database information when specified.
lspid	(OPTIONAL) Display only the specified LSP.
system-id	(OPTIONAL) Displays the link-state database for system-id.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added supported for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.1	Introduced on the S4810.

Usage Information

The following describes the `show isis database` command shown in the following example.

Field	Description
IS-IS Level-1/ Level-2 Link State Database	Displays the IS-IS link state database for Level 1 or Level 2.
LSPID	Displays the LSP identifier. The first six octets are the System ID of the originating router. The first six octets are the System ID of the originating router. The next octet is the pseudonode ID. If this byte is not zero, the LSP describes system links. If this byte is zero (0), the LSP describes the state of the originating router. The designated router for a LAN creates and floods a pseudonode LSP and describes the attached systems. The last octet is the LSP number. An LSP is divided into multiple LSP fragments if there is more data than cannot fit in a single LSP. Each fragment has a unique LSP number. An * after the LSPID indicates that the system originates an LSP where this command was issued.
LSP Seq Num	This value is the sequence number for the LSP that allows other systems to determine if they have received the latest information from the source.
LSP Checksum	This is the checksum of the entire LSP packet.
LSP Holdtime	This value is the amount of time, in seconds, that the LSP remains valid. A zero holdtime indicates that this is a purged LSP and is being removed from the link state database. A value between brackets indicates the duration that the purged LSP stays in the database before being removed.
ATT	This value represents the Attach bit. This value indicates that the router is a Level 1-2 router and can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 1-2 routers use the Attach bit to find the closest Level 1-2 router. They install a default route to the closest Level 1-2 router.
P	This value represents the P bit. This bit is always set to zero as Dell EMC Networking does not support area partition repair.
OL	This value represents the overload bit, determining congestion. If the overload bit is set, other routers do not use this system as a transit router when calculating routes.

Example

The bold sections identify that MultiTopology IS-IS is enabled.

```
DellEMC# show isis database

IS-IS Level-1 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x00000006 0xCF43    580          0/0/0
```

```
IS-IS Level-2 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x00000006 0xCF43    580          0/0/0
!
DellEMC# show isis database detail ISIS.00-00

IS-IS Level-1 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x0000002B 0x853B    1075         0/0/0
  Area Address: 49.0000.0001
  NLPID: 0xCC 0x8E
  IP Address: 10.1.1.1
  IPv6 Address: 1011::1
  Topology: IPv4 (0x00) IPv6 (0x8002)
  Metric: 10   IS OSPF.00
  Metric: 10   IS (MT-IPv6) OSPF.00
  Metric: 10   IP 15.1.1.0 255.255.255.0
  Metric: 10   IPv6 (MT-IPv6) 1511::/64
 Metric: 10   IPv6 (MT-IPv6) 2511::/64
 Metric: 10   IPv6 (MT-IPv6) 1011::/64
  Metric: 10   IPv6 1511::/64
  Metric: 10   IP 10.1.1.0 255.255.255.0
    Hostname: ISIS

IS-IS Level-2 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x0000002D 0xB2CD    1075         0/0/0
  Area Address: 49.0000.0001
  NLPID: 0xCC 0x8E
  IP Address: 10.1.1.1
  IPv6 Address: 1011::1
  Topology: IPv4 (0x00) IPv6 (0x8002)
  Metric: 10   IS OSPF.00
 Metric: 10   IS (MT-IPv6) OSPF.00
  Metric: 10   IP 10.1.1.0 255.255.255.0
  Metric: 10   IP 15.1.1.0 255.255.255.0
  Metric: 20   IP 10.3.3.0 255.255.255.0
  Metric: 10   IPv6 (MT-IPv6) 1011::/64
 Metric: 10   IPv6 (MT-IPv6) 1511::/64
 Metric: 10   IPv6 (MT-IPv6) 2511::/64
 Metric: 20   IPv6 (MT-IPv6) 1033::/64
  Metric: 10   IPv6 2511::/64
  Metric: 20   IPv6 1033::/64
  Hostname: ISIS

DellEMC# show isis database detail
IS-IS Level-1 Link State Database
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime
ATT/P/OL
FTOS.00-00          * 0x00000009   0x79D8        941               1/0/0
  NLPID:        0xCC
  Area Address: 49.0000.0001
```

show isis graceful-restart detail

Display detailed IS-IS graceful restart related settings.

Syntax `show isis [vrf vrf-name] graceful-restart detail`

Command Modes
- EXEC
- EXEC Privilege

Parameters

vrf *vrf-name* (Optional) Enter the keyword vrf followed by the name if the VRf to display IS-IS graceful restart details corresponding to that VRF.

NOTE: If you do not specify this option, the IS-IS graceful restart details corresponding to the default VRF are displayed.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.3.1.0	Introduced on the E-Series.

Example

```
DellEMC# show isis graceful-restart detail
Configured Timer Value
======================
Graceful Restart    : Enabled
T3 Timer            : Manual
T3 Timeout Value    : 30
T2 Timeout Value    : 30 (level-1), 30 (level-2)
T1 Timeout Value    : 5, retry count: 1
Adjacency wait time : 30

Operational Timer Value
=======================
Current Mode/State     : Normal/RUNNING
T3 Time left           : 0
T2 Time left           : 0 (level-1), 0 (level-2)
Restart ACK rcv count  : 0 (level-1), 0 (level-2)
Restart Req rcv count  : 0 (level-1), 0 (level-2)
Suppress Adj rcv count : 0 (level-1), 0 (level-2)
Restart CSNP rcv count : 0 (level-1), 0 (level-2)
Database Sync count    : 0 (level-1), 0 (level-2)
```

show isis hostname

Display IS-IS host names configured or learned on the switch.

Syntax `show isis [vrf vrf-name] hostname`

Parameters

vrf *vrf-name* Enter the keyword vrf followed by the name of the VRF to display IS-IS host names corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Example

```
DellEMC# show isis hostname
System Id       Dynamic Name Static Name
*F100.E120.0013 Force10      ISIS
DellEMC#
```

show isis interface

Display detailed IS-IS interface status and configuration information.

Syntax `show isis [vrf vrf-name] interface [interface]`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display IS-IS interface status information corresponding to that VRF.

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
DellEMC> show isis int
twentyFiveGigE 1/7 is up, line protocol is up
  MTU 1497, Encapsulation SAP
  Routing Protocol: IS-IS
    Circuit Type: Level-1-2
    Interface Index 37847070, Local circuit ID 1
    Level-1 Metric: 10, Priority: 64, Circuit ID: systest-3.01
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-1 adjacencies: 1
    Level-2 Metric: 10, Priority: 64, Circuit ID: systest-3.01
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-2 adjacencies: 1
    Next IS-IS LAN Level-1 Hello in 2 seconds
    Next IS-IS LAN Level-2 Hello in 1 seconds
    LSP Interval: 33
twentyFiveGigEt 1/8 is up, line protocol is up
  MTU 1497, Encapsulation SAP
  Routing Protocol: IS-IS
    Circuit Type: Level-1-2
    Interface Index 38371358, Local circuit ID 2
    Level-1 Metric: 10, Priority: 64, Circuit ID: systest-3.02
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-1 adjacencies: 1
    Level-2 Metric: 10, Priority: 64, Circuit ID: systest-3.02
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
--More--
```

show isis neighbors

Display information about neighboring (adjacent) routers.

Syntax `show isis [vrf vrf-name] neighbors [level-1 | level-2] [detail] [interface]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display adjacent router information corresponding to that VRF.
level-1	(OPTIONAL) Displays information about Level 1 IS-IS neighbors.
level-2	(OPTIONAL) Displays information about Level 2 IS-IS neighbors.
detail	(OPTIONAL) Displays detailed information about neighbors.
interface	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.

Usage Information

Use this command to confirm that the neighbor adjacencies are operating correctly. If you suspect that they are not, you can verify the specified area addresses of the routers by using the `show isis neighbors` command.

The following describes the `show isis neighbors` command shown in the following example.

Field	Description
System Id	The value that identifies a system in an area.
Interface	The interface, slot, and port in which the router was discovered.
State	The value providing status about the adjacency state. The range is Up and Init.
Type	This value displays the adjacency type (Layer 2, Layer 2 or both).
Priority	IS-IS priority the neighbor advertises. The neighbor with highest priority becomes the designated router for the interface.
Uptime	Displays the interfaces uptime.
Circuit Id	The neighbor's interpretation of the designated router for the interface.

Example

The bold sections below identify that Multi-Topology IS-IS is enabled. This command displays only one IP address per line.

```
DellEMC# show isis neighbors
System Id Interface State Type Priority Uptime Circuit Id
TEST Tf 1/7 Up L1L2(M) 127 09:28:01 TEST.02
!
DellEMC#show isis neighbors detail
System Id Interface State Type Priority Uptime Circuit Id
TEST Tf 1/7 Up L1L2(M) 127 09:28:04 TEST.02 Area Address(es):
49.0000.0001
  IP Address(es): 25.1.1.3*
  MAC Address: 0000.0000.0000
  Hold Time: 28
  Link Local Address: fe80::201:e8ff:fe00:492c
  Topology: IPv4 IPv6 , Common (IPv4 IPv6 )
 Adjacency being used for MTs: IPv4 IPv6
DellEMC#
```

show isis protocol

Display IS-IS routing information.

Syntax

```
show isis [vrf vrf-name] protocol
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display IS-IS routing information corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

The bold section identifies that Multi-Topology IS-IS is enabled.

```
DellEMC# show isis protocol
IS-IS Router: <Null Tag>
  System Id: F100.E120.0013 IS-Type: level-1-2
  Manual area address(es):
   49.0000.0001
  Routing for area address(es):
   49.0000.0001
  Interfaces supported by IS-IS:
  twentyFiveGigE 1/1    - IP - IPv6
  twentyFiveGigE 1/2    - IP - IPv6
  twentyFiveGigE 1/10   - IP - IPv6
  Loopback 0 - IP - IPv6
Redistributing:
Distance: 115
Generate narrow metrics: level-1-2
Accept narrow metrics:   level-1-2
Generate wide metrics:   none
Accept wide metrics:     none
Multi Topology Routing is enabled in transition mode.
DellEMC#
```

show isis traffic

This command allows you to display IS-IS traffic interface information.

Syntax

```
show isis [vrf vrf-name] traffic [interface]
```

Parameters

vrf *vrf-name*
(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display IS-IS traffic interface information corresponding to that VRF.

interface
(OPTIONAL) Identifies the interface type and the interface following:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show isis traffic` command shown in the following example.

Item	Description
Level-1/Level-2 Hellos (sent/ rcvd)	Displays the number of Hello packets sent and received.
PTP Hellos (sent/rcvd)	Displays the number of point-to-point Hellos sent and received.
Level-1/Level-2 LSPs sourced (new/refresh)	Displays the number of new and refreshed LSPs.
Level-1/Level-2 LSPs flooded (sent/rcvd)	Displays the number of flooded LSPs sent and received.
Level-1/Level-2 LSPs CSNPs (sent/ rcvd)	Displays the number of CSNP LSPs sent and received.
Level-1/Level-2 LSPs PSNPs (sent/ rcvd)	Displays the number of PSNP LPSs sent and received.
Level-1/Level-2 DR Elections	Displays the number of times designated router elections ran.

Item	Description
Level-1/Level-2 SPF Calculations	Displays the number of shortest path first calculations.
LSP checksum errors received	Displays the number of checksum errors LSPs received.
LSP authentication failures	Displays the number of LSP authentication failures.

Example

```
DellEMC# show is traffic
  IS-IS: Level-1 Hellos (sent/rcvd) : 0/721
  IS-IS: Level-2 Hellos (sent/rcvd) : 900/943
  IS-IS: PTP Hellos (sent/rcvd) : 0/0
  IS-IS: Level-1 LSPs sourced (new/refresh) : 0/0
  IS-IS: Level-2 LSPs sourced (new/refresh) : 1/3
  IS-IS: Level-1 LSPs flooded (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs flooded (sent/rcvd) : 5934/5217
  IS-IS: Level-1 LSPs CSNPs (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs CSNPs (sent/rcvd) : 472/238
  IS-IS: Level-1 LSPs PSNPs (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs PSNPs (sent/rcvd) : 10/337
  IS-IS: Level-1 DR Elections : 4
  IS-IS: Level-2 DR Elections : 4
  IS-IS: Level-1 SPF Calculations : 0
  IS-IS: Level-2 SPF Calculations : 389
  IS-IS: LSP checksum errors received : 0
  IS-IS: LSP authentication failures : 0
DellEMC#
```

spf-interval

Specify the minimum interval between shortest path first (SPF) calculations.

Syntax

`spf-interval [level-1 | level-2] interval seconds [initial_wait_interval seconds [second_wait_interval seconds]]`

To restore default values, use the `no spf-interval [level-1 | level-2] interval seconds [initial_wait_interval seconds [second_wait_interval seconds]]` command.

Parameters

level-1	(OPTIONAL) Enter the keyword `level-1` to apply the configuration to Level-1 SPF calculations.
level-2	(OPTIONAL) Enter the keyword `level-2` to apply the configuration to Level-2 SPF calculations.
interval seconds	Enter the maximum number of seconds between SPF calculations. The range is from 0 to 120 seconds. The default is **10 seconds**.
initial_wait_interval seconds	(OPTIONAL) Enter the initial wait time, in seconds, before running the first SPF calculations. The range is from 0 to 120 seconds. The default is **5 seconds**.
second_wait_interval seconds	(OPTIONAL) Enter the wait interval, in seconds, between the first and second SPF calculations. The range is from 0 to 120 seconds. The default is **5 seconds**.

Defaults

See *Parameters*.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.8.1.0	Added support for multi-topology ISIS.
7.5.1.0	Added support for SPF Throttling Enhancement.

Usage Information

This command `spf-interval` in CONFIG-ROUTER-ISIS-AF-IPV6 mode is used for IPv6 Multi-Topology route computation only. If using Single Topology mode, use the `spf-interval` command in CONFIG-ROUTER-ISIS mode for both IPv4 and IPv6 route computations.

SPF throttling slows down the frequency at which route calculations are performed during network instability. Even though throttling route calculations slows down network convergence, not throttling can result in a network not functioning as expected. If network topology is unstable, throttling slows down the scheduling of route calculations until the topology regains its stability.

The first route calculation is controlled by the initial wait interval and the second calculation is controlled by the second wait interval. Each subsequent wait interval is twice as long as the previous one until the wait interval reaches the maximum wait time specified (`interval seconds`). After the network calms down and there are no triggers for two times the maximum interval, fast behavior is restored (the initial wait time).

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iSCSI Optimization

Internet small computer system interface (iSCSI) optimization enables quality-of-service (QoS) treatment for iSCSI storage traffic on Dell EMC Networking OS platforms.

To configure and verify the iSCSI optimization feature, use the following Dell EMC Networking OS commands.

Topics:

- advertise dcbx-app-tlv
- iscsi aging time
- iscsi cos
- iscsi enable
- iscsi priority-bits
- iscsi profile-compellant
- iscsi target port
- show iscsi
- show iscsi session
- show iscsi session detailed
- show run iscsi

advertise dcbx-app-tlv

Configure DCBX to send iSCSI TLV advertisements.

Syntax

```
advertise dcbx-app-tlv iscsi
```

To disable DCBX iSCSI TLV advertisements, use the `no advertise dcbx-app-tlv iscsi` command.

Defaults

Disabled.

Command Modes

PROTOCOL LLDP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Usage Information

You can configure iSCSI TLVs to send either globally or on a specified interface. The interface configuration takes priority over global configuration.

iscsi aging time

Set the aging time for iSCSI sessions.

Syntax `iscsi aging time time`

To remove the iSCSI session aging time, use the `no iscsi aging time` command.

Parameters

time Enter the aging time for the iSCSI session. The range is from 5 to 43,200 minutes.

Defaults **10 minutes**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

iscsi cos

Set the QoS policy that is applied to the iSCSI flows.

Syntax `iscsi cos {enable | disable | dot1p vlan-priority-value [remark] | dscp dscp-value [remark]}`

To disable the QoS policy, use the `no iscsi cos` command.

Parameters

enable Enter the keyword `enable` to allow the application of preferential QoS treatment to iSCSI traffic so that the iSCSI packets are scheduled in the switch with a dot1p priority 4 regardless of the VLAN priority tag in the packet. The default is: the iSCSI packets are handled with dotp1 priority 4 without remark.

disable Enter the keyword `disable` to disable the application of preferential QoS treatment to iSCSI frames.

dot1p *vlan-priority-value* Enter the dot1p value of the VLAN priority tag assigned to the incoming packets in an iSCSI session. The range is from 0 to 7. The default is the dot1p value in ingress iSCSI frames is not changed and is the same priority is used in iSCSI TLV advertisements if you did not enter the `iscsi priority-bits` command.

dscp *dscp-value* Enter the DSCP value assigned to the incoming packets in an iSCSI session. The valid range is from 0 to 63. The default is: the DSCP value in ingress packets is not changed.

remark Marks the incoming iSCSI packets with the configured dot1p or DSCP value when they egress to the switch. The default is: the dot1and DSCP values in egress packets are not changed.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Usage Information By default, iSCSI flows are assigned to dot1p priority 4.

iscsi enable

Globally enable iSCSI optimization.

Syntax `iscsi enable`

To disable iSCSI optimization, use the `no iscsi enable` command.

Parameters

enable Enter the keyword `enable` to enable the iSCSI optimization feature.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

iscsi priority-bits

Configure the priority bitmap that advertises in the iSCSI application TLVs.

Syntax `iscsi priority-bits`

To remove the configured priority bitmap, use the `no iscsi priority-bits` command.

Defaults **4** (0x10 in the bitmap)

Command Modes PROTOCOL LLDP (only on the global, not on the interface)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

iscsi profile-compellant

Configure the auto-detection of Dell Compellent arrays on a port.

Syntax `iscsi profile-compellent`

Defaults Dell Compellent disk arrays are not detected.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

iscsi target port

Configure the iSCSI target ports and optionally, the IP addresses on which iSCSI communication is monitored.

Syntax

`iscsi target port [tcp-port-2...tcp-port-16]ip-address [ip-address]`

To remove the configured iSCSI target ports or IP addresses, use the `no iscsi target port` command.

Parameters

tcp-port-2...tcpport-16	Enter the tcp-port number of the iSCSI target ports. The `tcp-port-n` is the TCP port number or a list of TCP port numbers on which the iSCSI target listens to requests. Separate port numbers with a comma. The default is **860, 3260**.
ip-address (Optional)	Enter the ip-address that the iSCSI monitors. The ip-address specifies the IP address of the iSCSI target.

Defaults

860, 3260

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Usage Information

You can configure up to 16 target TCP ports on the switch in one command or multiple commands.

When you use the `no iscsi target port` command and the TCP port you wish to delete is one bound to a specific IP address, the IP address value must be included in the command.

show iscsi

Display the currently configured iSCSI settings.

Syntax

`show iscsi`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Example

```
DellEMC# show iscsi
iSCSI is enabled
iSCSI session monitoring is disabled
iSCSI COS : dot1p is 4 no-remark
Session aging time: 10
Maximum number of connections is 256
-----------------------------------------------
iSCSI Targets and TCP Ports:
-----------------------------------------------
TCP Port Target IP Address
3260
860
```

Related Commands

- show iscsi session — display information about active iSCSI sessions on the switch.
- show iscsi session detailed — display detailed information about active iSCSI sessions on the switch.
- show run iscsi — show `run iscsi`.

show iscsi session

Display information about active iSCSI sessions on the switch.

Syntax `show iscsi session`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Example

```
DellEMC# show isci session
Session 0:
-----------------------------------------------------
Target: iqn.2001-05.com.equallogic:0-8a0906-0e70c2002-10a0018426a48c94-
iom010
Initiator: iqn.1991-05.com.microsoft:win-x918v27yajg
ISID: 400001370000
```

```
Session 1:
-------------------------------------------------------
Target: iqn.2001-05.com.equallogic:0-8a0906-0f60c2002-0360018428d48c94-
iom011
Initiator: iqn.1991-05.com.microsoft:win-x918v27yajg
ISID: 400001370000.
```

Usage Information

Only sessions the switch observes are learned; sessions flowing through an adjacent switch are not learned.

After the switch is reloaded, any information exchanged during the initial handshake is not available. If the switch picks up the communication after reloading, it would detect a session was in progress but could not obtain complete information for it. Any incomplete information of this type would not be available in the `show` commands.

Related Commands

- show iscsi — display the currently configured iSCSI settings.
- show iscsi session detailed — display detailed information about active iSCSI sessions on the switch.
- show run iscsi — show `run iscsi`.

show iscsi session detailed

Display detailed information on active iSCSI sessions on the switch.

Syntax

```
show iscsi session detailed [session isid]
```

Parameters

isid	Enter the session's iSCSi ID to display detailed information about the specified iSCSi session.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
DellEMC# show isci session detailed
Session 0 :
-------------------------------------------------
Target:iqn.2010-11.com.ixia:ixload:iscsi-TG1
Initiator:iqn.2010-11.com.ixia.ixload:initiator-iscsi-2c
Up Time:00:00:01:28(DD:HH:MM:SS)
Time for aging out:00:00:09:34(DD:HH:MM:SS)
ISID:806978696102
Initiator  Initiator Target      Target  Connection
IP Address TCP Port  IP Address  TCPPort ID
10.10.0.44 33345     10.10.0.101 3260    0
Session 1 :
-------------------------------------------------
```

```
Target:iqn.2010-11.com.ixia:ixload:iscsi-TG1
Initiator:iqn.2010-11.com.ixia.ixload:initiator-iscsi-35
Up Time:00:00:01:22(DD:HH:MM:SS)
Time for aging out:00:00:09:31(DD:HH:MM:SS)
ISID:806978696102
Initiator  Initiator Target     Target  Connection
IP Address TCP Port  IP Address TCPPort ID
10.10.0.53 33432     10.10.0.101 3260   0
```

Related Commands

- show iscsi — display the currently configured iSCSI settings.
- show iscsi session — display information about active iSCSI sessions on the switch.
- show run iscsi — show `run iscsi`.

show run iscsi

Display all globally configured non-default iSCSI settings in the current Dell EMC Networking OS session.

Syntax `show run iscsi`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Related Commands

- show iscsi — display the currently configured iSCSI settings.
- show iscsi session — display detailed information about active iSCSI sessions on the switch.
- show iscsi session detailed — display detailed information on active iSCSI sessions on the switch.

28

Link Aggregation Control Protocol (LACP)

This section contains commands for Dell EMC Networks' implementation of the link aggregation control protocol (LACP) for creating dynamic link aggregation groups (LAGs) — known as "port-channels" in the Dell EMC Networking OS.

NOTE: For static LAG commands based on the standards specified in the IEEE 802.3 Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications, see Port Channel Commands .

Topics:

- clear lacp counters
- debug lacp
- lacp long-timeout
- lacp port-priority
- lacp system-priority
- port-channel-protocol lacp
- show lacp

clear lacp counters

Clear port channel counters.

Syntax `clear lacp port-channel-number counters`

Parameters

port-channel-number	Enter a port-channel number. The range is from 1 to 1284096.

Defaults Without a Port Channel specified, the command clears all Port Channel counters.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- show lacp — display the LACP configuration.

debug lacp

Debug LACP (configuration, events, and so on).

Syntax

`debug lacp [config | events | pdu [interface-type [in | out]]]`

To disable LACP debugging, use the `no [config | events | pdu [interface-type [in | out]]]` command.

Parameters

config	(OPTIONAL) Enter the keyword `config` to debug the LACP configuration.
events	(OPTIONAL) Enter the keyword `events` to debug the LACP event information.
pdu	(OPTIONAL) Enter the keyword `pdu` to debug the LACP Protocol Data Unit information.
***interface-type* in | out**	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. Optionally, enter an `in` or `out` parameter: • Receive enter `in` • Transmit enter `out`

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

lacp long-timeout

Configure a long timeout period (30 seconds) for an LACP session.

Syntax `lacp long-timeout`

To reset the timeout period to a short timeout (1 second), use the `no lacp long-timeout` command.

Defaults **1 second**

Command Modes INTERFACE (conf-if-po-number)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information This command applies to dynamic port-channel interfaces only. When applied on a static port-channel, this command has no effect.

Related Commands
- show lacp — display the LACP configuration.

lacp port-priority

To influence which ports will be put in Standby mode when there is a hardware limitation that prevents all compatible ports from aggregating, configure the port priority.

Syntax `lacp port-priority priority-value`

To return to the default setting, use the `no lacp port-priority priority-value` command.

Parameters

priority-value	Enter the port-priority value. The higher the value number, the lower the priority. The range is from 1 to 65535. The default is **32768**.

Defaults **32768**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
6.2.1.1	Introduced on the E-Series.

lacp system-priority

Configure the LACP system priority.

Syntax `lacp system-priority priority-value`

Parameters

priority-value	Enter the port-priority value. The higher the value number, the lower the priority. The range is from 1 to 65535. The default is **32768**.

Defaults **32768**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

port-channel-protocol lacp

Enable LACP on any LAN port.

Syntax `port-channel-protocol lacp`

To disable LACP on a LAN port, use the `no port-channel-protocol lacp` command.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced on the E-Series.

Related Commands

- show lacp — display the LACP information.
- show interfaces port-channel — display information on configured Port Channel groups.

show lacp

Display the LACP matrix.

Syntax

```
show lacp port-channel-number [sys-id | counters]
```

Parameters

port-channel-number	Enter a port-channel number. The range is from 1 to 1284096.
sys-id	(OPTIONAL) Enter the keywords `sys-id` and the value that identifies a system.
counters	(OPTIONAL) Enter the keyword `counters` to display the LACP counters.

Defaults

Without a Port Channel specified, the command clears all Port Channel counters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example (Port-Channel-Number)

```
DellEMC# show lacp 1
Port-channel 1 admin up, oper up, mode lacp
Actor   System ID:Priority 32768, Address 0001.e800.a12b
Partner System ID:Priority 32768, Address 0001.e801.45a5
                  Actor Admin Key 1, Oper Key 1, Partner Oper Key 1
                  LACP LAG 1 is an aggregatable link

A-Active LACP, B-Passive LACP, C-Short Timeout, D-Long Timeout
E-Aggregatable Link, F-Individual Link, G-IN_SYNC, H-OUT_OF_SYNC
I-Collection enabled, J-Collection disabled, K-Distribution enabled L-
Distribution disabled,
M-Partner Defaulted, N-Partner Non-defaulted, O-Receiver is in expired
state,
P-Receiver is not in expired state

Port Tf 1/6 is enabled, LACP is enabled and mode is lacp
  Actor   Admin: State ACEHJLMP Key 1    Priority 128
           Oper: State ACEGIKNP Key 1    Priority 128
  Partner Admin: State BDFHJLMP Key 0    Priority 0
           Oper: State BCEGIKNP Key 1    Priority 128
DellEMC#
```

Example (Sys-id)

```
DellEMC# show lacp 1 sys-id
Actor    System ID: Priority 32768, Address 0001.e800.a12b
Partner  System ID: Priority 32768, Address 0001.e801.45a5

DellEMC#
```

Example (Counter)

```
DellEMC# show lacp 1 counters
-----------------------------------------------------
           LACP PDU    Marker PDU   Unknown   Illegal
Port     Xmit Recv   Xmit Recv      Pkts Rx   Pkts Rx
-----------------------------------------------------
Tf 1/6/1  200  200     0    0        0          0
DellEMC#
```

Related Commands

- clear lacp counters — clear the LACP counters.
- show interfaces port-channel — display information on configured Port Channel groups.

29

Layer 2

This section describes commands to configure Layer 2 features.

Topics:

- MAC Addressing Commands
- Virtual LAN (VLAN) Commands
- Far-End Failure Detection (FEFD)

MAC Addressing Commands

The following commands are related to configuring, managing, and viewing MAC addresses.

mac-address-table aging-time

Specify an aging time for MAC addresses to remove from the MAC address table.

Syntax `mac-address-table aging-time` *seconds*

Parameters

seconds	Enter either zero (0) or a number as the number of seconds before MAC addresses are relearned. To disable aging of the MAC address table, enter `0`. The range is from 10 to 1000000. The default is **1800 seconds**.

Defaults **1800 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.3.1.0	On the E-Series, available in INTERFACE VLAN context, reduced the minimum aging time in the INTERFACE VLAN context from 10 seconds to 1 second.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Related Commands

- mac learning-limit — set the MAC address learning limits for a selected interface.
- show mac-address-table aging-time — display the MAC aging time.

mac-address-table static

Associate specific MAC or hardware addresses to an interface and VLANs.

Syntax

`mac-address-table static` *`mac-address`* `{multicast vlan` *`vlan-id`* `output—range` *`interface`*`}{`*`output interface`* `vlan` *`vlan-id`*`}`

To remove a MAC address, use the `no mac-address-table static` *`mac-address`* `output` *`interface`* `vlan` *`vlan-id`* command.

Parameters

mac-address Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.

multicast Enter a vlan port to where L2 multicast MAC traffic is forwarded.

NOTE: Use this option if you want multicast functionality in an L2 VLAN without IGMP protocols.

`output` *interface* For a unicast MAC address, enter the keyword `output` then one of the following interfaces for which traffic is forwarded:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

`output-range` *interface* For a multicast MAC address, enter the keyword `output-range` then one of the following interfaces to indicate a range of ports for which traffic is forwarded:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

- For a port channel interface, enter the keywords `port-channel` then a number.

vlan *vlan-id* Enter the keyword `vlan` then a VLAN ID number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Added support for output range parameter for S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Example (Unicast)
```
mac-address-table static 00:01:00:00:00:01 {output Tf 1/2 vlan 2}
```

Example (Multicast)
```
mac-address-table static 01:00:5E:01:00:01 {multicast vlan 2 output–range Tf 1/2, Tf 1/3}
```

Related Commands
- show mac-address-table — display the MAC address table.

mac-address-table station-move refresh-arp

Ensure that address resolution protocol (ARP) refreshes the egress interface when a station move occurs due to a topology change.

Syntax
```
mac-address-table station-move refresh-arp
```
To disable the ARP refresh feature, use the `no mac-address-table station-move refresh-arp` command.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Modified the default option from none to Enabled.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.

Usage Information For more information about using this command, see *NIC Teaming* in the Layer 2 section of the *Dell EMC Networking OS Configuration Guide*.

mac learning-limit

Limit the maximum number of MAC addresses (static + dynamic) learned on a selected interface.

Syntax

```
mac learning-limit address_limit [vlan vlan-id] [station-move-violation
[dynamic]] [dynamic [no-station-move| station-move]]
```

Parameters

address_limit	Enter the maximum number of MAC addresses that can be learned on the interface. The range is from 1 to 1000000.
vlan *vlan-id*	Enter the keyword then the VLAN ID. The range is from 1 to 4094.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to allow aging of MACs even though a learning limit is configured.
station-move-violation	(OPTIONAL) Enter the keywords `station-move` to allow a station move on learned MAC addresses.

Defaults

- On S-Series, the default behavior is dynamic.

NOTE: "Static" means manually entered addresses, which do not age.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Deprecated the `no-station-move` command (replaced by the `mac-learning-limit mac-address-sticky` command).
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the `vlan` option on the E-Series.
8.2.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series. Added the `station-move` option.
6.5.1.0	Added support for MAC Learning-Limit on the LAG.

Usage Information

This command and its options are supported on physical interfaces, static LAGs, LACP LAGs, and VLANs.

If you do not specify the `vlan` option, the MAC address counters are not VLAN-based. That is, the sum of the addresses learned on all VLANs (not having any learning limit configuration) is counted against the MAC learning limit.

MAC Learning Limit violation logs and actions are not available on a per-VLAN basis.

With the keyword `no-station-move` option, MAC addresses learned through this feature on the selected interface persist on a per-VLAN basis, even if received on another interface. Enabling or disabling this option has no effect on already learned MAC addresses.

After the MAC address learning limit is reached, the MAC addresses do not age out unless you add the `dynamic` option. To clear statistics on MAC address learning, use the `clear counters` command with the learning-limit parameter.

NOTE: If you configure this command on an interface in a routed VLAN, and after the MAC addresses learned reaches the limit set in the `mac learning-limit` command, IP protocols are affected. For example, VRRP sets multiple VRRP Masters and OSPF may not come up.

When a channel member is added to a port-channel and there is not enough ACL CAM space, the MAC limit functionality on that port-channel is undefined. When this occurs, un-configure the existing configuration first and then reapply the limit with a lower value.

Related Commands

- mac learning-limit mac-address-sticky — replace deprecated `no-station-move` parameter.
- show mac learning-limit — display MAC learning-limit configuration.

mac learning-limit learn-limit-violation

Configure an action for a MAC address learning-limit violation.

Syntax

```
mac learning-limit learn-limit-violation {log | shutdown}
```

To return to the default, use the `no mac learning-limit learn-limit-violation {log | shutdown}` command.

Parameters

log	Enter the keyword `log` to generate a syslog message on a learning-limit violation.
shutdown	Enter the keyword `shutdown` to shut down the port on a learning-limit violation.

Defaults None

Command Modes INTERFACE (conf-if-interface-slot/port)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

Usage Information This command is supported on physical interfaces, static LAGs, and LACP LAGs.

Related Commands

- show mac learning-limit — display details of the mac learning-limit.

mac learning-limit mac-address-sticky

Maintain the dynamically learned mac addresses as sticky MAC addresses on the selected port.

Syntax

```
mac learning-limit mac-address-sticky
```

To convert the sticky MAC addresses to dynamic MAC addresses, use the `no mac learning-limit` command.

Parameters

mac-address-sticky	Configures the dynamic MAC addresses as sticky on an interface.

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.

Usage Information If you configure `mac-learn-limit` and the sticky MAC feature is enabled, dynamically learned MAC addresses are converted to sticky for that port. Any new MAC address that is learned also becomes sticky for that port.

Related Commands

- show mac learning-limit — display the details of the mac learning-limit.

mac learning-limit station-move-violation

Specify the actions for a station move violation.

Syntax

```
mac learning-limit station-move-violation {log | shutdown-both | shutdown-offending | shutdown-original}
```

To disable a configuration, use the `no mac learning-limit station-move-violation` command, then the configured keyword.

Parameters

log	Enter the keyword `log` to generate a syslog message on a station move violation.
shutdown-both	Enter the keyword `shutdown` to shut down both the original and offending interface and generate a syslog message.
shutdown-offending	Enter the keywords `shutdown-offending` to shut down the offending interface and generate a syslog message.

	shutdown-original	Enter the keywords `shutdown-original` to shut down the original interface and generate a syslog message.

Defaults None

Command Modes INTERFACE (conf-if-interface-slot/port)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the S-Series.
7.8.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

Usage Information This command is supported on physical interfaces, static LAGs, and LACP LAGs.

Related Commands
- show mac learning-limit — display details of the mac learning-limit.

mac learning-limit reset

Reset the MAC address learning-limit error-disabled state.

Syntax `mac learning-limit reset`

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

mac port-security

Enable or disable the port security feature globally in the system.

Syntax

```
mac port-security
```

To disable the port security, use the `no mac port-security` command.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the C9010, MXL, FN IOM, S3100 series, S4810, S4820T, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, and Z9500.

Usage Information

Only if you enable the port security, you will be able to configure MAC address learning limit configurations on the interface level.

When you disable the port security, all the interface level configurations are reset. Also, all dynamically learnt MAC addresses on the interfaces configured with MAC address learning limit are cleared.

show mac-address-table

Display the MAC address table.

Syntax

```
show mac-address-table [address mac-address | interface interface | vlan vlan-id] [aging-time] [dynamic | static] [count [vlan vlan-id] [interface interface-type [slot [/port[/subport]]]]]
```

Parameters

address *mac-address*	(OPTIONAL) Enter the keyword `address` then a MAC address in the nn:nn:nn:nn:nn:nn format to display information on that MAC address.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to display only those MAC addresses the switch dynamically learns. Optionally, you can also add one of these combinations: `address` *`mac-address`*, `interface` *`interface`*, or `vlan` *`vlan-id`*.
static	(OPTIONAL) Enter the keyword `static` to display only those MAC addresses specifically configured on the switch. Optionally, you can also add one of these combinations: `address` *`mac-address`*, `interface` *`interface`*, or `vlan` *`vlan-id`*.
aging-time	Enter the keyword `aging-time` to display only aging-time information.
interface *interface*	(OPTIONAL) Enter the keyword `interface` and the interface information: • For a port channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
interface *interface-type*	(OPTIONAL) Instead of entering the keyword `interface` then the interface type, slot/port[/subport] information, as above, you can enter the interface type, then just a slot number.
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display the MAC address assigned to the VLAN. The range is 1 to 4094.
count	(OPTIONAL) Enter the keyword `count`, then optionally, by an interface or VLAN ID, to display total or interface-specific static addresses, dynamic addresses, and MAC addresses in use.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Updated the output.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show mac-address-table` command shown in the following example.

Column Heading	Description
VlanId	Displays the VLAN ID number.
Mac Address	Displays the MAC address in nn:nn:nn:nn:nn:nn format.
Type	Lists whether the MAC address was manually configured (Static), learned dynamically (Dynamic), or associated with a specific port (Sticky).
Interface	Displays the interface type and slot/port[/subport] information. The following abbreviations describe the interface types: ● Po = port channel ● Te = ten-gigabit Ethernet ● Fo = forty-gigabit Ethernet ● Tf = twentyfive-gigabit Ethernet ● Fi = fifty-gigabit Ethernet ● Hu = hundred-gigabit Ethernet
State	Lists if the MAC address is in use (Active) or not in use (Inactive).

Example

```
DellEMC(conf)# do show mac-address-table
Codes: *N - VLT Peer Synced MAC
VlanId    Mac Address          Type          Interface       State
2     00:00:00:00:00:01      Dynamic (N)     Po 128         Active
2     00:00:00:00:00:02      Dynamic (N)     Po 10           Active
2     00:00:00:00:00:03      Dynamic             Po 100         Active
2     00:00:00:00:00:04      Dynamic             Po 10           Active
```

Usage Information

The following describes the `show mac-address-table count` command shown in the following example.

Line Beginning With	Description
MAC Entries...	Displays the number of MAC entries learned per VLAN.

Line Beginning With	Description
Dynamic Address...	Lists the number of dynamically learned MAC addresses.
Static Address...	Lists the number of user-defined MAC addresses.
Total MAC...	Lists the total number of MAC addresses the switch uses.

Example (Count)

```
DellEMC# show mac-address-table count
MAC Entries for all vlans :
Dynamic Address Count :                110
Static Address (User-defined) Count : 0
Sticky Address Count :                 0
Total Synced Mac from Peer(N):         100
Total MAC Addresses in Use:            110
DellEMC#
```

Related Commands

- show mac-address-table aging-time — display MAC aging time.

show mac-address-table aging-time

Display the aging times assigned to the MAC addresses on the switch.

Syntax

```
show mac-address-table aging-time [vlan vlan-id]
```

Parameters

vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display the MAC address assigned to the VLAN. The range is from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the `vlan` option on the E-Series.
7.7.1.0	Introduced on the C-Series and S-Series.
pre-6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC# show mac-address-table aging-time
  Mac-address-table aging time : 1800

DellEMC#
```

Related Commands

- show mac-address-table — display the current MAC address configuration.

show mac learning-limit

Display MAC address learning limits set for various interfaces.

Syntax `show mac learning-limit [violate-action] [detail] [interface interface]`

Parameters

violate-action	(OPTIONAL) Enter the keywords `violate-action` to display the MAC learning limit violation status.
detail	(OPTIONAL) Enter the keyword `detail` to display the MAC learning limit in detail.
interface *interface*	(OPTIONAL) Enter the keyword `interface` with the following keywords and the interface information: • For a port channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on E-Series.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the `vlan` option on the E-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Added support for the `violate-action` and `detail` options.
6.5.1.0	Added support for Port Channel.

Example

```
DellEMC# show mac learning-limit
Interface    Learning  Dynamic    Static     Unknown SA
Slot/port    Limit     MAC count  MAC count  Drops
Tf 1/1       10        0          0          0
Tf 1/2       5         0          0          0
DellEMC#show mac learning-limit interface twentyFiveGigE 1/1
Interface    Learning  Dynamic    Static     Unknown SA
Slot/port    Limit     MAC count  MAC count  Drops
Tf 1/1       10        0          0          0
```

Virtual LAN (VLAN) Commands

The following commands configure and monitor virtual LANs (VLANs). VLANs are a virtual interface and use many of the same commands as physical interfaces.

You can configure an IP address and Layer 3 protocols on a VLAN called Inter-VLAN routing. FTP, TFTP, ACLs and SNMP are not supported on a VLAN.

Occasionally, while sending broadcast traffic over multiple Layer 3 VLANs, the VRRP state of a VLAN interface may continually switch between Master and Backup.

NOTE: For more information, refer to VLAN Stacking and VLAN-related commands, such as portmode hybrid in the Interfaces chapter.

default vlan-id

Specify a VLAN as the Default VLAN.

Syntax `default vlan-id vlan-id`

To remove the default VLAN status from a VLAN and VLAN 1 does not exist, use the `no default vlan-id vlan-id` syntax.

Parameters

vlan-id Enter the VLAN ID number of the VLAN to become the new Default VLAN. The range is from 1 to 4094. The default is **1**.

Defaults Default VLAN is VLAN **1**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information To return VLAN 1 as the Default VLAN, use this command syntax (`default-vlan-id 1`).

The Default VLAN contains only untagged interfaces.

Related Commands

- interface vlan — configure a VLAN.

description

Add a description about the selected VLAN.

Syntax `description description`

Parameters

description	Enter a text string description to identify the VLAN (80 characters maximum).

Defaults none

Command Modes INTERFACE VLAN

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
6.3.1.1	Introduced on the E-Series.

Related Commands show vlan – displays the VLAN configuration.

default-vlan disable

Disable the default VLAN so that all switchports are placed in the Null VLAN until they are explicitly configured as a member of another VLAN.

Defaults Enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced

Usage Information The `no default vlan disable` command is not listed in the running-configuration, but when the default VLAN is disabled, `default-vlan disable` is listed in the running-configuration.

name

Assign a name to the VLAN.

Syntax `name vlan-name`

To remove the name from the VLAN, use the `no name` command.

Parameters

vlan-name	Enter up to 32 characters as the name of the VLAN.

Defaults Not configured.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information To display information about a named VLAN, enter the `show vlan` command with the name parameter or the show interfaces description command.

Related Commands

- interface vlan — configure a VLAN.
- show vlan — display the current VLAN configurations on the switch.

show config

Display the current configuration of the selected VLAN.

Syntax `show config`

Command Modes INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(conf-if-vl-100)# show config
!
interface Vlan 100
  no ip address
  no shutdown
DellEMC(conf-if-vl-100)#
```

show vlan

Display the current VLAN configurations on the switch.

Syntax `show vlan [brief | id vlan-id | name vlan-name]`

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to display the following information: • VLAN ID • VLAN name (left blank if none is configured) • Spanning Tree Group ID • MAC address aging time • IP address
id *vlan-id*	(OPTIONAL) Enter the keyword `id` then a number from 1 to 4094. Only information on the VLAN specified is displayed.
name *vlan-name*	(OPTIONAL) Enter the keyword `name` then the name configured for the VLAN. Only information on the VLAN named is displayed.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1.(0.0)	Updated to support OpenFlow.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Augmented to display PVLAN data for the C-Series and S-Series and revised the output to include the Description field to display a user-entered VLAN description.
7.6.1.0	Introduced on the S-Series and revised the output to display Native VLAN.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show vlan` command shown in the following example.

Column Heading	Description
(Column 1 — no heading)	• asterisk symbol (*) = Default VLAN • G = GVRP VLAN • P = primary VLAN • C = community VLAN • I = isolated VLAN • O = OpenFlow
NUM	Displays existing VLAN IDs.
Status	Displays the word *Inactive* for inactive VLANs and the word *Active* for active VLANs.
Q	• Displays G for GVRP tagged • M for member of a VLAN-Stack VLAN • T for tagged interface • U for untagged interface • x (not capitalized x) for Dot1x untagged • X (capitalized X) for Dot1x tagged • o (not capitalized o) for OpenFlow untagged • O (capitalized O) for OpenFlow tagged • H for VSN tagged • i (not capitalized i) for Internal untagged

Column Heading	Description
	• I (capitalized I) for Internal tagged • v (not capitalized v) for VLT untagged • V (capitalized V) for VLT tagged
Ports	Displays the type, slot, and port information. • Po = port channel • Te = ten-gigabit Ethernet • Fo = forty-gigabit Ethernet • Tf = twentyfive-gigabit Ethernet • Fi = fifty-gigabit Ethernet • Hu = hundred-gigabit Ethernet

Example

```
DellEMC# show vlan

Codes: * - Default VLAN, G - GVRP VLANs, P - Primary, C - Community, I -
Isolated
Q: U - Untagged, T - Tagged, O - Openflow
   x - Dot1x untagged, X - Dot1x tagged
   o - OpenFlow untagged, O - OpenFlow tagged
   G - GVRP tagged, M - Vlan-stack
   i - Internal untagged, I - Internal tagged, v - VLT untagged, V - VLT
tagged
    NUM  Status      Description   Q Ports
*   1    Inactive
    2    Active                    U Po1(Tf 1/1)
                                   T Po20(Tf 1/6), Tf 1/25
                                   T Tf 1/7
    3    Active T Po20(Tf 1/6)
                                   T Tf 1/7
                                   U Tf 1/1
    4    Active U Po2(Tf 1/2)
                                   T Po20(Tf 1/6)
                                   T Tf 1/7
    5    Active T Po20(Tf 1/6)
                                   T Tf 1/7
                                   U Tf 1/3
    6    Active U Po3(Tf 1/4)
                                   T Po20(Tf 1/6)
                                   T Tf 1/7
    7    Active T Po20(Tf 1/6)
                                   T Tf 1/7
                                   U Tf 1/5
P 100    Active T Po1(Tf 1/1)
                                   T Tf 1/2
C 101    Inactive T Tf 1/3
I 102    Inactive T Tf 1/4
DellEMC#
```

Example (VLAN ID)

```
DellEMC# show vlan id 40

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     40   Active             M Tf 1/47

DellEMC# show vlan id 41

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
```

```
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     41   Active             T Tf 1/47

DellEMC# show vlan id 42

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     42   Active             U Tf 1/47
DellEMC#
```

Example (Brief)

```
DellEMC# show vlan br
VLAN  Name  STG  MAC Aging   IP Address
---- ------------------------------------
1           0    1800        unassigned
2           0    1800        2.2.2.2/24
3           0    1800        3.3.3.2/24
DellEMC#
```

Example (Name)

```
Dellconf)# interface vlan 222
DellEMC(conf-if-vl-222)#name test
DellEMC(conf-if-vl-222)#do show vlan name test

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description  Q Ports
     222  Inactive            U Tf 1/22
DellEMC(conf-if-vl-222)#
```

Example (OpenFlow instance)

```
    NUM    Status    Description                    Q Ports
*   1      Inactive
    3      Inactive
O   6      Inactive
O   8      Inactive
O   12     Inactive                                 O Tf 1/10/1
```

Related Commands

- vlan-stack compatible — enable the Stackable VLAN feature on the selected VLAN.
- interface vlan — configure a VLAN.

tagged

Add a Layer 2 interface to a VLAN as a tagged interface.

Syntax

`tagged` *interface*

To remove a tagged interface from a VLAN, use the `no tagged` *interface* command.

Parameters

interface Enter the following keywords and the interface information:

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults All interfaces in Layer 2 mode are untagged.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information When you use the `no tagged` command, the interface is automatically placed in the Default VLAN as an untagged interface unless the interface is a member of another VLAN. If the interface belongs to several VLANs, remove it from all VLANs to change it to an untagged interface.

Tagged interfaces can belong to multiple VLANs, while untagged interfaces can only belong to one VLAN at a time.

Related Commands
- interface vlan — configure a VLAN.
- untagged — specify which interfaces in a VLAN are untagged.

track ip

Track the Layer 3 operational state of a Layer 3 VLAN, using a subset of the VLAN member interfaces.

Syntax

`track ip interface`

To remove the tracking feature from the VLAN, use the `no track ip interface` command.

Parameters

interface

Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults

Not configured.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

When this command is configured, the VLAN is operationally UP if any of the interfaces specified in the `track ip` command are operationally UP, and the VLAN is operationally DOWN if none of the tracking interfaces are operationally UP.

If the `track ip` command is not configured, the VLAN's Layer 3 operational state depends on all the members of the VLAN.

The Layer 2 state of the VLAN, and the Layer 2 traffic, is not affected by the `track ip` command configuration.

Related Commands

- interface vlan — configure a VLAN.
- tagged — specify which interfaces in a VLAN are tagged.

untagged

Add a Layer 2 interface to a VLAN as an untagged interface.

Syntax

`untagged` *`interface`*

To remove an untagged interface from a VLAN, use the `no untagged` *`interface`* command.

Parameters

interface Enter the following keywords and the interface information:

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults

All interfaces in Layer 2 mode are untagged.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

Untagged interfaces can only belong to one VLAN.

In the Default VLAN, you cannot use the `no untagged interface` command. To remove an untagged interface from all VLANs, including the Default VLAN, enter INTERFACE mode and use the `no switchport` command.

Related Commands

- interface vlan — configure a VLAN.
- tagged — specify which interfaces in a VLAN are tagged.

Far-End Failure Detection (FEFD)

The Dell EMC Networking operating software supports far-end failure detection (FEFD) on the Ethernet interfaces of the platform.

The FEFD feature detects and reports far-end link failures.

- FEFD is not supported on the Management interface.
- During an RPM failover, FEFD is operationally disabled for approximately 8 to 10 seconds.
- By default, FEFD is disabled.

debug fefd

Enable debugging of FEFD.

Syntax

`debug fefd {events | packets} [interface]`

To disable debugging of FEFD, use the `no debug fefd {events | packets} [interface]` command.

Parameters

events	Enter the keyword `events` to enable debugging of FEFD state changes.
packets	Enter the keyword `packets` to enable debugging of FEFD to view information on packets sent and received.
interface	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enable far-end failure detection on an interface.
- fefd reset — enable FEFD globally on the system.

fefd

Enable Far-End Failure Detection on an interface, set the FEFD interval, or select the FEFD mode.

Syntax `fefd {disable|interval|mode {aggressive|normal}`

Parameters

disable Enter the keyword **disable** to disable FEFD for the specified interface.

interval Enter the keyword **interval**, followed by a value to specify the FEFD interval in seconds. Range is from 3 to 300. Default is 15.

mode Enter the keyword **mode** followed by the mode type to specify the FEFD mode.

- **normal**: Change the link state to “unknown” when a far-end failure is detected by the software on that interface. When the interface is placed in an “unknown” state, the software brings down the line protocol.
- **aggressive**: Change the link state to “error-disabled” when a far-end failure is detected by the software on that interface. When an interface is placed in an “error-disabled” state, you must enter the `fefd reset` command to reset the interface state. Range is normal or aggressive. Default is normal.

Defaults Disabled.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.

Usage Information

When you enter `no fefd` for an interface and `fefd-global`, FEFD is enabled on the interface because the `no fefd` command is not retained in the configuration file. To keep the interface FEFD disabled when the global configuration changes, use the `fefd reset` command.

Related Commands

- fefd disable — disable far-end failure detection on an interface.
- fefd reset — enable FEFD globally on the system.
- fefd mode — change FEFD mode on an interface.

fefd disable

Disable FEFD on an interface only. This command overrides the `fefd reset` command for the interface.

Syntax

`fefd disable`

To re-enable FEFD on an interface, use the `no fefd disable` command.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

`FEFD disable` command on the interface prevents the interface from running FEFD when FEFD is enabled globally.

Related Commands

- fefd reset — clear an interface in Err-disabled state. It doesn't work until the interface is in err-disabled state.
- fefd mode — change FEFD mode on an interface.

fefd interval

Set an interval between control packets.

Syntax

`fefd interval` *`seconds`*

To return to the default value, use the `no fefd interval` command.

Parameters

seconds	Enter a number as the time between FEFD control packets. The range is from 3 to 255 seconds. The default is **15 seconds**.

Defaults

15 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

You can set up the interval between control packets using the `fefd interval` command.

Related Commands

- fefd — enable far-end failure detection.

fefd mode

Change the FEFD mode on an interface.

Syntax `fefd mode {normal | aggressive}]`

To return the FEFD mode to the default of normal, use the `no fefd mode` command.

Parameters

normal (OPTIONAL) Enter the keyword `normal` to change the link state to "unknown" when a far-end failure the software detects on that interface. When the interface is placed in "unknown" state, the software brings down the line protocol.

aggressive (OPTIONAL) Enter the keyword `aggressive` to change the link state to "error-disabled" when a far-end failure the software detects on that interface. When an interface is placed in "error-disabled" state, enter the `fefd reset` command to reset the interface state.

Defaults Normal

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enable far-end failure detection.

fefd reset

Reset all interfaces or a single interface that was in "error-disabled" mode.

Syntax `fefd reset [interface]`

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands
- fefd — enable far-end failure detection.

fefd-global interval

Configure an interval between FEFD control packets.

Syntax `fefd-global interval seconds`

To return to the default value, use the `no fefd-global interval` command.

Parameters

seconds	Enter a number as the time between FEFD control packets. The range is from 3 to 300 seconds. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enable far-end failure detection.
- fefd-global — enable FEFD globally on the system.

fefd-global

Enable FEFD globally on the system.

Syntax

```
fefd-global [interval seconds][mode {normal | aggressive}]
```

To disable FEFD globally, use the `no fefd-global [mode {normal | aggressive}]` command.

Parameters

interval *seconds*	Enter the keyword `interval` followed by the number of seconds to wait between FEFD control packets. Range is from 3 to 300 seconds. Default is 15 seconds.
normal	(OPTIONAL) Enter the keywords `mode normal` to change the link state to "unknown" when a far-end failure the software detects on that interface. When the interface is placed in "unknown" state, the software brings down the line protocol. The default is **Normal mode**.
aggressive	(OPTIONAL) Enter the keywords `mode aggressive` to change the link state to "error-disabled" when a far-end failure the software detects on that interface. When an interface is placed in "error-disabled" state, t enter the `fefd reset` command to reset the interface state.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

If you enter only the `fefd-global` syntax, the mode is normal and the default interval is 15 seconds.

If you disable FEFD globally (`no fefd-global`), the system does not remove the FEFD interface configuration.

Related Commands

- fefd — enable far-end failure detection.
- fefd-global interval — configure an interval between FEFD control packets.
- show fefd — display the FEFD command output.

show fefd

View FEFD status globally or on a specific interface.

Syntax

```
show fefd [interface]
```

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

The following describes the `show fefd` command shown in the following example.

Field	Description
Interface	Displays the interfaces type and number.
Mode	Displays the mode (aggressive or normal) or NA if the interface contains `fefd reset` in its configuration.
Interval	Displays the interval between FEFD packets.
State	Displays the state of the interface and can be one of the following: ● bi-directional (interface is up, connected and hearing neighbor's echoes). ● err-disabled (only found when FEFD mode is aggressive and when the interface has not hearing its neighbor's echoes for three times the message interval. To reset an interface in this state, use the `fefd reset` command.) ● unknown (only found when FEFD mode is normal. ● locally disabled (interface contains the `fefd reset` command in its configuration). ● Admin Shutdown (interface is disabled with the `shutdown` command).

Example

```
DellEMC# show fefd
FEFD is globally 'ON', interval is 10 seconds, mode is 'Aggressive'.

INTERFACE   MODE        INTERVAL   STATE
                        (second)
Tf 1/1      Aggressive  10         Admin Shutdown
Tf 1/2      Aggressive  10         Admin Shutdown
Tf 1/3      Aggressive  10         Admin Shutdown
Tf 1/4      Aggressive  10         Admin Shutdown
Tf 1/5      Aggressive  10         Admin Shutdown
Tf 1/6      Aggressive  10         Admin Shutdown
Tf 1/7      Aggressive  10         Admin Shutdown
Tf 1/8      Aggressive  10         Admin Shutdown
Tf 1/9      Aggressive  10         Admin Shutdown
Tf 1/10     NA          NA         Locally disabled
Tf 1/11     Aggressive  10         Err-disabled
DellEMC#
```

Related Commands

- fefd — enable far-end failure detection.
- fefd disable — disable FEFD on an interface only.
- fefd-global — enable FEFD globally on the system.
- fefd reset — reset all interfaces or a single interface that was in "error-disabled" mode.

30

Link Layer Discovery Protocol (LLDP)

The link layer discovery protocol (LLDP) advertises connectivity and management from the local station to the adjacent stations on an IEEE 802 LAN.

LLDP facilitates multi-vendor interoperability by using standard management tools to discover and make available a physical topology for network management. The Dell EMC Networking operating software implementation of LLDP is based on IEEE standard 801.1ab.

The starting point for using LLDP is invoking LLDP with the `protocol lldp` command in either CONFIGURATION or INTERFACE mode.

The information LLDP distributes is stored by its recipients in a standard management information base (MIB). You can access the information by a network management system through a management protocol such as simple network management protocol (SNMP).

Topics:

- LLPD Commands
- LLDP-MED Commands

LLPD Commands

The following are LLDP commands.

advertise dot1-tlv

Advertise dot1 TLVs (Type, Length, Value).

Syntax

`advertise dot1-tlv {port-protocol-vlan-id | port-vlan-id | vlan-name}`

To remove advertised dot1-tlv, use the `no advertise dot1-tlv {port-protocol-vlan-id | port-vlan-id | vlan-name}` command.

Parameters

port-protocol-vlan-id	Enter the keywords `port-protocol-vlan-id` to advertise the port protocol VLAN identification TLV.
port-vlan-id	Enter the keywords `port-vlan-id` to advertise the port VLAN identification TLV.
vlan-name	Enter the keywords `vlan-name` to advertise the vlan-name TLV. This keyword is only supported on the C-Series and S-Series.

Defaults

Disabled.

Command Modes

CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series. Added the `vlan-name` option.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- protocol lldp (Configuration) — enable LLDP globally.
- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise dot3-tlv

Advertise dot3 TLVs (Type, Length, Value).

Syntax

```
advertise dot3-tlv {max-frame-size}
```

To remove advertised dot3-tlv, use the `no advertise dot3-tlv {max-frame-size}` command.

Parameters

max-frame-size	Enter the keywords `max-frame-size` to advertise the dot3 maximum frame size TLV.

Defaults None

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

advertise interface-port-desc

Advertise port descriptor.

Syntax

```
advertise interface-port-desc {description | port-id}
```

To remove the advertised port descriptor, use the `no advertise interface—port—desc {description | port-id}` command.

Parameters

description	Enter the keyword `description` then the interface description.
port-id	Enter the keyword `port-id` then the port-id. The range is from 0 to 7.

Defaults None

Command Modes CONFIGURATION (conf-lldp)

INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P1)	Introduced the `description` and `port-id` options.

Usage Information If you do not specify the option, by default the port-id takes higher precedence and sends the port-id in the LLDP packets.

clear lldp counters

Clear LLDP transmitting and receiving counters for all physical interfaces or a specific physical interface.

Syntax

```
clear lldp counters [interface interface]
```

Parameters

interface ***interface***	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

clear lldp neighbors

Clear LLDP neighbor information for all interfaces or a specific interface.

Syntax `clear lldp neighbors [interface interface]`

Parameters

interface *interface*

(OPTIONAL)Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.

- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

debug lldp interface

To display timer events, neighbor additions or deletions, and other information about incoming and outgoing packets, enable LLDP debugging.

Syntax `debug lldp interface {`*`interface`* `| all}{events | packet {brief | detail} {tx | rx | both}}`

To disable debugging, use the `no debug lldp [interface {`*`interface`* `| all}{events} {packet {brief | detail} {tx | rx | both}}]` command.

Parameters

interface ***interface***

Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

all	Enter the keyword `all` to display information on all interfaces.
events	Enter the keyword `events` to display major events such as timer events.
packet	Enter the keyword `packet` to display information regarding packets coming in or going out.
brief	Enter the keyword `brief` to display brief packet information.
detail	Enter the keyword `detail` to display detailed packet information.
tx	Enter the keyword `tx` to display transmit-only packet information.
rx	Enter the keyword `rx` to display receive-only packet information.
both	Enter the keyword `both` to display both receive and transmit packet information.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13.0.0	Enhanced to display organizational specific unrecognized LLDP TLVs.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC#Dec  4 22:38:27 : Received LLDP pkt on twentyFiveGigE 1/1 of length 204 :
Dec  4 22:38:27 : Packet dump:
Dec  4 22:38:27 :  01 80 c2 00 00 0e 00 a0 c9 00 00 03 81 00 00 00
Dec  4 22:38:27 :  88 cc 02 07 04 00 a0 c9 00 00 01 04 02 05 54 06
Dec  4 22:38:27 :  02 01 2c fe 05 aa bb cc 04 61 fa 01 40 00 00 00
Dec  4 22:38:28 :  00 00 00 00 00 00 00 00 c6 0f ba 27
```

```
Dec  4 22:38:28 : TLV: Chassis ID, Len: 7, Subtype: Mac address (4) Value: 00:a0:c9:00:00:01
Dec  4 22:38:29 : TLV: Port ID, Len: 2, Subtype: Interface name (5) Value: T
Dec  4 22:38:29 : TLV: TTL, Len: 2, Value: 300
Dec  4 22:38:29 : TLV: UNKNOWN TLV, ORG_SPEC[aa-bb-cc, 4], Len: 1, Value:a
Dec  4 22:38:29 :  aa bb cc 04 61
Dec  4 22:38:29 :  40
Dec  4 22:38:29 : TLV: UNKNOWN TLV, Type: 125 Len: 1, Value: @
Dec  4 22:38:29 : TLV: ENDOFPDU, Len: 0
```

disable

Enable or disable LLDP.

Syntax

`disable`

To enable LLDP, use the `no disable` command.

Defaults

Enabled — no disable.

Command Modes

CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- protocol lldp (Configuration) — enable LLDP globally.
- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

hello

Configure the rate at which the LLDP control packets are sent to its peer.

Syntax `hello seconds`

To revert to the default, use the `no hello seconds` command.

Parameters

seconds	Enter the rate, in seconds, at which the control packets are sent to its peer. The rate is from 5 to 180 seconds. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

mode

To receive or transmit, set LLDP.

Syntax `mode {tx | rx}`

To return to the default, use the `no mode` command.

Parameters

tx	Enter the keyword `tx` to set the mode to transmit.
rx	Enter the keyword `rx` to set the mode to receive.

Defaults Both **transmit** and **receive**.

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands
- protocol lldp (Configuration) — enable LLDP globally.
- show lldp neighbors — display the LLDP neighbors.

multiplier

Set the multiple of the hello timer before LLDP declares the interface dead.

Syntax `multiplier number`

To return to the default, use the `no multiplier` command.

Parameters

integer	Enter the number of consecutive misses before the LLDP declares the interface dead. The range is from 2 to 10.

Defaults **4**

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

protocol lldp (Configuration)

Enable the LLDP globally on the switch.

Syntax `protocol lldp`

To disable LLDP globally on the chassis, use the `no protocol lldp` command.

Defaults Enabled.

Command Modes CONFIGURATION (conf-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

protocol lldp (Interface)

Enter the LLDP protocol in INTERFACE mode.

Syntax

```
[no] protocol lldp
```

To return to the global LLDP configuration mode, use the `no protocol lldp` command from Interface mode.

Defaults

LLDP is not enabled on the interface.

Command Modes

INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

Before LLDP can be configured on an interface, it must be enabled globally from CONFIGURATION mode. This command places you in LLDP mode on the interface; it does not enable the protocol.

When you enter the `LLDP` protocol in the Interface context, it overrides global configurations. When you execute the `no protocol lldp` from INTERFACE mode, interfaces begin to inherit the configuration from global LLDP CONFIGURATION mode.

show lldp neighbors

Display LLDP neighbor information for all interfaces or a specified interface.

Syntax `show lldp neighbors [interface interface] [detail]`

Parameters

interface *interface*	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
detail	(OPTIONAL) Enter the keyword `detail` to display all the TLV information, remote management IP addresses, timers, and LLDP tx and rx counters.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13.0.0	Enhanced to display organizational specific unrecognized LLDP TLVs.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1.(0.0)	Modified output of detail parameter to display remote management IP addresses.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

Omitting the keyword `detail` displays only the remote chassis ID, Port ID, and Dead Interval.

Example

```
DellEMC(conf-if-tf-1/31)# do show lldp neighbors
Loc PortID Rem  Host Name       Rem     Port Id Rem Chassis Id
-------------------------------------------------------------
Tf   1/21  R2  twentyFiveGigE   1/11   00:01:e8:06:95:3e
Tf   1/31  R3  twentyFiveGigE   1/11   00:01:e8:09:c2:4a
```

Example (Detail)

```
DellEMC#show lldp neighbors detail
================================================================================
Local Interface Tf 1/4 has 1 neighbor
  Total Frames Out: 6547
  Total Frames In: 4136
  Total Neighbor information Age outs: 0
  Total Frames Discarded: 0
  Total In Error Frames: 0
  Total Unrecognized TLVs: 0
  Total TLVs Discarded: 0
  Next packet will be sent after 7 seconds
  The neighbors are given below:
-

  Remote Chassis ID Subtype: Mac address (4)
  Remote Chassis ID: 00:01:e8:06:95:3e
  Remote Port Subtype: Interface name (5)
  Remote Port ID: twentyFiveGigE 1/11
  Local Port ID: twentyFiveGigE 1/4
  Locally assigned remote Neighbor Index: 4
  Remote TTL: 120
  Information valid for next 120 seconds
  Time since last information change of this neighbor: 01:50:16
  Remote MTU: 1554
  Remote System Desc: Dell Networks Real Time Operating System Software
  Dell Operating System Version: 1.0.
  Dell Application Software Version: 9.12(1.0). Copyright (c) 1999-2017
  Build Time: Thu Aug 9 01:05:51 PDT 1999-2017
  Existing System Capabilities: Repeater Bridge Router
  Enabled System Capabilities: Repeater Bridge Router
  Remote Port Vlan ID: 1
  Port and Protocol Vlan ID: 1, Capability: Supported, Status: Enabled
  -

================================================================================
```

```
DellEMC(conf)#do show lldp neighbors detail
================================================================================
Local Interface twentyFiveGigE 1/1 has 2 neighbors
  Total Frames Out: 3
  Total Frames In: 8
  Total Neighbor information Age outs: 0
  Total Multiple Neighbors Detected: 0
  Total Frames Discarded: 0
  Total In Error Frames: 0
  Total Unrecognized TLVs: 960
  Total TLVs Discarded: 16
  Next packet will be sent after 9 seconds
  The neighbors are given below:
  ------------------------------------------------------------------------------

    Remote Chassis ID Subtype: Mac address (4)
    Remote Chassis ID:  00:00:00:00:00:01
    Remote Port Subtype:  Interface name (5)
    Remote Port ID:  TenGigabitEthernEt 1/40
    Local Port ID: twentyFiveGigE 1/1
    Locally assigned remote Neighbor Index: 1
    Remote TTL:  120
    Information valid for next 44 seconds
    Time since last information change of this neighbor:  00:01:16
    UnknownTLVList:
          (  9,  4) ( 10,  4) ( 11,  4) ( 12,  4) ( 13,  4) ( 14,  4) ( 15,  4) ( 16,  4) ( 17,  4) (
18,  4)
          ( 19,  4) ( 20,  4) ( 21,  4) ( 22,  4) ( 23,  4) ( 24,  4) ( 25,  4) ( 26,  4) ( 27,  4) (
28,  4)
          ( 29,  4) ( 30,  4) ( 31,  4) ( 32,  4) ( 33,  4) ( 34,  4) ( 35,  4) ( 36,  4) ( 37,  4) (
38,  4)
          ( 39,  4) ( 40,  4) ( 41,  4) ( 42,  4) ( 43,  4) ( 44,  4) ( 45,  4) ( 46,  4) ( 47,  4) (
48,  4)
          ( 49,  4) ( 50,  4) ( 51,  4) ( 52,  4) ( 53,  4) ( 54,  4) ( 55,  4) ( 56,  4) ( 57,  4) (
58,  4)
```

```
          ( 59,  4) ( 60,  4) ( 61,  4) ( 62,  4) ( 63,  4) ( 64,  4) ( 65,  4) ( 66,  4) ( 67,  4) (
68,  4)
          ( 69,  4) ( 70,  4) ( 71,  4) ( 72,  4) ( 73,  4) ( 74,  4) ( 75,  4) ( 76,  4) ( 77,  4) (
78,  4)
          ( 79,  4) ( 80,  4) ( 81,  4) ( 82,  4) ( 83,  4) ( 84,  4) ( 85,  4) ( 86,  4) ( 87,  4) (
88,  4)
          ( 89,  4) ( 90,  4) ( 91,  4) ( 92,  4) ( 93,  4) ( 94,  4) ( 95,  4) ( 96,  4) ( 97,  4) (
98,  4)
          ( 99,  4) (100,  4) (101,  4) (102,  4) (103,  4) (104,  4) (105,  4) (106,  4) (107,  4)
(108,  4)
          (109,  4) (110,  4) (111,  4) (112,  4) (113,  4) (114,  4) (115,  4) (116,  4) (117,  4)
(118,  4)
          (119,  4) (120,  4) (121,  4) (122,  4) (123,  4) (124,  4) (125,  4) (126,  4)
    OrgUnknownTLVList:
   ------------------------------------------------------------------------------

    Remote Chassis ID Subtype: Mac address (4)
    Remote Chassis ID:  00:00:00:00:00:02
    Remote Port Subtype:  Interface name (5)
    Remote Port ID:  TenGigabitEthernEt 1/40
    Local Port ID: twentyFiveGigE 1/1
    Locally assigned remote Neighbor Index: 2
    Remote TTL:  120
    Information valid for next 43 seconds
    Time since last information change of this neighbor:  00:01:17
    UnknownTLVList:
          (  9,  4) ( 10,  4) ( 11,  4) ( 12,  4) ( 13,  4) ( 14,  4) ( 15,  4) ( 16,  4) ( 17,  4) (
18,  4)
          ( 19,  4) ( 20,  4) ( 21,  4) ( 22,  4) ( 23,  4) ( 24,  4) ( 25,  4) ( 26,  4) ( 27,  4) (
28,  4)
          ( 29,  4) ( 30,  4) ( 31,  4) ( 32,  4) ( 33,  4) ( 34,  4) ( 35,  4) ( 36,  4) ( 37,  4) (
38,  4)
          ( 39,  4) ( 40,  4) ( 41,  4) ( 42,  4) ( 43,  4) ( 44,  4) ( 45,  4) ( 46,  4) ( 47,  4) (
48,  4)
          ( 49,  4) ( 50,  4) ( 51,  4) ( 52,  4) ( 53,  4) ( 54,  4) ( 55,  4) ( 56,  4) ( 57,  4) (
58,  4)
          ( 59,  4) ( 60,  4) ( 61,  4) ( 62,  4) ( 63,  4) ( 64,  4) ( 65,  4) ( 66,  4) ( 67,  4) (
68,  4)
          ( 69,  4) ( 70,  4) ( 71,  4) ( 72,  4) ( 73,  4) ( 74,  4) ( 75,  4) ( 76,  4) ( 77,  4) (
78,  4)
          ( 79,  4) ( 80,  4) ( 81,  4) ( 82,  4) ( 83,  4) ( 84,  4) ( 85,  4) ( 86,  4) ( 87,  4) (
88,  4)
          ( 89,  4) ( 90,  4) ( 91,  4) ( 92,  4) ( 93,  4) ( 94,  4) ( 95,  4) ( 96,  4) ( 97,  4) (
98,  4)
          ( 99,  4) (100,  4) (101,  4) (102,  4) (103,  4) (104,  4) (105,  4) (106,  4) (107,  4)
(108,  4)
          (109,  4) (110,  4) (111,  4) (112,  4) (113,  4) (114,  4) (115,  4) (116,  4) (117,  4)
(118,  4)
          (119,  4) (120,  4) (121,  4) (122,  4) (123,  4) (124,  4) (125,  4) (126,  4)
    OrgUnknownTLVList:
   ------------------------------------------------------------------------------

==========================================================================
Local Interface twentyFiveGigE 1/2 has 3 neighbors
  Total Frames Out: 4
  Total Frames In: 8
  Total Neighbor information Age outs: 0
  Total Multiple Neighbors Detected: 0
  Total Frames Discarded: 0
  Total In Error Frames: 0
  Total Unrecognized TLVs: 1056
  Total TLVs Discarded: 0
  Next packet will be sent after 16 seconds
  The neighbors are given below:
  ------------------------------------------------------------------------------

    Remote Chassis ID Subtype: Mac address (4)
    Remote Chassis ID:  4c:76:25:f4:ab:01
    Remote Port Subtype:  Interface name (5)
    Remote Port ID:  fortyGigE 1/2/8/1
    Local Port ID: twentyFiveGigE 1/2
    Locally assigned remote Neighbor Index: 1
    Remote TTL:  300
    Information valid for next 201 seconds
    Time since last information change of this neighbor:  00:01:39
    UnknownTLVList:
    OrgUnknownTLVList:
         ((00-01-66),127,  4) ((00-01-66),126,  4) ((00-01-66),125,  4) ((00-01-66),124,  4)
((00-01-66),123,  4)
         ((00-01-66),122,  4) ((00-01-66),121,  4) ((00-01-66),120,  4) ((00-01-66),119,  4)
((00-01-66),118,  4)
   ------------------------------------------------------------------------------

    Remote Chassis ID Subtype: Mac address (4)
    Remote Chassis ID:  4c:76:25:f4:ab:02
    Remote Port Subtype:  Interface name (5)
    Remote Port ID:  fortyGigE 1/2/8/1
    Local Port ID: twentyFiveGigE 1/2
    Locally assigned remote Neighbor Index: 2
    Remote TTL:  300
    Information valid for next 201 seconds
    Time since last information change of this neighbor:  00:01:39
    UnknownTLVList:
    OrgUnknownTLVList:
         ((00-01-66),127,  4) ((00-01-66),126,  4) ((00-01-66),125,  4) ((00-01-66),124,  4)
((00-01-66),123,  4)
         ((00-01-66),122,  4) ((00-01-66),121,  4) ((00-01-66),120,  4) ((00-01-66),119,  4)
((00-01-66),118,  4)
   ------------------------------------------------------------------------------

    Remote Chassis ID Subtype: Mac address (4)
    Remote Chassis ID:  4c:76:25:f4:ab:03
    Remote Port Subtype:  Interface name (5)
```

```
    Remote Port ID:  fortyGigE 1/2/8/1
    Local Port ID: twentyFiveGigE 1/2
    Locally assigned remote Neighbor Index: 3
    Remote TTL:  300
    Information valid for next 199 seconds
    Time since last information change of this neighbor:  00:01:41
    UnknownTLVList:
    OrgUnknownTLVList:
        ((00-01-66),127,  4) ((00-01-66),126,  4) ((00-01-66),125,  4) ((00-01-66),124,  4)
((00-01-66),123,  4)
        ((00-01-66),122,  4) ((00-01-66),121,  4) ((00-01-66),120,  4) ((00-01-66),119,  4)
((00-01-66),118,  4)
   ------------------------------------------------------------------------------
```

show lldp statistics

Display the LLDP statistical information.

Syntax `show lldp statistics`

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC# show lldp statistics
--------- LLDP GLOBAL STATISTICS ON CHASSIS ----
Total number of neighbors: 3
Last table change time: 00:01:23, In ticks: 8388
Total number of Table Inserts: 3
Total number of Table Deletes: 0
Total number of Table Drops: 0
Total number of Table Age Outs: 0
Total number of suppressed Traps: 2
DellEMC#
```

LLDP-MED Commands

The following are the LLDP-MED (Media Endpoint Discovery) commands.

Dell EMC Networking OS LLDP-MED commands are an extension of the set of LLDP TLV advertisement commands.

As defined by ANSI/TIA-1057, LLDP-MED provides organizationally specific TLVs (Type Length Value), so that endpoint devices and network connectivity devices can advertise their characteristics and configuration information. The Organizational Unique Identifier (OUI) for the Telecommunications Industry Association (TIA) is 00-12-BB.

- LLDP-MED Endpoint Device — any device that is on an IEEE 802 LAN network edge, can communicate using IP, and uses the LLDP-MED framework.
- LLDP-MED Network Connectivity Device — any device that provides access to an IEEE 802 LAN to an LLDP-MED endpoint device, and supports IEEE 802.1AB (LLDP) and TIA-1057 (LLDP-MED). The Dell EMC Networking system is an LLDP-MED network connectivity device.

Regarding connected endpoint devices, LLDP-MED provides network connectivity devices with the ability to:

- manage inventory
- identify physical location
- identify network policy

advertise med guest-voice

To advertise a separate limited voice service for a guest user with their own IP telephony handset or other appliances that support interactive voice services, configure the system.

Syntax

`advertise med guest-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med guest-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- protocol lldp (Configuration) — enable LLDP globally.
- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med guest-voice-signaling

To advertise a separate limited voice service for a guest user when the guest voice control packets use a separate network policy than the voice data, configure the system.

Syntax

`advertise med guest-voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med guest-voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults Unconfigured.

Command Modes CONFIGURATION (conf-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med location-identification

To advertise a location identifier, configure the system.

Syntax

```
advertise med location-identification {coordinate-based value | civic-based value | ecs-elin value}
```

To return to the default, use the `no advertise med location-identification {coordinate-based value | civic-based value | ecs-elin value}` command.

Parameters

coordinate-based *value*	Enter the keywords `coordinate-based` then the coordinated based location in hexadecimal value of 16 bytes.
civic-based *value*	Enter the keywords `civic-based` then the civic based location in hexadecimal format. The range is from 6 to 255 bytes.
ecs-elin *value*	Enter the keywords `ecs-elin` then the Emergency Call Service (ecs) Emergency Location Identification Number (elin) numeric location string. The range is from 10 to 25 characters.

Defaults Unconfigured.

Command Modes CONFIGURATION (conf-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Usage Information

- ECS — Emergency call service such as defined by TIA or the national emergency numbering association (NENA)
- ELIN — Emergency location identification number, a valid North America Numbering Plan format telephone number supplied for ECS purposes.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med softphone-voice

To advertise softphone to enable IP telephony on a computer so that the computer can be used as a phone, configure the system.

Syntax

`advertise med softphone-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med softphone-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults Unconfigured.

Command Modes CONFIGURATION (conf-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med streaming-video

To advertise streaming video services for broadcast or multicast-based video, configure the system. This command does not include video applications that rely on TCP buffering.

Syntax

`advertise med streaming-video {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med streaming-video {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med video-conferencing

To advertise dedicated video conferencing and other similar appliances that support real-time interactive video, configure the system.

Syntax

`advertise med video-conferencing {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med video-conferencing {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.

Version	Description
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med video-signaling

To advertise video control packets that use a separate network policy than video data, configure the system.

Syntax

`advertise med video-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med video-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults Unconfigured.

Command Modes CONFIGURATION (conf-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

-
- debug lldp interface — debug LLDP.

- show lldp neighbors — display the LLDP neighbors.

advertise med voice

To advertise a dedicated IP telephony handset or other appliances supporting interactive voice services, configure the system.

Syntax

`advertise med voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — de bug LLDP.
- show lldp neighbors — display the LLDP neighbors.

advertise med voice-signaling

To advertise when voice control packets use a separate network policy than voice data, configure the system.

Syntax

`advertise med voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged`, the Layer 2 priority, and then the DSCP value.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

- debug lldp interface — debug LLDP.
- show lldp neighbors — display the LLDP neighbors.

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Microsoft Network Load Balancing

Network load balancing (NLB) is a clustering functionality that is implemented by Microsoft on Windows 2000 Server and Windows Server 2003 operating systems. Microsoft NLB clustering allows multiple servers running Microsoft Windows to be represented by one MAC and one IP address to provide transparent failover and load-balancing. The Dell EMC Networking OS does not recognize server clusters by default; you must configure NLB functionality on a switch to support server clusters. The maximum NLB entry limit from 8 to 11 is increased and support for more CAM-ACL to increase.

Topics:

- arp (for Multicast MAC Address)
- mac-address-table static (for Multicast MAC Address)
- ip vlan-flooding

arp (for Multicast MAC Address)

To associate an IP address with a multicast MAC address in the switch when you configure multicast mode of network load balancing (NLB), use address resolution protocol (ARP).

Syntax

`arp` *`ip-address multicast-mac-address interface`*

To remove an ARP address, use the `no arp ip-address` command.

Parameters

ip-address	Enter an IP address in dotted decimal format.
multicast-mac-address	Enter a 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format for the static MAC address to be used to switch multicast traffic.
interface	Enter any of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • The interface specified here must be one of the interfaces configured using the `{output-range | output}` *`interface`* option with the `mac-address-table static` command.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.3(0.0)	Added support for association of an IP address with multicast MAC address on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

For multicast mode of NLB, to associate an IP address with a multicast MAC address in the switch, use address resolution protocol (ARP) by entering the `arp ip-address multicast-mac-address` command in Global configuration mode. This setting causes the multicast MAC address to be mapped to the cluster IP address for NLB mode of operation of the switch.

Related Commands

- clear arp-cache — clear dynamic ARP entries from the ARP table.
- show arp — display the ARP table.

mac-address-table static (for Multicast MAC Address)

For multicast mode of network load balancing (NLB), configure a static multicast MAC address, associate the multicast MAC address with the VLAN used to switch Layer 2 multicast traffic, and add output ports that will receive multicast streams on the VLAN. To delete a configured static multicast MAC address from the MAC address table on the router, enter the `no mac-address-table static multicast-mac-address` command.

Syntax

`mac-address-table static multicast-mac-address multicast vlan vlan-id range-output {single-interface | interface-list | interface-range}`

To remove a MAC address, use the `no mac-address-table static multicast-mac-address output interface vlan vlan-id` command.

Parameters

multicast-mac-address Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.

multicast Enter a vlan port to where L2 multicast MAC traffic is forwarded.

NOTE: Use this option if you want multicast functionality in an L2 VLAN without IGMP protocols.

output *interface* For a multicast MAC address, enter the keyword `output` then one of the following interfaces for which traffic is forwarded:

- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

output-range *interface* For a multicast MAC address, enter the keyword `output-range` then one of the following interfaces to indicate a range of ports for which traffic is forwarded:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.

- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Management interface, enter the keyword managementethernet followed by slot/port numbers.
- For a Port Channel interface, enter the keywords port-channel followed by a number.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

vlan *vlan-id* Enter the keyword `vlan` then a VLAN ID number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.3(0.0)	Added support for multicast MAC address on the MXL platform.

Example (Multicast)

```
mac-address-table static 01:00:5E:01:00:01 {multicast vlan 2 output–
range Tf 1/2,Tf 1/3
```

ip vlan-flooding

Enable unicast data traffic flooding on VLAN member ports.

Syntax `ip vlan-flooding`

To disable, use the `no ip vlan-flooding` command.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.3(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL platforms.

Default Disabled

Usage Information By default this command is disabled. There might be some ARP table entries which are resolved through ARP packets which had Ethernet MAC SA different from MAC information inside the ARP packet. This unicast data traffic flooding occurs only for those packets which use these ARP entries.

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Multicast Source Discovery Protocol (MSDP)

Multicast source discovery protocol (MSDP) connects multiple PIM sparse-mode (PIM-SM) domains together.

MSDP peers connect using TCP port 639. Peers send keepalives every 60 seconds. A peer connection is reset after 75 seconds if no MSDP packets are received. MSDP connections are parallel with MBGP connections.

The Dell EMC Networking OS supports MSDP commands on the platform.

Topics:

- clear ip msdp peer
- clear ip msdp sa-cache
- clear ip msdp statistic
- ip msdp cache-rejected-sa
- ip msdp default-peer
- ip msdp log-adjacency-changes
- ip msdp mesh-group
- ip msdp originator-id
- ip msdp peer
- ip msdp redistribute
- ip msdp sa-filter
- ip msdp sa-limit
- ip msdp shutdown
- ip multicast-msdp
- show ip msdp
- show ip msdp sa-cache rejected-sa

clear ip msdp peer

Reset the TCP connection to the peer and clear all the peer statistics.

Syntax `clear ip msdp peer {peer address}`

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.)

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
6.2.1.1	Introduced

clear ip msdp sa-cache

Clears the entire source-active cache, the source-active entries of a particular multicast group, rejected, or local source-active entries.

Syntax `clear ip msdp sa-cache [group-address | rejected-sa | local]`

Parameters

group-address	Enter the group IP address in dotted decimal format (A.B.C.D.).
rejected-sa	Enter the keywords `rejected-sa` to clear the cache source-active entries that are rejected because the RPF check failed, an SA filter or limit is configured, the RP or MSDP peer is unreachable, or because of a format error.
local	Enter the keyword `local` to clear out local PIM advertised entries. It applies the redistribute filter (if present) while adding the local PIM SA entries to the SA cache.

Defaults Without any options, this command clears the entire source-active cache.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
7.8.1.0	Added the `local` option.
7.7.1.0	Added the `rejected-sa` option.
6.2.1.1	Introduced

clear ip msdp statistic

Clears the entire source-active cache, the source-active entries of a particular multicast group, rejected, or local source-active entries.

Syntax `clear ip msdp statistic peer` *peer-address*

Parameters

peer	Enter the keyword `peer` to clear the MSDP peer entries.
peer-address	Enter the IP address of the MSDP peer.

Defaults Without any options, this command clears the entire source-active cache.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
7.8.1.0	Added the `local` option.
7.7.1.0	Added the `rejected-sa` option.
6.2.1.1	Introduced

ip msdp cache-rejected-sa

Enable an MSDP cache for the rejected source-active entries.

Syntax

`ip msdp cache-rejected-sa {number}`

To clear the MSDP rejected source-active entries, use the `no ip msdp cache-rejected-sa {number}` command then the `ip msdp cache-rejected-sa {number}` command.

Parameters

number Enter the number of rejected SA entries to cache. The range is from 0 to 32766.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.4.1.0	Introduced

Related Commands

- show ip msdp sa-cache rejected-sa — display the rejected SAs in the SA cache.

ip msdp default-peer

Define a default peer from which to accept all source-active (SA) messages.

Syntax

`ip msdp default-peer peer address [list name]`

To remove the default peer, use the `no ip msdp default-peer {peer address} list name` command.

Parameters

peer address Enter the peer address in a dotted decimal format (A.B.C.D.)

	list *name*	Enter the keywords `list name` and specify a standard access list that contains the RP address that should be treated as the default peer. If no access list is specified, then all SAs from the peer are accepted.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added the `list` option and removed the `prefix-list` option.
7.4.1.0	Introduced

Usage Information If a list is not specified, all SA messages received from the default peer are accepted. You can enter multiple `default peer` commands.

ip msdp log-adjacency-changes

Enable logging of MSDP adjacency changes.

Syntax `ip msdp log-adjacency-changes`

To disable logging, use the `no ip msdp log-adjacency-changes` command.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced

ip msdp mesh-group

To be a member of a mesh group, configure a peer.

Syntax

`ip msdp mesh-group {name} {peer address}`

To remove the peer from a mesh group, use the `no ip msdp mesh-group {name} {peer address}` command.

Parameters

name	Enter a string of up to 16 characters long for as the mesh group name.
peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced

Usage Information

An MSDP mesh group is a mechanism for reducing SA flooding, typically in an intra-domain setting. When some subset of a domain's MSDP speakers are fully meshed, they can be configured into a mesh-group. If member X of a mesh-group receives a SA message from an MSDP peer that is also a member of the mesh-group, member X accepts the SA message and forwards it to all of its peers that are not part of the mesh-group. However, member X cannot forward the SA message to other members of the mesh-group.

ip msdp originator-id

Configure the MSDP Originator ID.

Syntax

`ip msdp originator-id {`*`interface`*`}`

To remove the originator-id, use the `no ip msdp originator-id {`*`interface`*`}` command.

Parameters

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
6.2.1.1	Introduced

ip msdp peer

Configure an MSDP peer.

Syntax

`ip msdp peer` *`peer address`* `[connect-source] [description] [sa-limit` *`number`*`]`

To remove the MSDP peer, use the `no ip msdp peer` *`peer address`* `[connect-source interface] [description` *`name`*`] [sa-limit` *`number`*`]` command.

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).
connect-source *interface*	Enter the keywords `connect-source` then one of the interfaces and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
description name	(OPTIONAL) Enter the keyword *description* then a description name (maximum 80 characters) to designate a description for the MSDP peer.
sa-limit *number*	(OPTIONAL) Enter the maximum number of SA entries in SA-cache. The range is from 1 to 100000. .

Defaults See *Parameters* .

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
7.5.1.0	Added option for SA upper limit and the `description` option.
6.2.1.1	Introduced

Usage Information

The `connect-source` option is used to supply a source IP address for the TCP connection. When an interface is specified using the `connect-source` option, the primary configured address on the interface is used.

If the total number of SA messages received from the peer is already larger than the limit when this command is applied, those SA messages continue to be accepted. To enforce the limit in such situation, use the `clear ip msdp peer` command to reset the peer.

Related Commands

- ip msdp sa-limit — configure the MSDP SA Limit.
- clear ip msdp peer — clear the MSDP peer.
- show ip msdp — display the MSDP information.

ip msdp redistribute

Filter local PIM SA entries in the SA cache. SAs which the ACL denies time out and are not refreshed. Until they time out, they continue to reside in the MSDP SA cache.

Syntax

```
ip msdp redistribute [list acl-name]
```

Parameters

list *acl-name*	Enter the name of an extended ACL that contains permitted SAs. If you do not use this option, all local entries are blocked.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced

Usage Information

Modifications to the ACL do not have an immediate effect on the sa-cache.

To apply the redistribute filter to entries already present in the SA cache, use the `clear ip msdp sa-cache local` command.

ip msdp sa-filter

Permit or deny MSDP source active (SA) messages based on multicast source and/or group from the specified peer.

Syntax

`ip msdp sa-filter {in | out} peer-address list [access-list name]`

Remove this configuration using the `no ip msdp sa-filter {in | out} peer address list [access-list name]` command.

Parameters

in	Enter the keyword `in` to enable incoming SA filtering.
out	Enter the keyword `out` to enable outgoing SA filtering.
peer-address	Enter the peer address of the MSDP peer in a dotted decimal format (A.B.C.D.).
access-list name	Enter the name of an extended ACL that contains permitted SAs. If you do not use this option, all local entries are blocked.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the E-Series.

ip msdp sa-limit

Configure the upper limit of source-active (SA) entries in SA-cache.

Syntax `ip msdp sa-limit` *number*

To return to the default, use the `no ip msdp sa-limit` *number* command.

Parameters

number	Enter the maximum number of SA entries in SA-cache. The range is from 1 to 500000.

Defaults **50000**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.5.1.0	Introduced on the E-Series.

Usage Information

Dell EMC Networking OS counts the SA messages originated by itself and those messages received from the MSDP peers. When the total SA messages reach this limit, the subsequent SA messages are dropped (even if they pass RPF checking and policy checking).

If the total number of SA messages is already larger than the limit when this command is applied, those SA messages that are already in Dell EMC Networking OS continue to be accepted. To enforce the limit in such situation, use the `clear ip msdp sa-cache` command.

Related Commands

- ip msdp peer — configure the MSDP peer.
- clear ip msdp peer — clear the MSDP peer.
- show ip msdp — display the MSDP information.

ip msdp shutdown

Administratively shut down a configured MSDP peer.

Syntax `ip msdp shutdown {peer address}`

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced

ip multicast-msdp

Enable MSDP.

Syntax `ip multicast-msdp`

To exit MSDP, use the `no ip multicast-msdp` command.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced

show ip msdp

Display the MSDP peer status, SA cache, or peer summary.

Syntax `show ip msdp {peer peer address | sa-cache | summary}`

Parameters

peer *peer address*	Enter the keyword `peer` then the peer address in a dotted decimal format (A.B.C.D.).
sa-cache	Enter the keywords `sa-cache` to display the Source-Active cache.
summary	Enter the keyword `summary` to display an MSDP peer summary.

Defaults Not configured.

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced

Example

```
DellEMC# show ip msdp peer 100.1.1.1

Peer Addr: 100.1.1.1
  Local Addr: 100.1.1.2(639) Connect Source: none
  State: Established Up/Down Time: 00:00:08
  Timers: KeepAlive 60 sec, Hold time 75 sec
  SourceActive packet count (in/out): 0/0
  SAs learned from this peer: 0
  SA Filtering:
  Input (S,G) filter: none
  Output (S,G) filter: none
DellEMC#
```

Example (Sa-cache)

```
DellEMC# show ip msdp sa-cache
MSDP Source-Active Cache - 1 entries
GroupAddr  SourceAddr     RPAddr        LearnedFrom Expire UpTime
224.1.1.1  172.21.220.10  172.21.3.254  172.21.3.254 102  00:02:52
DellEMC#
```

Example (Summary)

```
DellEMC# show ip msdp summary
Peer Addr       Local Addr      State       Source    SA       Up/Down
  Description
5.5.5.32        6.6.6.32        Established  Lo 32     20      00:07:17
     Peer1
DellEMC#
```

show ip msdp sa-cache rejected-sa

Display the rejected SAs in the SA cache.

Syntax `show ip msdp sa-cache rejected-sa`

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
7.4.1.0	Introduced.

Example

```
DellEMC# show ip msdp sa-cache rejected-sa
MSDP Rejected SA Cache 200 rejected SAs received, cache-size 1000
UpTime   GroupAddr SourceAddr RPAddr    LearnedFrom Reason
00:00:13 225.1.2.1 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.2 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.3 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.4 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.5 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.6 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.7 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.8 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.9 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.10 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.11 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.11 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.12 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.13 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.14 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.15 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.16 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.17 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.18 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.19 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
```

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Multicast Listener Discovery Protocol

The Multicast Listener Discovery (MLD) protocol is used by IPv6 routers to discover multicast listeners on a directly attached link.

Similar to the Internet Group Management Protocol (IGMP), which handles multicast group memberships in IPv4 networks, MLD is used for multicast management on IPv6 networks.

Topics:

- clear ipv6 mld groups
- debug ipv6 mld
- ipv6 mld explicit-tracking
- ipv6 mld last-member-query-interval
- ipv6 mld query-interval
- ipv6 mld query-max-resp-time
- ipv6 mld version
- show ipv6 mld groups
- show ipv6 mld interface
- MLD Snooping

clear ipv6 mld groups

Clear entries from the group cache table.

Syntax `clear ipv6 mld [vrf vrf-name] groups [interface | group-address]`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF.
interface	Enter the following keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.
group-address	(OPTIONAL) Enter the group address in the following format: x:x:x:x::x. The :: notation specifies successive hexadecimal fields of zero.

Defaults None.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

debug ipv6 mld

Enable debugging on IPv6 MLD packets.

Syntax `debug ipv6 mld [vrf vrf-name] {group-address | interface}`

To turn off debugging, use the `no debug ipv6 mld {group-address | interface}` command.

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF.
group-address	(OPTIONAL) Enter the multicast group address in the x:x:x:x::x format. The :: notation specifies successive hexadecimal fields of zero.
interface	Enter the following keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld explicit-tracking

Enable MLD explicit tracking receivers.

Syntax `ipv6 mld explicit-tracking`

To disable explicit tracking, use the `no ipv6 mld explicit-tracking` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld last-member-query-interval

Change the MAX Response Time inserted into the Group-Specific Queries sent in response to a Leave Group messages. This interval is also the interval between Group-Specific Query messages.

Syntax `ipv6 mld last-member-query-interval {milliseconds}`

To return to the default, use the `no ipv6 mld last-member-query-interval {milliseconds}` command.

Parameters

milliseconds Enter the last member query interval in milliseconds. The range is from 100 to 65535.

Defaults 1000 milliseconds.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld query-interval

Change the transmission frequency of the MLD host.

Syntax `ipv6 mld query-interval [seconds]`

To return to the default interval, use the `no ipv6 mld query-interval` command.

Parameters

seconds Enter the interval in seconds. The range is from 1 to 18000.

Defaults 60 seconds.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld query-max-resp-time

Set the maximum query response time advertised in the general queries.

Syntax `ipv6 mld query-max-resp-time {seconds}`

To return to the default, use the `no ipv6 mld query-max-resp-time` command.

Parameters

seconds Enter the interval in seconds. The range is from 1 to 25.

Defaults 10 seconds.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld version

Configure the MLD version on the system.

Syntax `ipv6 mld version {1 | 2}`

Defaults MLD version 2

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F–ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Usage Information The `ipv6 mld version` command is applicable for MLD snooping-enabled interfaces.

Example The following is a sample configuration wherein MLD version 1 is selected on the system.

```
interface Vlan 61
 ip vrf forwarding red
  ipv6 address 61::9/64
 ipv6 ospf 2 area 0
 untagged TenGigabitEthernet 2/18
  ipv6 pim sparse-mode
 ipv6 mld version 1
 no shutdown
```

show ipv6 mld groups

View the configured MDL groups.

Syntax `show ipv6 mld [vrf vrf-name] groups [detail] [group-address] [interface interface [detail]]`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF.
group-address	Enter the group address for which you want to display information.
interface *interface*	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.
detail	View detailed group information.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Example

```
Dell#show ipv6 mld groups
Total Number of Groups: 1
MLD Connected Group Membership
Group Address    Interface    Mode     Uptime    Expires     Last
Reporter
 Ff08::12         Vlan 10     MLDv2   00:00:12  00:02:05     1::2
```

show ipv6 mld interface

View the configured MLD interfaces.

Syntax `show ipv6 mld [vrf vrf-name] interface [interface]`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF.
interface *interface*	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Updated the output to show both MLD versions 1 and 2.
9.11(3.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Example

```
DELL EMC# show ipv6 mld vrf red interface vlan 100
Vlan 100
  Inbound MLD access group is not set
  Internet address is 61::9/64
  MLD is up on the interface
  MLD query interval is 60 seconds
  MLD querier timeout is 0 seconds
  MLD max query response time is 10 seconds
  MLD last member query response interval is 1000 ms
  MLD immediate-leave is disabled
  MLD activity: 40 joins
  MLD querying router is fe80::211:33ff:fe44:7788
  MLD version is 1
```

MLD Snooping

MLD snooping allows the switch to examine the MLD packets and forwards the decision based on their content. You can configure MLD snooping in subnets that receive MLD queries from either MLD or the MLD snooping querier. MLD snooping limits the IPv6 multicast traffic at Layer 2 by configuring Layer 2 LAN ports and dynamically forwards the IPv6 multicast traffic to the ports that want to receive it. Hosts join IPv6 multicast groups either by sending an unsolicited MLD report or by sending an MLD report in response to a general query from an IPv6 multicast router (the switch forwards general queries from IPv6 multicast routers to all the ports in a VLAN). The switch snoops these reports and in response to a snooped MLD report, the switch creates an entry in its forwarding table for the VLAN on which the report was received. When the other hosts that are interested in this multicast traffic send MLD reports, the switch snoops their report and adds them to the existing forwarding table entry. The switch creates only one entry per VLAN in the forwarding table for each multicast group, for which it snoops an MLD report.

clear ipv6 mld snooping groups

Clear entries from the group cache table.

Syntax `clear ipv6 mld snooping groups [interface | group-address]`

Parameters

interface Enter the following keywords and slot/port or number information:
- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

group-address (OPTIONAL) Enter the group address in the following format: x:x:x:x::x. The :: notation specifies successive hexadecimal fields of zero.

Defaults None.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

debug ipv6 mld snooping

Enable debugging on IPv6 MLD snooping packets.

Syntax `debug ipv6 mld {group-address | interface}`

To turn off debugging, use the `no debug ipv6 mld {group-address | interface}` command.

Parameters

group-address (OPTIONAL) Enter the multicast group address in the x:x:x:x::x format. The :: notation specifies successive hexadecimal fields of zero.

interface Enter the following keywords and slot/port or number information:
- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld snooping

Enable MLD snooping on a VLAN.

Syntax `ipv6 mld snooping`

To disable MLD snooping, use the `no ipv6 mld snooping` command.

Defaults Enabled on all VLAN interfaces.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld snooping enable

Enable MLD snooping on the switch globally.

Syntax `ipv6 mld snooping enable`

To disable MLD snooping, use the `no ipv6 mld snooping enable` command.

Defaults Enabled on all VLAN interfaces.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld snooping explicit-tracking

Enable explicit MLD snooping tracking on an interface.

Syntax `ipv6 mld snooping explicit-tracking`

To disable MLD snooping explicit tracking, use the `no ipv6 mld snooping explicit-tracking` command.

Defaults Disabled.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld snooping mrouter

Configure a Layer 2 port as a multicast router port.

Syntax `ipv6 mld snooping mrouter interface {interface` *`interface`*`}`

Parameters

interface Enter the keyword `interface`to indicate the next-hop interface to the multicast router.

interface Enter one of the following keywords and the interface information:

- For a null interface, enter the keyword `null` then the slot/port information. The Null interface number is 0.
- For the Management interface on the stack-unit, enter the keyword `ManagementEthernet` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

ipv6 mld snooping querier

Enable the MLD querier processing for the VLAN interface.

Syntax `ipv6 mld snooping querier`

To disable the querier feature, use the `no ipv6 mld snooping querier` command.

Defaults Disabled

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

show ipv6 mld snooping groups

Display the IPv6 MLD snooping group information.

Syntax `show ipv6 mld snooping groups [group address] [summary] [interface interface [detail]]`

Parameters

group-address	(Optional) Enter the multicast group addresss in the X:X:X:X::X format. The :: notation specifies successive hexadecimal fields of zero.
summary	(OPTIONAL) Enter the keyword `summary` to display a summary of groups.
interface *interface*	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.
detail	View detailed group information.

Defaults None.

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Example

```
Dell EMC#show ipv6 mld snooping groups
Total Number of Groups: 1
Channel ::/ff0e::225:1:1:1, interface Vlan 10
  Uptime 11:24:49 , Last join time 00:00:15
  Expires in 00:01:54
  Ports : Po 1
Dell EMC#
```

show ipv6 mld snooping interface

View the configured MLD snooping interfaces.

Syntax `show ipv6 mld snooping interface [interface]`

Parameters

interface *interface*	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Updated the output to show both MLD versions 1 and 2.
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Example

```
DellEMC# show ipv6 mld snooping interface vlan 100
Vlan 100 is up, line protocol is up
  Interface address is fe80::211:33ff:fe44:7788/64
  MLD protocol processing disabled
  Current MLD snooping version is 1
  MLD snooping is enabled on this interface
  MLD snooping querier is disabled and is currently inactive
  MLD snooping last member query response interval is 1000 ms
  MLD snooping explicit tracking is disabled
```

show ipv6 mld snooping mrouter

Display information on the MLD snooping router.

Syntax `show ipv6 mld snooping mrouter [vlan]`

Parameters

VLAN	(OPTIONAL) Enter the keyword `VLAN` then the VLAN number to display the information on that specific VLAN. The VLAN range is from 1 to 4094.

Defaults None.

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, S3100, and C9010.

Example

```
Dell#show ipv6 mld snooping mrouter
Interface Ports (* - Dynamic)
Vlan 2 Gi 1/18
Dell#
```

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Multiple Spanning Tree Protocol (MSTP)

Multiple spanning tree protocol (MSTP), as implemented by the Dell EMC Networking OS, conforms to IEEE 802.1s.

This command supports the Dell EMC Networking OS.

Topics:

- debug spanning-tree mstp
- disable
- forward-delay
- hello-time
- max-age
- msti
- name
- port-channel path-cost custom
- protocol spanning-tree mstp
- revision
- show config
- show spanning-tree mst configuration
- show spanning-tree msti
- spanning-tree
- spanning-tree msti
- tc-flush-standard

debug spanning-tree mstp

Enable debugging of the multiple spanning tree protocol and view information on the protocol.

Syntax

`debug spanning-tree mstp [all | bpdu` *`interface`* `{in | out} | events]`

To disable debugging, enter **no debug spanning-tree** mstp

Parameters

all	(OPTIONAL) Enter the keyword all to debug `all` spanning tree operations.
bpdu `interface` {in | out}	(OPTIONAL) Enter the keyword `bpdu` to debug bridge protocol data units (BPDU). (OPTIONAL) Enter the interface keyword along with the type slot/port of the interface you want displayed. Type slot/port options are the following: • For a port channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

	Optionally, enter an `in` or `out` parameter with the optional interface: • For Receive, enter the keyword `in`. • For Transmit, enter the keyword `out`.
events	(OPTIONAL) Enter the keyword `events` to debug MSTP events.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC# debug spanning-tree mstp bpdu twentyFiveGigE 1/1 ?
in Receive (in)
out Transmit (out)
```

disable

Globally disable the multiple spanning tree protocol on the switch.

Syntax `disable`

To enable MSTP, enter the `no disable` command.

Defaults Disabled.

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Related Commands

- protocol spanning-tree mstp — enter MULTIPLE SPANNING TREE mode.

forward-delay

The amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.

Syntax `forward-delay seconds`

To return to the default setting, use the `no forward-delay` command.

Parameters

seconds	Enter the number of seconds the interface waits in the Blocking State and the Learning State before transiting to the Forwarding State. The range is from 4 to 30. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Related Commands

- max-age — change the wait time before MSTP refreshes protocol configuration information.
- hello-time — change the time interval between bridge protocol data units (BPDUs).

hello-time

Set the time interval between generation of MSTB bridge protocol data units (BPDUs).

Syntax

`hello-time` *seconds*

To return to the default value, use the `no hello-time` command.

Parameters

seconds	Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10. The default is **2 seconds**.

Defaults **2 seconds**

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Related Commands

- forward-delay — amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.
- max-age — change the wait time before MSTP refreshes protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the MSTB.

Syntax `max-age seconds`

To return to the default values, use the `no max-age` command.

Parameters

max-age	Enter a number of seconds the Dell EMC Networking OS waits before refreshing configuration information. The range is from 6 to 40. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
6.5.1.0	Introduced.

Related Commands

- forward-delay — amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.
- hello-time — change the time interval between BPDUs.

msti

Configure multiple spanning tree instance, bridge priority, and one or multiple VLANs mapped to the MST instance.

Syntax

`msti` *`instance`* {`vlan` *`range`* | `bridge-priority` *`priority`*}

To disable mapping or bridge priority, use the `no msti` *`instance`* {`vlan` *`range`* | `bridge-priority` *`priority`*} command.

Parameters

msti *instance*	Enter the MSTP instance. The range is from zero (0) to 63.
vlan *range*	Enter the keyword `vlan` then the identifier range value. The range is from 1 to 4094.
bridge-priority *priority*	Enter the keywords `bridge-priority` then a value in increments of 4096 as the bridge priority. The range is from zero (0) to 61440. Valid priority values are: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, and 61440. All other values are rejected.

Defaults default bridge-priority is **32768**.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Version	Description
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Usage Information By default, all VLANs are mapped to MST instance zero (0) unless you use the `vlan range` command to map it to a non-zero instance.

name

The name you assign to the multiple spanning tree region.

Syntax `name region-name`

To remove the region name, use the `no name` command.

Parameters

region-name Enter the MST region name. The range is 32 character limit.

Defaults No default name.

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Usage Information For two MSTP switches to be within the same MSTP region, the switches must share the same region name (including matching case).

Related Commands

- msti — map the VLAN(s) to an MST instance.
- revision — assign the revision number to the MST configuration.

port-channel path-cost custom

Sets the path cost to be constant for port-channel regardless of its operation status.

Syntax

```
port-channel path-cost custom
```

To change the path cost to comply with new IEEE standard behavior, use `no port-channel path-cost custom` command.

Defaults Disabled

Command Modes SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.1)	Introduced on MXL, FN IOM, S6000, S3100, S4810, S4820T, S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, S5048F-ON, C9010, and Z9100–ON,

Usage Information

This command is used to keep the port-channel path cost constant regardless of the operational status of the port-channel member ports.

This command is supported in all STP modes such as STP, RSTP, MSTP, and PVST.

The command behavior does not change when a new member port is added to the port-channel or an existing member port is deleted from the configuration. The path cost reflects the cumulative speed of the port-channel member ports.

Example

```
DELLEMC(conf)#protocol spanning-tree pvst
DELLEMC(conf-pvst)#port-channel path-cost custom
```

protocol spanning-tree mstp

To enable and configure the multiple spanning tree group, enter MULTIPLE SPANNING TREE mode.

Syntax

```
protocol spanning-tree mstp
```

To disable the multiple spanning tree group, use the `no protocol spanning-tree mstp` command.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information

MSTP is not enabled when you enter MULTIPLE SPANNING TREE mode. To enable MSTP globally on the switch, enter the `no disable` command while in MULTIPLE SPANNING TREE mode.

For more information about the multiple spanning tree protocol, refer to the *Dell EMC Networking OS Configuration Guide*.

Example

```
DellEMC(conf)# protocol spanning-tree mstp
DellEMC(config-mstp)#no disable
```

Related Commands

- disable — disable multiple spanning tree.

revision

The revision number for the multiple spanning tree configuration.

Syntax

`revision` *range*

To return to the default values, use the `no revision` command.

Parameters

range	Enter the revision number for the MST configuration. The range is from 0 to 65535. The default is **0**.

Defaults

0

Command Modes

MULTIPLE SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information For two MSTP switches to be within the same MST region, the switches must share the same revision number.

Related Commands
- msti — map the VLAN(s) to an MST instance.
- name — assign the region name to the MST region.

show config

View the current configuration for the mode. Only non-default values are shown.

Syntax `show config`

Command Modes MULTIPLE SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-mstp)# show config
!
protocol spanning-tree mstp
  no disable
  name CustomerSvc
  revision 2
  MSTI 10 VLAN 101-105
  max-hops 5
DellEMC(conf-mstp)#
```

show spanning-tree mst configuration

View the multiple spanning tree configuration.

Syntax `show spanning-tree mst configuration`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information Enable the multiple spanning tree protocol prior to using this command.

Example

```
DellEMC# show spanning-tree mst configuration
MST region name: CustomerSvc
Revision: 2
MSTI VID
  10 101-105
DellEMC#
```

show spanning-tree msti

View the multiple spanning tree instance.

Syntax `show spanning-tree msti [instance-number [brief]] [guard]`

Parameters

instance-number	(Optional) Enter the multiple spanning tree instance number. The range is from 0 to 63.
brief	(Optional) Enter the keyword `brief` to view a synopsis of the MST instance.
guard	(Optional) Enter the keyword `guard` to display the type of guard enabled on an MSTP interface and the current port state.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Support for the optional keyword `guard` was added on the C-Series, S-Series, and E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Expanded to display the port error disable state (EDS) loopback BPDU inconsistency causes.

Usage Information Enable the multiple spanning tree protocol prior to using this command.

Example

```
DellEMC# show spanning-tree msti 10
MSTI 10 VLANs mapped 101-105

Bridge Identifier has priority 32768, Address 0001.e802.3506
Configured hello time 2, max age 20, forward delay 15, max hops 5
Current root has priority 16384, Address 0001.e800.0a5c
Number of topology changes 0, last change occurred 3058087

Port 82 (twentyFiveGigE 1/1) is designated Forwarding
Port path cost 0, Port priority 128, Port Identifier 128.82
```

```
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 32768, address 0001.e802.35:06
Designated port id is 128.82, designated path cost
Number of transitions to forwarding state 1
BPDU (Mrecords): sent 1109, received 0
The port is not in the portfast mode

Port 88 (twentyFiveGigE 1/6) is root Forwarding
Port path cost 0, Port priority 128, Port Identifier 128.88
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 16384, address 0001.e800.0a:5c
Designated port id is 128.88, designated path cost
Number of transitions to forwarding state 4
BPDU (Mrecords): sent 19, received 1103
The port is not in the portfast mode

Port 89 (twentyFiveGigE 1/7) is alternate Discarding
Port path cost 0, Port priority 128, Port Identifier 128.89
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 16384, address 0001.e800.0a:5c
Designated port id is 128.89, designated path cost
Number of transitions to forwarding state 3
BPDU (Mrecords): sent 7, received 1103
The port is not in the portfast mode
```

Example (EDS and LBK)

The bold line shows the loopback BPDU inconsistency (LBK_INC).

```
DellEMC# show spanning-tree msti 0 brief
    MSTI 0 VLANs mapped 1-4094

Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max hops 20
Bridge ID Priority 32768, Address 0001.e801.6aa8
We are the root of MSTI 0 (CIST)
Configured hello time 2, max age 20, forward delay 15, max hops 20
CIST regional root ID Priority 32768, Address 0001.e801.6aa8
CIST external path cost 0

Interface                              Designated
Name      PortID   Prio Cost Sts Cost Bridge ID      PortID
-----------------------------------------------------------
Tf 1/1    128.257  128  20000 EDS 0 32768 0001.e801.6aa8 128.257

Interface
Name    Role  PortID Prio Cost Sts Cost Link-type Edge Boundary
-----------------------------------------------------------
Tf 1/1   ErrDis 128.257  128 20000 EDS 0   P2P       No   No

DellEMC# show spanning-tree msti 0
MSTI 0 VLANs mapped 1-4094

Root Identifier has priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max hops 20
Bridge Identifier has priority 32768, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15, max hops 20
We are the root of MSTI 0 (CIST)
Current root has priority 32768, Address 0001.e801.6aa8
CIST regional root ID Priority 32768, Address 0001.e801.6aa8
CIST external path cost 0
Number of topology changes 1, last change occured 00:00:15 ago on Tf 1/1

Port 257 (twentyFiveGigE 1/1) is LBK_INC Discarding
Port path cost 20000, Port priority 128, Port Identifier 128.257
Designated root has priority 32768, address 0001.e801.6aa8
Designated bridge has priority 32768, address 0001.e801.6aa8
Designated port id is 128.257, designated path cost 0
Number of transitions to forwarding state 1
BPDU (MRecords): sent 21, received 9
The port is not in the Edge port mode
```

Usage Information

The following describes the `show spanning-tree msti 5 guard` command shown in the following example.

Field	Description
Interface Name	MSTP interface.
Instance	MSTP instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Guard)

```
DellEMC# show spanning-tree msti 5 guard
Interface
Name       Instance  Sts Guard    type
-------------------------------------
Tf 1/1     5         INCON(Root)  Rootguard
Tf 1/2     5         FWD          Loopguard
Tf 1/3     5         EDS(Shut)    Bpduguard
```

spanning-tree

Enable the multiple spanning tree protocol on the interface.

Syntax

`spanning-tree`

To disable the multiple spanning tree protocol on the interface, use the `no spanning-tree` command.

Parameters

spanning-tree	Enter the keywords `spanning-tree` to enable the MSTP on the interface.

Defaults

Enable.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

spanning-tree msti

Configure multiple spanning tree instance cost and priority for an interface.

Syntax `spanning-tree msti` *instance* {`cost` *cost* | `priority` *priority*}

Parameters

msti *instance*	Enter the keyword `msti` and the MST instance number. The range is from zero (0) to 63.
cost *cost*	(OPTIONAL) Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. The defaults are: • 100 Mb/s Ethernet interface = **200000** • 1-Gigabit Ethernet interface = **20000** • 10-Gigabit Ethernet interface = **2000** • Port Channel interface with one 100 Mb/s Ethernet = **200000** • Port Channel interface with one 1 Gigabit Ethernet = **20000** • Port Channel interface with one 10 Gigabit Ethernet = **2000** • Port Channel with two 1 Gigabit Ethernet = **18000** • Port Channel with two 10 Gigabit Ethernet = **1800** • Port Channel with two 100 Mbps Ethernet = **180000**
priority *priority*	Enter keyword `priority` then a value in increments of 16 as the priority. The range is from 0 to 240. The default is **128**.

Defaults
- cost = depends on the interface type
- priority = **128**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

Syntax

`tc-flush-standard`

To disable, use the `no tc-flush-standard` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced

Usage Information

By default, Dell EMC Networking OS implements an optimized flush mechanism for MSTP. This mechanism helps in flushing the MAC addresses only when necessary (and less often) allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, this `knob` command can be turned on to enable flushing MAC addresses after receiving every topology change notification.

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Multicast

The multicast commands are supported by Dell EMC Networking OS.

Topics:

- IPv4 Multicast Commands

IPv4 Multicast Commands

The following section contains the IPv4 multicast commands.

clear ip mroute

Clear learned multicast routes on the multicast forwarding table. To clear the protocol-independent multicast (PIM) tree information base, use the `clear ip pim tib` command.

Syntax `clear ip mroute [vrf vrf-name] {group-address [source-address] | *}`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
***group-address* [*source-address*]**	Enter the multicast group address and source address (if desired), in dotted decimal format, to clear information on a specific group.
*	Enter * to clear all multicast routes.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.11.(3.0)	Removed support for keyword `snooping`.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Added support for keyword `snooping` on the Z9000, S4810, and S4820T.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- show ip pim tib — show the PIM tree information base.

ip mroute

Assign a static mroute.

Syntax

```
ip mroute [vrf vrf-name] destination mask {ip-address | null 0| {{bgp| ospf} process-id | isis | rip | static} {ip-address | tag | null 0}} [distance]
```

To delete a specific static mroute, use the `no ip mroute [vrf vrf-name] destination mask {ip-address | null 0| {{bgp| ospf} process-id | isis | rip | static} {ip-address | tag | null 0}} [distance]` command.

To delete all mroutes matching a certain mroute, use the `no ip mroute [vrf vrf-name] destination mask` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to assign a static mroute to that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
destination	Enter the IP address in dotted decimal format of the destination device.
mask	Enter the mask in slash prefix formation (`/x`) or in dotted decimal format.
null 0	(OPTIONAL) Enter the keyword `null` then zero (0).
[*protocol* [*process-id* | *tag*] *ip-address*]	(OPTIONAL) Enter one of the routing protocols: • Enter the BGP as-number then the IP address in dotted decimal format of the reverse path forwarding (RPF) neighbor. The range is from 1 to 65535. • Enter the OSPF process identification number then the IP address in dotted decimal format of the RPF neighbor. the range is from 1 to 65535. • Enter the IS-IS alphanumeric tag string then the IP address in dotted decimal format of the RPF neighbor. • Enter the RIP IP address in dotted decimal format of the RPF neighbor.
static *ip-address*	(OPTIONAL) Enter the Static IP address in dotted decimal format of the RPF neighbor.
ip-address	(OPTIONAL) Enter the IP address in dotted decimal format of the RPF neighbor.
distance	(OPTIONAL) Enter a number as the distance metric assigned to the mroute. The range is from 0 to 255.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
E-Series legacy command	

Related Commands

- show ip mroute — display the routing table.

ip multicast-limit

To limit the number of multicast entries on the system, use this feature.

Syntax `ip multicast-limit [vrf vrf-name] limit`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to limit the number of multicast on the VRF.
limit	Enter the desired maximum number of multicast entries on the system. The range is from 1 to 16000.

Defaults The default is 4000.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the E-Series.

Usage Information

This feature allows you to limit the number of multicast entries on the system. This number is the total of all the multicast entries on all line cards in the system. On each line card, the multicast module only installs the maximum number of entries, depending on the configured CAM profile.

To store multicast routes, use the IN-L3-McastFib CAM partition. It is a separate hardware limit that exists per port-pipe. This hardware space limitation can supersede any software-configured limit. The opposite is also true, the CAM partition might not be exhausted at the time the system-wide route limit set by the `ip multicast-limit` command is reached.

Related Commands

- show ip igmp groups — display the IGMP groups.

ip multicast-routing

Enable IP multicast forwarding.

Syntax

`ip multicast-routing [vrf vrf-name]`

To disable multicast forwarding, use the `no ip multicast-routing [vrf vrf-name]` command.

Defaults

Disabled.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to enable IP multicast forwarding on that VRF.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
E-Series legacy command	

Usage Information

After you enable multicast, you can enable IGMP and PIM on an interface. In INTERFACE mode, enter the `ip pim sparse-mode` command to enable IGMP and PIM on the interface.

Related Commands

- ip pim sparse-mode — enable IGMP and PIM on an interface.

mtrace

Trace a multicast route from the source to the receiver.

Syntax

`mtrace [vrf vrf-name] {source-address/hostname} [destination-address/hostname] [group-address/hostname]`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF. If VRF name is not mentioned, the default VRF will be used. Mtrace is not supported for management VRF.
source-address/hostname	Enter the source IP address in dotted decimal format (A.B.C.D). This is a unicast address of the beginning of the path to be traced.
destination-address/hostname	Enter the destination (receiver) IP address in dotted decimal format (A.B.C.D). If omitted, the mtrace starts from the system at which the command is typed.
group-address/hostnamae	Enter the multicast group address in dotted decimal format (A.B.C.D). If group address is not given then software shall invokes a weak mtrace. A weak mtrace is one that follows the RPF path to the source, regardless of whether any router along the path has multicast routing table state

Command Modes EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Re-introduced the mtrace command on the Dell EMC Networking OS.
7.5.1.0	Expanded to support originator.
7.4.1.0	Expanded to support the intermediate (transit) router.

Usage Information

Mtrace is an IGMP based protocol that provides a multicast trace route facility and is implemented according to the IETF draft “A *trace route* facility for IP Multicast” (draft-fenner-traceroute-ipm-01.txt). Dell EMC Networking OS supports the Mtrace client and transit functionality.

As an Mtrace client, Dell EMC Networking OS transmits Mtrace queries, receives, parses, and prints out the details in the response packet received.

A transit or intermediate router, forwards mtrace requests to the RPF neighbor after appending its response block to the packet. In case it is the first hop router, it sends a response.

As an Mtrace transit or intermediate router, Dell EMC Networking OS returns the response to Mtrace queries. After receiving the Mtrace request, Dell EMC Networking OS computes the RPF neighbor for the source, fills in the request and the forwards the request to the RPF neighbor.

Example

```
R1>mtrace 103.103.103.3 1.1.1.1 226.0.0.3
Type Ctrl-C to abort.
```

```
Querying reverse path for source 103.103.103.3 to destination 1.1.1.1
via group 226.0.0.3
From source (?) to destination (?)

-----------------------------------------------------------------
|Hop|    OIF IP     |Proto| Forwarding Code |Source Network/Mask|
-----------------------------------------------------------------
  0  1.1.1.1          -->    Destination
 -1  1.1.1.1          PIM   Reached RP/Core   103.103.103.0/24
 -2  101.101.101.102  PIM       -             103.103.103.0/24
 -3  2.2.2.1          PIM       -             103.103.103.0/24
 -4  103.103.103.3    -->    Source
-----------------------------------------------------------------
```

The mtrace command traverses the path of the response data block in the reverse direction of the multicast data traffic. The mtrace command traverses the reverse path to the source from the destination. As a result, the tabular output of the mtrace command displays the destination details in the first row, followed by the RPF router details along the path in the consequent rows, and finally the source details in the last row. The tabular output contains the following columns:

- Hop — a hop number(counted negatively to indicate reverse-path)
- OIF IP — outgoing interface address
- Proto — multicast routing protocol
- Forwarding code — error code as present in the response blocks
- Source Network/Mask — source mask

show ip multicast-cam

Display the content addressable memory (CAM) size and the portions allocated for IP multicast traffic.

Syntax `show ip multicast-cam linecard` *`slot-id`* `port-set` *`port-pipe`*

Parameters

linecard *slot-id*	Enter the keyword `linecard` with a slot number to select the line card for which to gather information. The range of Z9500 slot IDs is from 0 to 2.
port-set *port-pipe*	Enter the keyword `port-set` with a port-pipe number to select the port pipe for which to gather information. The range of port pipes is from 0 to 3.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
E-Series legacy command	

Example

```
DellEMC# show ip multicast-cam stack-unit 1 port 0
Vrf Id       Group Address     Source Address   Vlan Id     IPMC index     L2 Ports
L3 Ports
--------    ---------------   ---------------   -------    ------------   ------------
------------
0             224.1.1.1         0.0.0.0           1000      1              tf 1/3,
tf 1/10,
0             224.1.1.2         0.0.0.0           1000      1              tf 1/3,
tf 1/10,
0             224.1.1.1         165.13.34.5       2000      2              tf 1/5,
tf 1/11,
```

show ip mroute

View the multicast routing table.

Syntax

```
show ip mroute [vrf vrf-name] [static | group-address [source-address] |
count | snooping [vlan vlan-id] [group-address [source-address]] | summary
| vlt [group-address [source-address] | count]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
static	(OPTIONAL) Enter the keyword `static` to view static multicast routes.
***group-address* [*source-address*]**	(OPTIONAL) Enter the multicast group-address to view only routes associated with that group. Enter the source-address to view routes with that group-address and source-address.
count	(OPTIONAL) Enter the keyword `count` to view the number of multicast routes and packets.
snooping [vlan *vlan-id*] [*group-address* [*source-address*]]	Enter the keyword `snooping` to display information on the multicast routes PIM-SM snooping discovers. Enter a VLAN ID to limit the information displayed to the multicast routes PIM-SM snooping discovers on a specified VLAN. The VLAN ID range is from 1 to 4094. Enter a multicast group address and, optionally, a source multicast address in dotted decimal format (A.B.C.D) to limit the information displayed to the multicast routes PIM-SM snooping discovers for a specified multicast group and source.
summary	(OPTIONAL) Enter the keyword `summary` to view a summary of all routes.
vlt	(OPTIONAL) Enter the keyword `vlt` to view multicast routes with a spanned incoming interface. Enter a multicast group address in dotted decimal format (A.B.C.D) to limit the information displayed to the multicast routes for a specified multicast group and optionally a source multicast address in dotted decimal format (A.B.C.D) to limit the information displayed for a specified multicast source. Enter the keyword `count` to display the total number of multicast routes with the spanned IIF.

Command Modes

- EXEC

- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2.(0.0)	Added support for keyword `vlt` to the Z9000, S4810, and S4820T.
8.4.1.1	Support for the keyword `snooping` and the optional `vlan vlan-id`, `group-address`, and `source-address` parameters were added on E-Series.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example (Static)

```
DellEMC# show ip mroute static

Mroute: 23.23.23.0/24, interface: Lo 2
Protocol: static, distance: 0, route-map: none, last change: 00:00:23
```

Example (Snooping)

```
DellEMC# show ip mroute snooping

IPv4 Multicast Snooping Table

(*, 224.0.0.0), uptime 17:46:23
  Incoming vlan: Vlan 2
  Outgoing interface list:
    twentyFiveGigE 1/13

(*, 225.1.2.1), uptime 00:04:16
  Incoming vlan: Vlan 2
  Outgoing interface list:
    twentyFiveGigE 1/11
    twentyFiveGigE 1/13

(165.87.1.7, 225.1.2.1), uptime 00:03:17
  Incoming vlan: Vlan 2
  Outgoing interface list:
    twentyFiveGigE 1/11
    twentyFiveGigE 1/13
    twentyFiveGigE 1/20
```

Example (VLT)

```
DellEMC# show ip mroute vlt
IP Multicast Routing Table
Flags: S - Synced
(*, 225.1.1.1), uptime 00:39:33 flags: S
Incoming interface: Vlan 10
Spanned outgoing interface list:
 Vlan 20 (S)
Vlan 30

(50.1.1.2, 225.1.1.1), uptime 00:39:33 flags: S
Incoming interface: Vlan 10
Spanned outgoing interface list:
Vlan 20 (S)
```

Usage Information

The following describes the `show ip mroute` command shown in the following example.

Field	Description
(S, G)	Displays the forwarding entry in the multicast route table.
uptime	Displays the amount of time the entry has been in the multicast forwarding table.
Incoming interface	Displays the reverse path forwarding (RPF) information towards the source for (S,G) entries and the RP for (*,G) entries.
Outgoing interface list:	Lists the interfaces that meet one of the following: • a directly connected member of the Group • statically configured member of the Group • received a (*,G) or (S,G) Join message

Example

```
DellEMC# show ip mroute

IP Multicast Routing Table

(*, 224.10.10.1), uptime 00:05:12
  Incoming interface: twentyFiveGigE 1/12
  Outgoing interface list:
    twentyFiveGigE 1/13

(1.13.1.100, 224.10.10.1), uptime 00:04:03
  Incoming interface: twentyFiveGigE 1/4
  Outgoing interface list:
    twentyFiveGigE 1/12
    twentyFiveGigE 1/13

(*, 224.20.20.1), uptime 00:05:12
  Incoming interface: twentyFiveGigE 1/12
  Outgoing interface list:
    twentyFiveGigE 1/4
```

show ip rpf

View reverse path forwarding.

Syntax `show ip rpf`

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
E-Series legacy command	

Usage Information

Network administrators use static mroutes to control the reach-ability of the multicast sources. If a PIM-registered multicast source is reachable using static mroute as well as unicast route, the distance of each route is examined and the route with shorter distance is the one the PIM selects for reach-ability.

NOTE: The default distance of mroutes is zero (0) and is CLI configurable on a per route basis.

Example

```
DellEMC# show ip rpf
RPF information for 10.10.10.9
  RPF interface: Tf 1/4
  RPF neighbor: 165.87.31.4
  RPF route/mask: 10.10.10.9/255.255.255.255
  RPF type: unicast
```

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Neighbor Discovery Protocol (NDP)

The neighbor discovery protocol for IPv6 is defined in RFC 2461 as part of the Stateless Address Autoconfiguration protocol. It replaces the Address Resolution Protocol used with IPv4. NDP defines mechanisms for solving the following problems:

- Router discovery — hosts can locate routers residing on a link
- Prefix discovery — hosts can discover address prefixes for the link
- Parameter discovery
- Address autoconfiguration — configuration of addresses for an interface
- Address resolution — mapping from IP address to link-layer address
- Next-hop determination
- Neighbor unreachability detection (NUD) — determine that a neighbor is no longer reachable on the link.
- Duplicate address detection (DAD) — allow a node to check whether a proposed address is already in use.
- Redirect — the router can inform a node about a better first-hop.

NDP uses the following five ICMPv6 packet types in its implementation:

- Router Solicitation
- Router Advertisement
- Neighbor Solicitation
- Neighbor Advertisement
- Redirect

Topics:

- IPv6 Router Advertisement (RA) Guard

IPv6 Router Advertisement (RA) Guard

The IPv6 RA guard provides support to perform conditional forwarding or blocking of the router advertisement messages that are received at the network device platform. This functionality analyzes and filters the RAs sent by the devices and compares the configuration information on the layer 2 device with the RA frame. Once the layer 2 device validates the content of the RA frame against the configuration, it forwards the RA to its unicast or multicast destination. On failure to validate the RA frame content, the RA frame is dropped.

The IPv6 RA guard supports two different modes:

- Host mode — When a policy with device role as host is applied on an interface, all the RA packets are dropped without validation. You can also configure the host mode policy with VLAN option to drop the RA packets on that specific VLAN and port.
- Router mode — When a policy with device role as router is applied on an interface, all the RA packets are validated based on the configuration information in the policy. Similarly, you can also apply this mode over any specific VLAN and the validation is performed only for that particular VLAN RA packets.

To configure the IPv6 RA guard, use the following Dell EMC Networking OS commands.

clear ipv6 neighbors

Delete all entries in the IPv6 neighbor discovery cache or neighbors of a specific interface. Static entries are not removed using this command.

Syntax `clear ipv6 neighbors [vrf vrf-name] [ipv6-address | interface]`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to clear the neighbor corresponding to that VRF.

NOTE: If you do not specify this option, the neighbors in the default VRF are cleared.

ipv6-address Enter the IPv6 address of the neighbor in the x:x:x:x::x format to remove a specific IPv6 neighbor.

NOTE: The :: notation specifies successive hexadecimal fields of zero.

interface *interface* To remove all neighbor entries learned on a specific interface, enter the keyword `interface` then the interface type and slot/port or number information of the interface:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

debug ipv6 nd ra–guard

Enable debugging for IPv6 RA guard snooping information.

Syntax `debug ipv6 nd ra-guard [interface_type slot/port | count value]`

Parameters

interface_type slot/port	Enter the one of the following interfaces and slot/port information: • For a port channel interface, enter the keywords `port-channel` then a number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
count *value*	Enter the keyword `count` then the number of debug outputs. The range is from 1 to 65534. The default is infinity.

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

device–role

Specify the role of the device attached to the port.

Syntax `device-role {host | router}`

To reset the device role, use the `no device-role {host | router}` command.

Parameters

host	Enter the keyword `host` to set the device-role as host.
router	Enter the keyword `router` to set the device-role as router.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- ipv6 nd raguard policy policy-name — define the RA guard policy name and enter the RA guard policy configuration mode.
- ipv6 nd ra-guard enable — configure the RA guard related commands.

hop–limit

Enable the verification of the advertised hop count limit. If this command is not configured, the verification process is bypassed.

Syntax

```
hop-limit {maximum | minimum limit}
```

To reset the hop count limit, use the `no hop-limit {maximum | minimum limit}` command.

Parameters

maximum *limit*	Enter the keyword `maximum` then the hop limit value. The range is from 0 to 254.
minimum *limit*	Enter the keyword `minimum` then the hop limit value. The range is from 0 to 254.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the RA guard policy name and enter the RA guard policy configuration mode.

ipv6 nd ra–guard attach–policy

Apply the IPv6 RA guard to a specific interface.

Syntax

```
ipv6 nd ra-guard attach–policy policy-name [vlan [vlan 1, vlan 2, vlan 3.....]]
```

Parameters

policy *policy-name*	Enter the keyword `policy` then the policy name. The policy-name allows a maximum of **140** characters.
vlan *[vlan 1, vlan 2, vlan 3.....]*	Enter the keyword `vlan` then the VLAN range. The VLAN range is from 1 to 4094.

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- show ipv6 nd ra-guard policy — display the configuration applied on all the RA guard policies or a specific RA guard policy.

ipv6 nd ra–guard enable

Allow you to configure the RA guard related commands.

Syntax

```
ipv6 nd ra-guard enable
```

To disable the RA guard, use the `no ipv6 nd ra-guard enable` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

ipv6 nd ra–guard policy

Define the RA guard policy name and enter the RA guard policy list configuration mode.

Syntax `ipv6 nd ra-guard policy policy-name`

Parameters

policy *policy-name*	Enter the keyword `policy` then the policy-name. The policy name allows a maximum of **140** characters.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.

ipv6 neighbor

Configure a static entry in the IPv6 neighbor discovery.

Syntax

`ipv6 neighbor [vrf vrf-name] {ipv6-address} {interface interface} {hardware_address}`

To remove a static IPv6 entry from the IPv6 neighbor discovery, use the `no ipv6 neighbor [vrf vrf-name] {ipv6-address} {interface interface}` command.

Parameters

vrf *vrf-name* (Optional) Enter the keyword vrf followed by the name of the VRF to install IPv6 routes in that VRF.

ipv6-address Enter the IPv6 address of the neighbor in the x:x:x:x::x format.

NOTE: The :: notation specifies successive hexadecimal fields of zero.

interface *interface* Enter the keyword `interface` then the interface type and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a tunnel interface, enter the keyword `tunnel` then the tunnel interface number. The range is from 1 to 16383.

hardware_address Enter a 48-bit hardware MAC address in nn:nn:nn:nn:nn:nn format.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

Usage Information

Neighbor Discovery Protocol for IPv6 is defined in RFC 2461 as part of the Stateless Address Autoconfiguration protocol. It replaces the Address Resolution Protocol used with IPv4. It defines mechanisms for solving problems, such as:

- Router discovery: Hosts can locate routers residing on a link.
- Prefix discovery: Hosts can discover address prefixes for the link.
- Parameter discovery .
- Address autoconfiguration — configuration of addresses for an interface .
- Address resolution — mapping from IP address to link-layer address.
- Next-hop determination.
- Neighbor Unreachability Detection (NUD): Determine that a neighbor is no longer reachable on the link.
- Duplicate Address Detection (DAD): Allow a node to check whether a proposed address is already in use.
- Redirect: The router can inform a node about a better first-hop.

Use the ipv6 neighbor command to manually configure the IPv6 address of a neighbor to be discovered by the switch.

managed-config-flag

Set the managed address configuration flag.

Syntax

```
managed-config-flag {on | off}
```

To clear the flag, use the `no managed-config-flag {on | off}` command.

Parameters

on	Enter the keyword `on` to set the managed-config-flag value as ON.
off	Enter the keyword `off` to set the managed-config flag value as OFF.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

match ra

Enable verifying either of the configured source IPv6 address or prefix address or the source MAC address in the inspected messages. If this command is not configured, the verification process is bypassed.

Syntax

`match ra {ipv6-access-list` *`name`* `| ipv6-prefix-list` *`name`* `| mac-access-list` *`name`*`}`

To reset the access list, use the `no match ra{ipv6-access-list | ipv6-prefix-list | mac-access-list}` command.

Parameters

ipv6–access-list *name*	Enter the keywords `ipv6-access-list` then the access-list name. The access-list name allows a maximum of **140** characters.
ipv6–prefix-list *name*	Enter the keywords `ipv6-prefix-list` then the prefix-list name. The prefix-list name allows a maximum of **140** characters.
ipv6–mac-access-list *name*	Enter the keywords `ipv6-mac-access-list` then the mac-access-list name. The mac-access-list name allows a maximum of **140** characters.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the RA guard policy name and enter the RA guard policy configuration mode.

mtu

Enable the verification of the configured maximum transmission unit (MTU) value in the received RA packets.

Syntax `mtu value`

To reset the MTU value, use the `no mtu value` command.

Parameters

value	Enter the maximum transmission unit value in bytes. The range is from 1,280 to 11,982 bytes.

Defaults 0

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the RA guard policy name and enter the RA guard policy configuration mode.

other–config–flag

Enable the verification of the advertised other configuration parameter. If this command is not configured, the verification process is bypassed.

Syntax `other-config-flag {on | off}`

To reset the other configuration parameter, use the `no other-config-flag {on | off}` command.

Parameters

on	Enter the keyword `on` to set the other-config-flag value as ON.
off	Enter the keyword `off` to set the other-config flag value as OFF.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

reachable–time

Enable the verification of the configured reachability time in the received RA packets.

Syntax `reachable–time value`

To reset the advertised reachability time, use the `no reachable-time`*`value`* command.

Parameters

value Enter the advertised reachability time in milliseconds. The range is from 0 to 3,600,000 milliseconds.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the RA guard policy name and enter the RA guard policy configuration mode.

retrans-time

Enable the verification of the configured retransmission timer value in the received RA packets.

Syntax `retrans–timer value`

To reset the advertised retransmission interval, use the `no retrans-timervalue` command.

Parameters

value	Enter the advertised retransmission time interval in milliseconds. The range is from 100 to 4,294,967,295 milliseconds.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

ipv6 nd ra-guard enable — configure the RA guard related commands.

router–lifetime

Set the router lifetime.

Syntax `router–lifetime value`

Parameters

value	Enter the router lifetime in seconds. The range is from 0 to 9,000 seconds.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

router–preference maximum

Enable the verification of the advertised default router preference (DRP) value. The preference value is lower than or equal to the specified limit. If this command is not configured, the verification process is bypassed.

Syntax

```
router-preference maximum {high | low | medium}
```

To reset the default router preference value, use the `no router-preference maximum {high | low | medium}` command.

Parameters

high	Enter the keyword `high` to set the DRP value as high.
low	Enter the keyword `low` to set the DRP value as low.
medium	Enter the keyword `medium` to set the DRP value as medium.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000-ON, and Z9000 switches.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

show config

Display the RA guard policy mode configurations.

Syntax `show config`

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Example

```
DellEMC(conf)# ipv6 nd ra-guard policy test
DellEMC(conf-ra_guard_policy_list)#show config
!
ipv6 nd ra-guard policy test
 device-role router
 hop-limit maximum 251
 mtu 1350
 other-config-flag on
 reachable-time 540
 retrans-timer 101
 router-preference maximum medium
 trusted-port
DellEMC(conf-ra_guard_policy_list)#
```

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd ra-guard policy — define the RA guard policy name and enter the RA guard policy list configuration mode.
- device-role — specify the role of the device attached to the port.
- hop-limit — enable the verification of the advertised hop count limit.

- mtu — set the maximum transmission unit (MTU) value.
- other-config-flag — enable the verification of the advertised other configuration parameter.
- reachable-time — set the advertised reachability time.
- retrans-timer — set the advertised retransmission time.
- router-preference maximum — enable the verification of the advertised default router preference (DRP) value.
- trusted-port — apply the policy to trusted ports.

show ipv6 nd ra–guard policy

Display the configurations applied on all the RA guard policies or a specific RA guard policy.

Syntax `show ipv6 nd ra-guard policy policy-name`

Parameter

policy *policy-name*	Enter the keyword `policy` then the policy name. The policy name allows a maximum of **140** characters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, Introduced on the S6000–ON, and Z9000 switches.

Example

```
DellEMC# show ipv6 nd ra-guard policy test

ipv6 nd ra-guard policy test
  device-role router
  hop-limit maximum    1
  match  ra  ipv6-access-list  access
  other-config-flag on
  router-preference maximum medium
  trusted-port
  Interfaces :
  Tf 1/1
DellEMC#
```

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd ra-guard policy — define the RA guard policy name and enter the RA guard policy list configuration mode.

- device-role — specify the role of the device attached to the port.
- hop-limit — enable the verification of the advertised hop count limit.
- mtu — set the maximum transmission unit (MTU) value.
- other-config-flag — enable the verification of the advertised other configuration parameter.
- reachable-time — set the advertised reachability time.
- retrans-timer — set the advertised retransmission time.
- router-preference maximum — enable the verification of the advertised default router preference (DRP) value.
- trusted-port — apply the policy to trusted ports.
- ipv6 nd raguard attach-policy — apply the IPv6 RA guard to a specific interface.

show ipv6 neighbors

Display IPv6 discovery information. Entering the command without options shows all IPv6 neighbor addresses stored on the control processor (CP).

Syntax

```
show ipv6 neighbors [vrf vrf-name] [ipv6-address| interface interface]
```

Parameters

vrf *vrf-name*
(OPTIONAL) Enter the keyword vrf and the name of the VRF to display the neighbors corresponding to that VRF.
NOTE: If you do not specify this option, neighbors corresponding to the default VRF are displayed.

ipv6-address
Enter the IPv6 address of the neighbor in the x:x:x:x::x format.
NOTE: The :: notation specifies successive hexadecimal fields of zero.

interface *interface*
Enter the keyword `interface` then the interface type and slot/port or number information:
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Management interface, enter the keyword managementethernet followed by slot/port numbers.
- For a Port Channel interface, enter the keywords port-channel followed by a number.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults
None

Command Modes
- EXEC
- EXEC Privilege

Command History
This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.

Example

```
DellEMC# show ipv6 neighbors
IPv6 Address  Expires(min) Hardware Address State  Interface VLAN CPU
-------------------------------------------------------------------
100::1          0.03       00:00:00:00:00:22 DELAY  Tf 1/12   -    CP
fe80::200:ff:fe00:22 232   00:00:00:00:00:22 STALE  Tf 1/12   -    CP
500::1          0.60       00:01:e8:17:5c:af REACH  Tf 1/13   -    CP
fe80::200:ff:fe00:17 232   00:00:00:00:00:29 REACH  Tf 1/14   -    CP
900::1          0.60       00:01:e8:17:5c:b1 STALE  Po 23     -    CP
400::1          0.60       00:01:e8:17:5c:ae REACH  Tf 1/2    Vl 100 CP
DellEMC#
```

trusted–port

Allow bypassing the configured RA guard validation and forwards the RA packets received on the interface, which has the trusted port policy attached.

Syntax `trusted-port`

To reset the policy applied to the trusted port, use the `no trusted-port` command.

Defaults None

Command Modes POLICY LIST CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the C9010.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.9(0.0)	Introduced on the Z9500.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9000 switches.

Usage Information

Use this command to disable all the RA guard policies.

Related Commands

- ipv6 nd ra-guard enable — configure the RA guard related commands.
- ipv6 nd raguard policy policy-name — define the router advertisement (RA) guard policy name and enter the RA guard policy configuration mode.

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Object Tracking

Object Tracking supports IPv4 and IPv6, and is available on the Dell EMC Networking platforms.

Object tracking allows you to define objects of interest, monitor their state, and report to a client when a change in an object's state occurs. The following tracked objects are supported:

- Link status of Layer 2 interfaces
- Routing status of Layer 3 interfaces (IPv4 and IPv6)
- Reachability of IPv4 and IPv6 routes
- Metric thresholds of IPv4 and IPv6 routes

You can configure client applications, such virtual router redundancy protocol (VRRP), to receive a notification when the state of a tracked object changes.

Topics:

- IPv4 Object Tracking Commands
- IPv6 Object Tracking Commands

IPv4 Object Tracking Commands

The following section describes the IPv4 VRRP commands.

debug track

Enables debugging for tracked objects.

Syntax `debug track [all | notifications | object-id]`

Parameters

all	Enables debugging on the state and notifications of all tracked objects.
notifications	Enables debugging on the notifications of all tracked objects.
object-id	Enables debugging on the state and notifications of the specified tracked object. The range is 1 to 500.

Defaults Enable debugging on the state and notifications of all tracked objects (`debug track all`).

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Example

```
DellEMC# debug track all

04:35:04: %RPM0-P:RP2 %OTM-5-STATE: track 6 - Interface twentyFiveGigE
1/2
line-protocol DOWN

04:35:04: %RPM0-P:RP2 %OTM-5-NOTIF: VRRP notification: resource ID 6 DOWN
```

delay

Configure the time delay used before communicating a change in the status of a tracked object to clients.

Syntax `delay {[up seconds] [down seconds]}`

To return to the default setting, use the `no delay` command.

Parameters

seconds	Enter the number of seconds the object tracker waits before sending a notification about the change in the UP and/or DOWN state of a tracked object to clients. The range is 0 to 180. The default is **0 seconds**.

Defaults **0 seconds**

Command Modes OBJECT TRACKING (*conf_track_object-id*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information You can configure an UP and/or DOWN timer for each tracked object to set the time delay before a change in the state of a tracked object is communicated to clients. The configured time delay starts when the state changes from UP to DOWN or vice-versa.

If the state of an object changes back to its former UP/DOWN state before the timer expires, the timer is cancelled and the client is not notified. For example, if the DOWN timer is running when an interface goes down and comes back up, the DOWN timer is cancelled and the client is not notified of the event.

If the timer expires and an object's state has changed, a notification is sent to the client. If no delay is configured, a notification is sent immediately after a change in the state of a tracked object is detected. The time delay in communicating a state change is specified in seconds.

Related Commands

- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.
- track interface line-protocol – configure object tracking on the line-protocol state of a Layer 2 interface.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.
- track ip route reachability – configure object tracking on the reachability of an IPv4 route.

description

Enter a description of a tracked object.

Syntax `description {text}`

To remove the description, use the `no description {text}` command.

Parameters

text	Enter a description to identify a tracked object (80 characters maximum).

Defaults None

Command Modes OBJECT TRACKING (*conf_track_object-id*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Related Commands

- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.
- track interface line-protocol – configure object tracking on the line-protocol state of a Layer 2 interface.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.
- track ip route reachability – configure object tracking on the reachability of a specific IP address. Policy-based Routing uses the track command to track the next-hop ip address.

show running-config track

Display the current configuration of tracked objects.

Syntax `show running-config track [object-id]`

Parameters

object-id	(OPTIONAL) Display information on the specified tracked object. The range is 1 to 500.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Example

```
DellEMC# show running-config track

track 1 ip route 23.0.0.0/8 reachability

track 2 ipv6 route 2040::/64 metric threshold
delay down 3
delay up 5
threshold metric up 200

track 3 ipv6 route 2050::/64 reachability

track 4 interface twentyFiveGigE 1/2 ip routing

track 5 ip route 192.168.0.0/24 reachability vrf red

track resolution ip route isis 20
track resolution ip route ospf 10
```

Example (Object-id)

```
DellEMC# show running-config track 300

track 300 ip route 10.0.0.0/8 metric threshold
  delay down 3
  delay up 5
  threshold metric up 100
```

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.
- track interface line-protocol – configure object tracking on the line-protocol state of a Layer 2 interface.

- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.
- track ip route reachability – configure object tracking on the reachability of an IPv4 route.

show track

Display information about tracked objects, including configuration, current tracked state (UP or DOWN), and the clients which are tracking an object.

Syntax

```
show track [object-id [brief] | interface [brief] [vrf vrf-name] | ip route
[brief] [vrf vrf-name] | resolution | vrf vrf-name [brief] | brief]
```

Parameters

object-id	(OPTIONAL) Display information on the specified tracked object. The range is 1 to 500.
interface	(OPTIONAL) Display information on all tracked interfaces (Layer 2 and IPv4 Layer 3).
ip route	(OPTIONAL) Display information on all tracked IPv4 routes.
resolution	(OPTIONAL) Display information on the configured resolution values used to scale protocol-specific route metrics. The range is 0 to 255.
brief	(OPTIONAL) Display a single line summary of the tracking information for a specified object, object type, or all tracked objects.
vrf *vrf-name*	(OPTIONAL) E-Series only: Display information on only the tracked objects that are members of the specified VRF instance. The maximum is 32 characters. If you do not enter a VRF name, information on the tracked objects from all VRFs displays.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

The following describes the `show track` command shown in the Example below.

Output	Description
Track *object-id*	Displays the number of the tracked object.
Interface *type slot/port*, IP route *ip-address*, IPv6 route *ipv6-address*	Displays the interface type and slot/port number or address of the IPv4/IPv6 route that is being tracked.

Output	Description
***object* is Up/ Down**	Up/Down state of tracked object; for example, IPv4 interface, reachability or metric threshold of an IP route.
number* changes, last change *time	Number of times that the state of the tracked object has changed and the time since the last change in *hours:minutes:seconds*.
First hop interface	Displays the type and slot/port number of the first-hop interface of the tracked route.
Tracked by	Client that is tracking an object's state; for example, VRRP.

Example

```
DellEMC# show track

Track 1
  IP route 23.0.0.0/8 reachability
  Reachability is Down (route not in route table)
    2 changes, last change 00:16:08
  Tracked by:

Track 2
  IPv6 route 2040::/64 metric threshold
  Metric threshold is Up (STATIC/0/0)
    5 changes, last change 00:02:16
  Metric threshold down 255 up 254
  First-hop interface is twentyFiveGigE 1/2
  Tracked by:
    VRRP twentyFiveGigE 1/3 IPv6 VRID 1

Track 3
  IPv6 route 2050::/64 reachability
  Reachability is Up (STATIC)
    5 changes, last change 00:02:16
  First-hop interface is twentyFiveGigE 1/2
  Tracked by:
    VRRP twentyFiveGigE 1/3 IPv6 VRID 1
```

Usage Information

The following describes the `show track brief` command shown in the Example below.

Output	Description
ResID	Number of the tracked object.
Resource	Type of tracked object.
Parameter	Detailed description of the tracked object.
State	Up or Down state of the tracked object.
Last Change	Time since the last change in the state of the tracked object.

Example (Brief)

```
DellEMC> show track brief
ResId Resource               Parameter    State LastChange
1     IP route reachability   10.16.0.0/16 Up    00:01:08
2     Interface line-protocol Ethernet0/2  Down  00:05:00
3     Interface ip routing    VLAN100      Up    01:10:05
```

Related Commands

- show running-config track – display configuration information about tracked objects.
- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.
- track interface line-protocol – configure object tracking on the line-protocol state of a Layer 2 interface.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.
- track ip route reachability – configure object tracking on the reachability of an IPv4 route.

threshold metric

Configure the metric threshold used to determine the UP and/or DOWN state of a tracked IPv4 or IPv6 route.

Syntax

`threshold metric {up` *`number`* `| down` *`number`*`}`

To return to the default setting, use the `no threshold metric {up` *`number`* `| down` *`number`*`}` command.

Parameters

up *number*	Enter a number for the UP threshold to be applied to the scaled metric of an IPv4 or IPv6 route. The default UP threshold is **254**. The routing state is UP if the scaled route metric is less than or equal to the UP threshold.
down *number*	Enter a number for the DOWN threshold to be applied to the scaled metric of an IPv4 or IPv6 route. The default DOWN threshold is**255**. The routing state is DOWN if the scaled route metric is greater than or equal to the DOWN threshold.

Defaults

None

Command Modes

OBJECT TRACKING (conf_track_*object-id*)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to configure the UP and/or DOWN threshold for the scaled metric of a tracked IPv4 or IPv6 route.

Determine the UP/DOWN state of a tracked route by the threshold for the current value of the route metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client always considers a lower value to have priority over a higher value.

The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

Configure the UP and DOWN thresholds for each tracked route with the `threshold metric` command. The default UP threshold is 254; the default DOWN threshold is 255. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

The tracking process uses a protocol-specific resolution value to convert the actual metric in the routing table to a scaled metric in the range 0 to 255. You can configure the resolution value used to scale route metrics for supported protocols with the `track resolution ip route` and `track resolution ipv6 route` commands.

Related Commands

- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.
- track resolution ip route – configure the protocol-specific resolution value used to scale an IPv4 route metric.

track interface ip routing

Configure object tracking on the routing status of an IPv4 Layer 3 interface.

Syntax

`track object-id interface interface ip routing`

To return to the default setting, use the `no track object-id` command.

Parameters

object-id Enter the ID number of the tracked object. The range is 1 to 500.

interface Enter one of the following values:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a tunnel interface, enter the keyword `tunnel`.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added support for `tunnel` interface.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information Use this command to create an object that tracks the routing state of an IPv4 Layer 2 interface:

- The status of the IPv4 interface is UP only if the Layer 2 status of the interface is UP and the interface has a valid IP address.

- The Layer 3 status of an IPv4 interface goes DOWN when its Layer 2 status goes down (for a Layer 3 VLAN, all VLAN ports must be down) or the IP address is removed from the routing table.

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track interface line-protocol – configure object tracking on the line-protocol state of a Layer 2 interface.

track interface line-protocol

Configure object tracking on the line-protocol state of a Layer 2 interface.

Syntax

`track` *`object-id`* `interface` *`interface`* `line-protocol`

To return to the default setting, use the `no track` *`object-id`* command.

Parameters

object-id Enter the ID number of the tracked object. The range is 1 to 500.

interface Enter one of the following values:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a tunnel interface, enter the keyword `tunnel`.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information Use this command to create an object that tracks the line-protocol state of a Layer 2 interface by monitoring its operational status (UP or DOWN).

When the link-level status goes down, the tracked object status is considered to be DOWN; if the link-level status is up, the tracked object status is considered to be UP.

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.

track ip route metric threshold

Configure object tracking on the threshold of an IPv4 route metric.

Syntax

`track` *`object-id`* `ip route` *`ip-address/prefix-len`* `metric threshold [vrf` *`vrf-name`*`]`

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
ip-address/ prefix-len	Enter an IPv4 address in dotted decimal format. The valid IPv4 prefix lengths are from /0 to /32.
vrf *vrf-name*	(Optional) E-Series only: You can configure a VPN routing and forwarding (VRF) instance to specify the virtual routing table to which the tracked route belongs.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to create an object that tracks the UP and/or DOWN threshold of an IPv4 route metric. In order for a route's metric to be tracked, the route must appear as an entry in the routing table.

A tracked IPv4 route is considered to match an entry in the routing table only if the exact IPv4 address and prefix length match a table entry. For example, when configured as a tracked route, 10.0.0.0/24 does not match the routing table entry 10.0.0.0/8. If no route-table entry has the exact IPv4 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure the threshold of an IPv4 route metric as a tracked object, the UP/DOWN state of the tracked route is also determined by the current metric for the route in the routing table.

To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client

always considers a lower value to have priority over a higher value. The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

You configure the UP and DOWN thresholds for each tracked route by using the `threshold metric` command. The default UP threshold is **254**; the default DOWN threshold is **255**. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- threshold metric – configure the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- track resolution ip route – configure the protocol-specific resolution value used to scale an IPv4 route metric.

track ip route reachability

Configure object tracking on the reachability of an IPv4 route.

Syntax

`track` *`object-id`* `ip route` *`ip-address/prefix-len`* `reachability [vrf` *`vrf-name`*`]`

To return to the default setting, use the `no track` *`object-id`* command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
ip-address/ prefix-len	Enter an IPv4 address in dotted decimal format. The valid IPv4 prefix lengths are from /0 to /32.
vrf *vrf-name*	(Optional) E-Series only: You can configure a VPN routing and forwarding (VRF) instance to specify the virtual routing table to which the tracked route belongs.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to create an object that tracks the reachability of an IPv4 route. In order for a route's reachability to be tracked, the route must appear as an entry in the routing table.

A tracked IPv4 route is considered to match an entry in the routing table only if the exact IPv4 address and prefix length match a table entry. For example, when configured as a tracked route, 10.0.0.0/24 does not match the routing table entry 10.0.0.0/8. If no route-table entry has the exact IPv4 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure IPv4 route reachability as a tracked object, the UP/DOWN state of the tracked route is also determined by the entry of the next-hop address in the ARP cache. A tracked route is considered to be reachable if there is an ARP cache entry for the route's next-hop address.

If the next-hop address in the ARP cache ages out for a route tracked for its reachability, an attempt is made to regenerate the ARP cache entry to if the next-hop address appears before considering the route DOWN.

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.

track reachability refresh

Change the refresh interval for tracking the reachability of the next-hop. If the next-hop address in the ARP cache ages out for a route tracked for its reachability, an attempt is made to check if the next-hop address is reachable after a certain refresh interval before considering the route DOWN.

Syntax `track reachability refresh interval`

Parameters

interval	Enter the refresh interval, in seconds, for object tracking reachability. The range is from 0 to 60 seconds. The default is 60.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information To disable the attempt to track the reachability of next-hop after the configured refresh interval, set the refresh interval as 0.

Related Commands

- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.

track resolution ip route

Configure the protocol-specific resolution value used to scale an IPv4 route metric.

Syntax

```
track resolution ip route {isis resolution-value | ospf resolution-value}
```

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
isis *resolution-value*	Enter the resolution used to convert the metric in the routing table for ISIS routes to a scaled metric.
ospf *resolution-value*	Enter the resolution used to convert the metric in the routing table for OSPF routes to a scaled metric.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to configure the protocol-specific resolution value that converts the actual metric of an IPv4 route in the routing table to a scaled metric in the range 0 to 255.

The UP/DOWN state of a tracked IPv4 route is determined by a user-configurable threshold (the `threshold metric` command) for the route's metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible.

The protocol-specific resolution value calculates the scaled metric by dividing a route's cost by the resolution value set for the route protocol:

- For ISIS, you can set the resolution in the range 1 to 1000, where the default is **10**.
- For OSPF, you can set the resolution in the range 1 to 1592, where the default is **1**.
- The resolution value used to map static routes is not configurable. By default, Dell EMC Networking OS assigns a metric of **0** to static routes.
- The resolution value used to map RIP routes is not configurable. The RIP hop-count is automatically multiplied by 16 to scale it. For example, a RIP metric of 16 (unreachable) scales to 256, which considers the route to be DOWN.

Related Commands

- threshold metric – configure the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- track ip route metric threshold – configure object tracking on the threshold of an IPv4 route metric.

IPv6 Object Tracking Commands

The following section describes the IPv6 object tracking commands.

The following object tracking commands apply to IPv4 and IPv6:

- debug track
- delay
- description
- show running-config track
- threshold metric
- track interface line-protocol

show track ipv6 route

Display information about all tracked IPv6 routes, including configuration, current tracked state (UP or DOWN), and the clients which are tracking an object.

Syntax `show track ipv6 route [brief]`

Parameters

brief	(OPTIONAL) Display a single line summary of information for tracked IPv6 routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

The following describes the `show track ipv6 route` command shown in the Example below.

Output	Description
Track *object-id*	Displays the number of the tracked object.
Interface *type slot/port*, IP route *ip-address*, IPv6 route *ipv6-address*	Displays the interface type and slot/port number or address of the IPv4/IPv6 route that is being tracked.
***object* is Up/ Down**	Up/Down state of tracked object; for example, IPv4 interface, reachability or metric threshold of an IP route.
number* changes, last change *time	Number of times that the state of the tracked object has changed and the time since the last change in *hours:minutes:seconds*.

Output	Description
First hop interface	Displays the type and slot/port number of the first-hop interface of the tracked route.
Tracked by	Client that is tracking an object's state; for example, VRRP.

Example

```
DellEMC# show track ipv6 route

Track 2
  IPv6 route 2040::/64 metric threshold
  Metric threshold is Up (STATIC/0/0)
    5 changes, last change 00:02:30
  Metric threshold down 255 up 254
  First-hop interface is twentyFiveGigE 1/2
  Tracked by:
    VRRP twentyFiveGigE 1/4 IPv6 VRID 1

Track 3
  IPv6 route 2050::/64 reachability
  Reachability is Up (STATIC)
    5 changes, last change 00:02:30
  First-hop interface is twentyFiveGigE 1/2
  Tracked by:
    VRRP twentyFiveGigE 1/4 IPv6 VRID 1
```

Usage Command The following describes the show track ipv6 route brief command shown in the Example below.

Ouput	Description
ResID	Number of the tracked object.
Resource	Type of tracked object.
Parameter	Detailed description of the tracked object.
State	Up or Down state of the tracked object.
Last Change	Time since the last change in the state of the tracked object.

Example (Brief)

```
DellEMC# show track ipv6 route brief

ResId Resource                  Parameter State LastChange
2     IPv6 route metric threshold 2040::/64 Up 00:02:36
3     IPv6 route reachability     2050::/64 Up 00:02:36
```

Related Commands

- show running-config track – display configuration information about tracked objects.
- show track – display information about tracked objects, including configuration, current state, and clients which track the object.
- track interface ipv6 routing – configure object tracking on the routing status of an IPv6 Layer 3 interface.
- track ipv6 route metric threshold – configure object tracking on the threshold of an IPv6 route metric.
- track ipv6 route reachability – configure object tracking on the reachability of an IPv6 route.

track interface ipv6 routing

Configure object tracking on the routing status of an IPv6 Layer 3 interface.

Syntax `track object-id interface interface ipv6 routing`

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
interface	Enter one of the following values:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a tunnel interface, enter the keyword `tunnel`.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information Use this command to create an object that tracks the routing state of an IPv6 Layer 3 interface:

- The status of the IPv6 interface is UP only if the Layer 2 status of the interface is UP and the interface has a valid IP address.
- The Layer 3 status of an IPv6 interface goes DOWN when its Layer 2 status goes down (for a Layer 3 VLAN, all VLAN ports must be down) or the IP address is removed from the routing table.

Related Commands

- show track ipv6 route – display information about tracked IPv6 routes, including configuration, current state, and clients which track the route.
- track interface ip routing – configure object tracking on the routing status of an IPv4 Layer 3 interface.

track ipv6 route metric threshold

Configure object tracking on the threshold of an IPv4 route metric.

Syntax `track` *`object-id`* `ipv6 route` *`ipv6-address/prefix-len`* `metric threshold`

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
ipv6-address/ prefix-len	Enter an IPv6 address in X:X:X:X::X format. The valid IPv6 prefix lengths are from /0 to / 128.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to create an object that tracks the UP and/or DOWN threshold of an IPv6 route metric. In order for a route's metric to be tracked, the route must appear as an entry in the routing table.

A tracked IPv6 route is considered to match an entry in the routing table only if the exact IPv6 address and prefix length match a table entry. For example, when configured as a tracked route, 3333:100:200:300:400::/80 does not match routing table entry 3333:100:200:300::/64. If no route-table entry has the exact IPv6 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure the threshold of an IPv6 route metric as a tracked object, the UP/DOWN state of the tracked route is also determined by the current metric for the route in the routing table.

To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client always considers a lower value to have priority over a higher value. The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

You configure the UP and DOWN thresholds for each tracked IPv6 route by using the `threshold metric` command. The default UP threshold is **254**; the default DOWN threshold is **255**. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

Related Commands

- show track ipv6 route – display information about tracked IPv6 routes, including configuration, current state, and clients which track the route.
- threshold metric – configure the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- track resolution ipv6 route – configure the protocol-specific resolution value used to scale an IPv6 route metric.

track ipv6 route reachability

Configure object tracking on the reachability of an IPv6 route.

Syntax

```
track object-id ipv6 route ip-address/prefix-len reachability
```

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. The range is 1 to 500.
ipv6-address/ prefix-len	Enter an IPv6 address in X:X:X:X::X format. The valid IPv6 prefix lengths are from /0 to / 128.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to create an object that tracks the reachability of an IPv6 route. In order for a route's reachability to be tracked, the route must appear as an entry in the routing table.

A tracked route is considered to match an entry in the routing table only if the exact IPv6 address and prefix length match a table entry. For example, when configured as a tracked route, 3333:100:200:300:400::/80 does not match routing table entry 3333:100:200:300::/64. If no route-table entry has the exact IPv6 address and prefix length, the tracked route is considered to be DOWN.

When you configure IPv6 route reachability as a tracked object, the UP/DOWN state of the tracked route is also determined by the entry of the next-hop address in the ARP cache. A tracked route is considered to be reachable if there is an ARP cache entry for the route's next-hop address.

If the next-hop address in the ARP cache ages out for a route tracked for its reachability, an attempt is made to regenerate the ARP cache entry to if the next-hop address appears before considering the route DOWN.

Related Commands

- show track ipv6 route – display information about tracked IPv6 routes, including configuration, current state, and clients which track the route.
- track ipv6 route reachability – configure object tracking on the reachability of an IPv4 route.

track resolution ipv6 route

Configure the protocol-specific resolution value used to scale an IPv6 route metric.

Syntax

```
track resolution ipv6 route {isis resolution-value | ospf resolution-value}
```

To return to the default setting, use the `no track object-id` command.

Parameters

object-id	Enter the ID number of the tracked object. Use the range to 1 to 500.
isis *resolution-value*	Enter the resolution used to convert the metric in the routing table for ISIS routes to a scaled metric.
ospf *resolution-value*	Enter the resolution used to convert the metric in the routing table for OSPF routes to a scaled metric.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
8.3.12.0	Introduced on the S4810.
8.4.1.0	Introduced.

Usage Information

Use this command to configure the protocol-specific resolution value that converts the actual metric of an IPv6 route in the routing table to a scaled metric in the range 0 to 255.

The UP/DOWN state of a tracked IPv6 route is determined by the user-configurable threshold (the `threshold metric` command) for a route's metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible.

The protocol-specific resolution value calculates the scaled metric by dividing a route's cost by the resolution value set for the route protocol:

- For ISIS, you can set the resolution in the range 1 to 1000, where the default is 10.
- For OSPF, you can set the resolution in the range 1 to 1592, where the default is 1.
- The resolution value used to map static routes is not configurable. By default, Dell EMC Networking OS assigns a metric of 0 to static routes.
- The resolution value used to map RIP routes is not configurable. The RIP hop-count is automatically multiplied by 16 to scale it. For example, a RIP metric of 16 (unreachable) scales to 256, which considers the route to be DOWN.

Related Commands

- threshold metric – configure the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- track ipv6 route metric threshold – configure object tracking on the threshold of an IPv6 route metric.

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Open Shortest Path First (OSPFv2 and OSPFv3)

Open Shortest Path First version 2 for IPv4 is supported on platform.

OSPF is an interior gateway protocol (IGP), which means that it distributes routing information between routers in a single autonomous system (AS). OSPF is also a link-state protocol in which all routers contain forwarding tables derived from information about their links to their neighbors.

The fundamental mechanisms of OSPF (flooding, DR election, area support, SPF calculations, and so on) are the same for OSPFv2 and OSPFv3. OSPFv3 runs on a per-link basis instead of on a per-IP-subnet basis.

The Dell EMC Networking OS versions 9.4(0.0) and 9.7(0.0) introduce support for VRF on OSPFv2 and OSPFv3 respectively. The multi-process OSPF feature supported on Dell EMC Networking OS version 7.8.1.0 is modified. In earlier versions, multiple OSPF processes were created without VRF (prior to 9.4(0.0)). In the Dell EMC Networking OS versions 9.4(0.0) and 9.7(0.0) (for OSPFv3), multiple OSPF processes can be created on a router, but with only one OSPF process per VRF. However, there can be one OSFPv2 and one OSPFv3 on the same VRF.

This section is divided into two sections. There is no overlap between the two sets of commands. You cannot use an OSPFv2 command in the IPv6 OSPFv3 mode. OSPFv2 is supported on IPv4 tunnels only and OSPFv3 is supported on IPv6 tunnels only.

Topics:

- OSPFv2 Commands
- OSPFv3 Commands

OSPFv2 Commands

The Dell EMC Networking implementation of OSPFv2 is based on IETF RFC 2328. .

area default-cost

Set the metric for the summary default route the area border router (ABR) generates into the stub area. Use this command on the border routers at the edge of a stub area.

Syntax

`area area-id default-cost cost`

To return default values, use the `no area area-id default-cost` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
cost	Specifies the stub area's advertised external route metric. The range is from zero (0) to 65535.

Defaults

cost = **1**; no areas are configured.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information In the Dell EMC Networking operating software (OS), `cost` is defined as reference bandwidth/ bandwidth.

Related Commands

- area stub — create a stub area.

area nssa

Specify an area as a not so stubby area (NSSA).

Syntax

```
area area-id nssa [default-information-originate] [no-redistribution] [no-summary]
```

To delete an NSSA, use the `no area area-id nssa` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
no-redistribution	(OPTIONAL) Specify that the `redistribute` command does not distribute routes into the NSSA. This command can be used when the router is an autonomous system boundary router (ASBR) or area border router (ABR).
default-information-originate	(OPTIONAL) Allows external routing information to be imported into the NSSA by using Type 7 default.
no-summary	(OPTIONAL) Specify that no summary LSAs should be sent into the NSSA.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Introduced on the remaining DNOS platforms.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

area range

Summarize routes matching an address/mask at an area border router (ABR).

Syntax

`area area-id range ip-address mask [not-advertise]`

To disable route summarization, use the `no area area-id range ip-address mask` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
ip-address	Specify an IP address in dotted decimal format.
mask	Specify a mask for the destination prefix. Enter the full mask (for example, 255.255.255.0).
not-advertise	(OPTIONAL) Enter the keywords `not-advertise` to set the status to DoNotAdvertise (that is, the Type 3 summary-LSA is suppressed and the component networks remain hidden from other areas.)

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information Only the routes within an area are summarized, and that summary is advertised to other areas by the ABR. External routes are not summarized.

Related Commands
- area stub — create a stub area.
- router ospf — enter ROUTER OSPF mode to configure an OSPF instance.

area stub

Configure a stub area, which is an area not connected to other areas.

Syntax `area area-id stub [no-summary]`

To delete a stub area, use the `no area area-id stub` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
no-summary	(OPTIONAL) Enter the keywords `no-summary` to prevent the ABR from sending summary Link State Advertisements (LSAs) into the stub area.

Defaults Disabled.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information To configure all routers and access servers within a stub, use this command.

Related Commands

- router ospf — enter ROUTER OSPF mode to configure an OSPF instance.

auto-cost

Specify how the OSPF interface cost is calculated based on the reference bandwidth method.

Syntax `auto-cost [reference-bandwidth ref-bw]`

To return to the default bandwidth or to assign cost based on the interface type, use the `no auto-cost [reference-bandwidth]` command.

Parameters

ref-bw	(OPTIONAL) Specify a reference bandwidth in megabits per second. The range is from 1 to 4294967. The default is **100 megabits per second**.

Defaults **100 megabits per second**.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

clear ip ospf

Clear all OSPF routing tables.

Syntax `clear ip ospf process-id [vrf vrf-name] [process]`

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to clear all OSPF routing tables corresponding to that VRF.
process	(OPTIONAL) Enter the keyword `process` to reset the OSPF process.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

clear ip ospf statistics

Clear the packet statistics in interfaces and neighbors.

Syntax `clear ip ospf [process-id] [vrf vrf-name] statistics [interface name {neighbor router-id}]`

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to clear all OSPF routing tables corresponding to that VRF.
statistics	Enter the keyword statistics to clear the packet statistics in interfaces and neighbors.
interface *name*	(OPTIONAL) Enter the keyword `interface` then one of the following interface keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For Port Channel groups, enter the keywords `port-channel` then a number.
neighbor *router-id*	(OPTIONAL) Enter the keyword `neighbor` then the neighbor's router-id in dotted decimal format (A.B.C.D.).

Defaults None

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

debug ip ospf

Display debug information on OSPF. Entering the `debug ip ospf` commands enables OSPF debugging for the first OSPF process.

Syntax

```
debug ip ospf [process-id] [vrf vrf-name] [bfd |event | packet | spf | database-timer rate-limit]
```

To cancel the debug command, use the `no debug ip ospf` command.

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` to view debugging information on OSPF corresponding to that VRF.
bfd	(OPTIONAL) Enter the keyword `bfd` to debug only OSPF BFD information.
event	(OPTIONAL) Enter the keyword `event` to debug only OSPF event information.
packet	(OPTIONAL) Enter the keyword `packet` to debug only OSPF packet information.
spf	(OPTIONAL) Enter the keyword `spf` to display the Shortest Path First information.
database-timer rate-limit	(OPTIONAL) Enter the keywords `database-timer rate-limit` to display the LSA throttling timer information. This applies to the S4810 platform only.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.4(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Added the `database-timer rate-limit` option for the S4810.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `debug ip ospf` command shown in the Example below.

Field	Description
8:14	Displays the time stamp.
OSPF	Displays the OSPF process ID: instance ID.
v:	Displays the OSPF version. Dell EMC Networking OS supports version 2 only.
t:	Displays the type of packet sent: ● 1 - Hello packet ● 2 - database description ● 3 - link state request ● 4 - link state update ● 5 - link state acknowledgement
l:	Displays the packet length.
rid:	Displays the OSPF router ID.
aid:	Displays the Autonomous System ID.
chk:	Displays the OSPF checksum.
aut:	States if OSPF authentication is configured. One of the following is listed: ● 0 - no authentication configured ● 1 - simple authentication configured using the `ip ospf authentication-key` command ● 2 - MD5 authentication configured using the `ip ospf message-digest-key` command
auk:	If the `ip ospf authentication-key` command is configured, this field displays the key used.
keyid:	If the `ip ospf message-digest-key` command is configured, this field displays the MD5 key
to:	Displays the interface to which the packet is intended.

Field	Description
dst:	Displays the destination IP address.
netmask:	Displays the destination IP address mask.
pri:	Displays the OSPF priority
N, MC, E, T	Displays information available in the Options field of the HELLO packet: • N + (N-bit is set) • N - (N-bit is not set) • MC+ (bit used by MOSPF is set and router is able to forward IP multicast packets) • MC- (bit used by MOSPF is not set and router cannot forward IP multicast packets) • E + (router is able to accept AS External LSAs) • E - (router cannot accept AS External LSAs) • T + (router can support TOS) • T - (router cannot support TOS)
hi:	Displays the amount of time configured for the HELLO interval.
di:	Displays the amount of time configured for the DEAD interval.
dr:	Displays the IP address of the designated router.
bdr:	Displays the IP address of the Border Area Router.

Example

```
DellEMC# debug ip ospf 1 packet
OSPF process 90, packet debugging is on

DellEMC#
08:14:24 : OSPF(100:00):
Xmt. v:2 t:1(HELLO) l:44 rid:192.1.1.1
   aid:0.0.0.1 chk:0xa098 aut:0 auk: keyid:0 to:Tf 1/1 dst:224.0.0.5
      netmask:255.255.255.0 pri:1 N-, MC-, E+, T-,
      hi:10 di:40 dr:90.1.1.1 bdr:0.0.0.0
```

default-information originate

To generate a default external route into an OSPF routing domain, configure Dell EMC Networking Operating System (OS).

Syntax `default-information originate [always] [metric metric-value] [metric-type type-value] [route-map map-name]`

To return to the default values, use the `no default-information originate` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to specify that default route information must always be advertised.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number to configure a metric value for the route. The range is from 1 to 16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then an OSPF link state type of 1 or 2 for default routes. The values are: • 1 = Type 1 external route • 2 = Type 2 external route
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of an established route map.

Defaults Disabled.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Related Commands

- redistribute — redistributes routes from other routing protocols into OSPF.

default-metric

Change the metrics of redistributed routes to a value useful to OSPF. Use this command with the `redistribute` command.

Syntax

`default-metric` *number*

To return to the default values, use the `no default-metric [number]` command.

Parameters

number	Enter a number as the metric. The range is from 1 to 16777214.

Defaults

Disabled.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

description

Add a description about the selected OSPF configuration.

Syntax `description` *description*

To remove the OSPF description, use the `no description` command.

Parameters

description	Enter a text string description to identify the OSPF configuration (80 characters maximum).

Defaults None

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Related Commands

- show ip ospf asbr — display the VLAN configuration.

distance

Define an administrative distance for particular routes to a specific IP address.

Syntax

`distance weight [ip-address mask access-list-name]`

To delete the settings, use the `no distance weight [ip-address mask access-list-name]` command.

Parameters

weight	Specify an administrative distance. The range is from 1 to 255. The default is **110**.
ip-address	(OPTIONAL) Enter a router ID in the dotted decimal format. If you enter a router ID, include the mask for that router address.
mask	(OPTIONAL) Enter a mask in dotted decimal format or /n format.
access-list-name	(OPTIONAL) Enter the name of an IP standard access list, up to 140 characters.

Defaults **110**

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

distance ospf

Configure an OSPF distance metric for different types of routes.

Syntax

`distance ospf [external dist3] [inter-area dist2] [intra-area dist1]`

To delete these settings, use the `no distance ospf` command.

Parameters

external *dist3*	(OPTIONAL) Enter the keyword `external` then a number to specify a distance for external type 5 and 7 routes. The range is from 1 to 255. The default is **110**.
inter-area *dist2*	(OPTIONAL) Enter the keywords `inter-area` then a number to specify a distance metric for routes between areas. The range is from 1 to 255. The default is **110**.
intra-area *dist1*	(OPTIONAL) Enter the keywords `intra-area` then a number to specify a distance metric for all routes within an area. The range is from 1 to 255. The default is **110**.

Defaults

- external *dist3* = **110**
- inter-area *dist2* = **110**
- intra-area *dist1* = **110**

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information To specify a distance for routes learned from other routing domains, use the `redistribute` command.

distribute-list in

Apply a filter to incoming routing updates from OSPF to the routing table.

Syntax `distribute-list` *`prefix-list-name`* `in [`*`interface`*`]`

To delete a filter, use the `no distribute-list` *`prefix-list-name`* `in [`*`interface`*`]` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For Port Channel groups, enter the keywords `port-channel` then a number. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

distribute-list out

To restrict certain routes destined for the local routing table after the SPF calculation, apply a filter.

Syntax

`distribute-list` *`prefix-list-name`* `out [bgp | connected | isis | rip | static]`

To remove a filter, use the `no distribute-list` *`prefix-list-name`* `out [bgp | connected | isis | rip | static]` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
bgp	(OPTIONAL) Enter the keyword `bgp` to specify that BGP routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
connected	(OPTIONAL) Enter the keyword `connected` to specify that connected routes are distributed.
isis	(OPTIONAL) Enter the keyword `isis` to specify that IS-IS routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
rip	(OPTIONAL) Enter the keyword `rip` to specify that RIP routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
static	(OPTIONAL) Enter the keyword `static` to specify that only manually configured routes are distributed.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for the Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information The `distribute-list out` command applies to routes autonomous system boundary routers (ASBRs) redistributes into OSPF. It can be applied to external type 2 and external type 1 routes, but not to intra-area and inter-area routes.

fast-convergence

This command sets the minimum LSA origination and arrival times to zero (0), allowing more rapid route computation so that convergence takes less time.

Syntax `fast-convergence {number}`

To cancel fast-convergence, use the `no fast convergence` command.

Parameters

number	Enter the convergence level desired. The higher this parameter is set, the faster OSPF converge takes place. The range is from 1 to 4.

Defaults None.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on all platforms.

Usage Information

The higher this parameter is set, the faster OSPF converge takes place.

NOTE: The faster the convergence, the more frequent the route calculations and updates. This behavior impacts CPU utilization and may impact adjacency stability in larger topologies.

Generally, convergence level 1 meets most convergence requirements. Higher convergence levels should only be selected following consultation with Dell EMC Networking technical support.

graceful-restart grace-period

Specifies the time duration, in seconds, that the router's neighbors continue to advertise the router as fully adjacent regardless of the synchronization state during a graceful restart.

NOTE: This command enables OSPFv2 graceful restart globally by setting the grace period (in seconds) that an OSPFv2 router's neighbors continues to advertise the router as adjacent during a graceful restart.

Syntax

`graceful-restart grace-period` *seconds*

To disable the grace period, use the `no graceful-restart grace-period` command.

Parameters

seconds	Time duration, in seconds, that specifies the duration of the restart process before OSPF terminates the process. The range is from 40 to 1800 seconds.

Defaults

Not Configured

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series. Added support for Multi-Process OSPF.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information The Helper mode is enabled by default on the device. To enable the restart mode also on the device, you must configure the grace period using this command. After you enable restart mode the router advertises the neighbor as fully adjacent during a restart.

graceful-restart helper-reject

Specify the OSPF router to not act as a helper during graceful restart.

Syntax `graceful-restart helper-reject` *ip-address*

To return to default value, use the `no graceful-restart helper-reject` command.

Parameters

ip-address	Enter the OSPF router-id, in IP address format, of the restart router that *will not* act as a helper during graceful restart.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.

Version	Description
7.8.1.0	`Restart role` enabled on the S-Series (Both `Helper` and `Restart` roles now supported on S-Series). Added support for Multi-Process OSPF.
7.7.1.0	Added `Helper-Role` support on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

graceful-restart mode

Enable the graceful restart mode.

Syntax `graceful-restart mode [planned-only | unplanned-only]`

To disable graceful restart mode, use the `no graceful-restart mode` command.

Parameters

planned-only	(OPTIONAL) Enter the keywords `planned-only` to indicate graceful restart is supported in a planned restart condition only.
unplanned-only	(OPTIONAL) Enter the keywords `unplanned-only` to indicate graceful restart is supported in an unplanned restart condition only.

Defaults Support for both planned and unplanned failures.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

graceful-restart role

Specify the role for your OSPF router during graceful restart.

Syntax

```
graceful-restart role [helper-only | restart-only]
```

To disable graceful restart role, use the `no graceful-restart role` command.

Parameters

role helper-only (OPTIONAL) Enter the keywords `helper-only` to specify the OSPF router is a helper only during graceful restart.

role restart-only (OPTIONAL) Enter the keywords `restart-only` to specify the OSPF router is a restart only during graceful-restart.

Defaults By default, OSPF routers are both helper and restart routers during a graceful restart.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF. Added `Restart` and `Helper` roles support on the S-Series.
7.7.1.0	Added `Helper-Role` support on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

ip ospf auth-change-wait-time

OSPF provides a grace period while OSPF changes its interface authentication type. During the grace period, OSPF sends out packets with new and old authentication scheme until the grace period expires.

Syntax

```
ip ospf auth-change-wait-time seconds
```

To return to the default, use the `no ip ospf auth-change-wait-time` command.

Parameters

seconds	Enter the seconds. The range is from 0 to 300.

Defaults **zero (0) seconds**.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

ip ospf authentication-key

Enable authentication and set an authentication key on OSPF traffic on an interface.

Syntax `ip ospf authentication-key [encryption-type] key`

To delete an authentication key, use the `no ip ospf authentication-key` command.

Parameters

encryption-type	(OPTIONAL) Enter 7 to encrypt the key.
key	Enter an eight-character string. Strings longer than eight characters are truncated.

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information All neighboring routers in the same network must use the same password to exchange OSPF information.

ip ospf cost

Change the cost associated with the OSPF traffic on an interface.

Syntax `ip ospf cost cost`

To return to default value, use the `no ip ospf cost` command.

Parameters

cost	Enter a number as the cost. The range is from 1 to 65535.

Defaults The default cost is based on the reference bandwidth.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

If this command is not configured, cost is based on the `auto-cost` command.

When you configure OSPF over multiple vendors, to ensure that all routers use the same cost, use the `ip ospf cost` command. Otherwise, OSPF routes improperly.

Related Commands

- auto-cost — control how the OSPF interface cost is calculated.

ip ospf dead-interval

Set the time interval since the last hello-packet was received from a router. After the interval elapses, the neighboring routers declare the router dead.

Syntax

`ip ospf dead-interval` *seconds*

To return to the default values, use the `no ip ospf dead-interval` command.

Parameters

seconds	Enter the number of seconds for the interval. The range is from 1 to 65535. The default is **40 seconds**.

Defaults

40 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information By default, the dead interval is four times the default hello-interval.

Related Commands
- ip ospf hello-interval — set the time interval between the hello packets.

ip ospf hello-interval

Specify the time interval between the hello packets sent on the interface.

Syntax `ip ospf hello-interval seconds`

To return to the default value, use the `no ip ospf hello-interval` command.

Parameters

seconds	Enter the number of seconds for the interval. The range is from 1 to 65535. The default is **10 seconds**.

Defaults **10 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information The time interval between the hello packets must be the same for routers in a network.

Related Commands
- ip ospf dead-interval — set the time interval before a router is declared dead.

ip ospf message-digest-key

Enable OSPF MD5 authentication and send an OSPF message digest key on the interface.

Syntax `ip ospf message-digest-key keyid md5 key`

To delete a key, use the `no ip ospf message-digest-key keyid` command.

Parameters

keyid	Enter a number as the key ID. The range is from 1 to 255.
key	Enter a continuous character string as the password.

Defaults No MD5 authentication is configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
9.1(0.0)	Included usage information on maximum number of digest keys per interface.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information You can configure a maximum of six digest keys on an interface. Of the available six digest keys, the switches select the MD5 key that is common. The remaining MD5 keys are unused.

To change to a different key on the interface, enable the new key while the old key is still enabled. Dell EMC Networking OS sends two packets: the first packet authenticated with the old key and the second packet authenticated with the new key. This process ensures that the neighbors learn the new key and communication is not disrupted by keeping the old key enabled.

After the reply is received and the new key is authenticated, delete the old key. Dell EMC recommends keeping only one key per interface.

NOTE: The MD5 secret is stored as plain text in the configuration file with service password encryption. Write down or otherwise record the key. You cannot learn the key once it is configured. Use caution when changing the key.

ip ospf mtu-ignore

Disable OSPF MTU mismatch detection upon receipt of database description (DBD) packets.

Syntax `ip ospf mtu-ignore`

To return to the default, use the `no ip ospf mtu-ignore` command.

Defaults Enabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

ip ospf network

Set the network type for the interface.

Syntax `ip ospf network {broadcast | point-to-point}`

To return to the default, use the `no ip ospf network` command.

Parameters

broadcast	Enter the keyword `broadcast` to designate the interface as part of a broadcast network.
point-to-point	Enter the keywords `point-to-point` to designate the interface as part of a point-to-point network.

Defaults Broadcast.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

ip ospf priority

To determine the designated router for the OSPF network, set the priority of the interface.

Syntax `ip ospf priority number`

To return to the default setting, use the `no ip ospf priority` command.

Parameters

number	Enter a number as the priority. The range is from 0 to 255. The default is **1**.

Defaults **1**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

Setting a priority of 0 makes the router ineligible for election as a designated router or backup designated router.

Use this command for interfaces connected to multi-access networks, not point-to-point networks.

ip ospf retransmit-interval

Set the retransmission time between lost link state advertisements (LSAs) for adjacencies belonging to the interface.

Syntax

```
ip ospf retransmit-interval seconds
```

To return to the default values, use the `no ip ospf retransmit-interval` command.

Parameters

seconds	Enter the number of seconds as the interval between retransmission. The range is from 1 to 3600. The default is **5 seconds**. This interval must be greater than the expected round-trip time for a packet to travel between two routers.

Defaults **5 seconds**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information Set the time interval to a number large enough to prevent unnecessary retransmissions.

ip ospf transmit-delay

To send a link state update packet on the interface, set the estimated time elapsed.

Syntax `ip ospf transmit-delay` *seconds*

To return to the default value, use the `no ip ospf transmit-delay` command.

Parameters

seconds Enter the number of seconds as the interval between retransmission. The range is from 1 to 3600. The default is **1 second**.

This value must be greater than the transmission and propagation delays for the interface.

Defaults **1 second**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

log-adjacency-changes

To send a Syslog message about changes in the OSPF adjacency state, set Dell EMC Networking OS.

Syntax `log-adjacency-changes`

To disable the Syslog messages, use the `no log-adjacency-changes` command.

Defaults Disabled.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
pre- 6.1.1.1	Introduced on the E-Series.

maximum-paths

Enable the software to forward packets over multiple paths.

Syntax `maximum-paths number`

To disable packet forwarding over multiple paths, use the `no maximum-paths` command.

Parameters

number	Specify the number of paths. The range for OSPFv2 is from 1 to 64. The default for OSPFv2 is **4 paths**. The range for OSPFv3 is from 1 to 64. The default for OSPFv3 is **8 paths**.

Defaults **4**

Command Modes ROUTER OSPF for OSPFv2

ROUTER OSPFv3 for OSPFv3

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

mib-binding

Enable this OSPF process ID to manage the SNMP traps and process SNMP queries.

Syntax

```
mib-binding
```

To mib-binding on this OSPF process, use the `no mib-binding` command.

Defaults none.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced to all platforms.

Usage Information

This command is either enabled or disabled. If no OSPF process is identified as the MIB manager, the first OSPF process is used.

If an OSPF process has been selected, it must be disabled prior to assigning new process ID the MIB responsibility.

network area

Define which interfaces run OSPF and the OSPF area for those interfaces.

Syntax

```
network ip-address mask area area-id
```

To disable an OSPF area, use the `no network ip-address mask area area-id` command.

Parameters

ip-address	Specify a primary or secondary address in dotted decimal format. The primary address is required before adding the secondary address.
mask	Enter a network mask in /prefix format. (/x)
area-id	Enter the OSPF area ID as either a decimal value or in a valid IP address. Decimal value range is from 0 to 65535. IP address format is dotted decimal format A.B.C.D.

NOTE: If the area ID is smaller than 65535, it is converted to a decimal value. For example, if you use an area ID of 0.0.0.1, it is converted to 1.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced to all platforms.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information To enable OSPF on an interface, the `network area` command must include, in its range of addresses, the primary IP address of an interface.

NOTE: An interface can be attached only to a single OSPF area.

If you delete all the network area commands for Area 0, the `show ip ospf` command output does not list Area 0.

passive-interface

Suppress both receiving and sending routing updates on an interface.

Syntax `passive-interface {default | interface}`

To enable both the receiving and sending routing, use the `no passive-interface interface` command.

To return all OSPF interfaces (current and future) to active, use the `no passive-interface default` command.

Parameters

default	Enter the keyword `default` to make all OSPF interfaces (current and future) passive.
interface	Enter the following keywords and slot/port or number information: ● For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. ● For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. ● For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. ● For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. ● For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. ● For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Modified to include the keyword `default`.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information Although the passive interface does not send or receive routing updates, the network on that interface is still included in OSPF updates sent using other interfaces.

The `default` keyword sets all interfaces as passive. You can then configure individual interfaces, where adjacencies are desired, using the `no passive-interface` *`interface`* command. The `no` form of this command is inserted into the configuration for individual interfaces when the `no passive-interface` *`interface`* command is issued while `passive-interface default` is configured.

This command behavior has changed as follows:

`passive-interface` *`interface`*

- The previous `no passive-interface interface` is removed from the running configuration.
- The ABR status for the router is updated.
- Save `passive-interface interface` into the running configuration.

`passive-interface default`

- All present and future OSPF interfaces are marked as *passive*.
- Any adjacency is explicitly terminated from all OSPF interfaces.
- All previous `passive-interface interface` commands are removed from the running configuration.
- All previous `no passive-interface interface` commands are removed from the running configuration.

`no passive-interface interface`

- Remove the interface from the passive list.
- The ABR status for the router is updated.
- If `passive-interface default` is specified, then save `no passive-interface interface` into the running configuration.

`No passive-interface default`

- Clear everything and revert to the default behavior.
- All previously marked passive interfaces are removed.
- May update ABR status.

On configuring suppression using the passive-interface command, the state of the OSPF neighbor does not change to INIT; instead, the state of the OSPF neighbor changes to DOWN after the dead-timer expires.

redistribute

Redistribute information from another routing protocol throughout the OSPF process.

Syntax

`redistribute {connected | isis | ospf | rip | static} [metric metric-value | metric-type type-value] [route-map map-name] [tag tag-value]`

To disable redistribution, use the `no redistribute {connected | isis | rip | static}` command.

Parameters

connected	Enter the keyword `connected` to specify that information from active routes on interfaces is redistributed.
isis	Enter the keyword isis to specify that ISO IS-IS information is redistributed.
ospf	Enter the keyword ospf to specify that information corresponding to OSPF is redistributes.
rip	Enter the keyword `rip` to specify that RIP routing information is redistributed.
static	Enter the keyword `static` to specify that information from static routes is redistributed.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number. The range is from 0 (zero) to 16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = OSPF External type 1 • 2 = OSPF External type 2
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` then a number. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

To redistribute the default route (0.0.0.0/0), configure the `default-information originate` command.

Despite removing an OSPF process globally, the OSPF process is not completely removed from the BGP configuration.

Related Commands

- default-information originate — generate a default route into the OSPF routing domain.

redistribute bgp

Redistribute BGP routing information throughout the OSPF instance.

Syntax

`redistribute bgp as` *`number`* `[metric` *`metric-value`*`] | [metric-type` *`type-value`*`] | [tag` *`tag-value`*`]`

To disable redistribution, use the `no redistribute bgp as` *`number`* `[metric` *`metric-value`*`] | [metric-type` *`type-value`*`] [route-map` *`map-name`*`] [tag` *`tag-value`*`]` command.

Parameters

as number	Enter the autonomous system number. The range is from 1 to 65535.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then the metric-value number. The range is from 0 to16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = for OSPF External type 1 • 2 = for OSPF External type 2
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.

	tag *tag-value*	(OPTIONAL) Enter the keyword `tag` to set the tag for routes redistributed into OSPF. The range is from 0 to 4294967295.

Defaults None

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.3	Added Route Map for BGP Redistribution to OSPF.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the keyword `default`.
pre- 6.1.1.1	Introduced on the E-Series.

redistribute isis

Redistribute IS-IS routing information throughout the OSPF instance.

Syntax `redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric metric-value | metric-type type-value] [route-map map-name] [tag tag-value]`

To disable redistribution, use the `no redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric metric-value | metric-type type-value] [route-map map-name] [tag tag-value]` command.

Parameters

tag	(OPTIONAL) Enter the name of the IS-IS routing process.
level-1	(OPTIONAL) Enter the keywords `level-1` to redistribute only IS-IS Level-1 routes.
level-1-2	(OPTIONAL) Enter the keywords `level-1-2` to redistribute both IS-IS Level-1 and Level-2 routes.

	level-2	(OPTIONAL) Enter the keywords `level-2` to redistribute only IS-IS Level-2 routes.
	metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number. The range is from 0 (zero) to 4294967295.
	metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = for OSPF External type 1 • 2 = for OSPF External type 2
	route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.
	tag *tag-value*	(OPTIONAL) Enter the keyword `tag` to set the tag for routes redistributed into OSPF. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

router-id

To configure a fixed router ID, use this command.

Syntax `router-id ip-address`

To remove the fixed router ID, use the `no router-id ip-address` command.

Parameters	***ip-address***	Enter the router ID in the IP address format.

Defaults None.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

You can configure an arbitrary value in the IP address format for each router. However, each router ID must be unique. If you use this command on an OSPF router process, which is already active (that is, has neighbors), a prompt reminding you that changing the router-id brings down the existing OSPF adjacency. The new router ID is effective at the next reload.

Example

```
DellEMC(conf)# router ospf 100
DellEMC(conf-router_ospf)#router-id 1.1.1.1
Changing router-id will bring down existing OSPF adjacency [y/n]:

DellEMC(conf-router_ospf)#show config
!
router ospf 100
router-id 1.1.1.1
DellEMC(conf-router_ospf)# no router-id
Changing router-id will bring down existing OSPF adjacency [y/n]:
DellEMC#
```

router ospf

To configure an OSPF instance, enter ROUTER OSPF mode.

Syntax

`router ospf` *process-id* `[vrf {`*vrf name*`}]`

To clear an OSPF instance, use the `no router ospf process-id` command.

Parameters

process-id	Enter a number for the OSPF instance. The range is from 1 to 65535.
vrf name	(Optional) Enter the VRF process identifier to tie the OSPF instance to the VRF. All network commands under this OSPF instance are then tied to the VRF instance.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Added support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.9.1.0	Added support for VRF.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information You must have an IP address assigned to an interface to enter ROUTER OSPF mode and configure OSPF. You can create only one OSPFv2 process per VRF.

Example

```
DellEMC(conf)# router ospf 2
DellEMC(conf-router_ospf)#
```

show config

Display the non-default values in the current OSPF configuration.

Syntax `show config`

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC(conf-router_ospf)# show config
!
router ospf 3
passive-interface 0 twentyFiveGigE 1/1
DellEMC(conf-router_ospf)#
```

show ip ospf

Display information on the OSPF process configured on the switch.

Syntax `show ip ospf [process-id | vrf vrf name]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf name*	Show only the OSPF information tied to the VRF process.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Added output for LSA throttling timers.
8.3.7.0	Introduced on the S4810.
7.9.1.0	Added support for VRF.
7.8.1.0	Added support of Multi-Process OSPF.
7.8.1.0	Added the *process-id* option, in support of Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

If you delete all the network area commands for Area 0, the `show ip ospf` command output does not list Area 0.

The following describes the `show ip ospf` command shown in the following example.

Line Beginning with	Description
"Routing Process..."	Displays the OSPF process ID and the IP address associated with the process ID.
"Supports only..."	Displays the number of Type of Service (TOS) rouse supported.
"SPF schedule..."	Displays the delay and hold time configured for this process ID.
"Convergence Level"	
"Min LSA...."	Displays the intervals set for LSA transmission and acceptance.
"Number of..."	Displays the number and type of areas configured for this process ID.

Example

```
DellEMC# show ip ospf 10
Routing Process ospf 10 with ID 1.1.1.1 Virtual router default-vrf
Supports only single TOS (TOS0) routes
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Convergence Level 0
Min LSA origination 0 msec, Min LSA arrival 1000 msec
Min LSA hold time 5000 msec, Max LSA wait time 5000 msec
Number of area in this router is 1, normal 1 stub 0 nssa 0
    Area BACKBONE (0)
      Number of interface in this area is 1
      SPF algorithm executed 205 times
      Area ranges are
DellEMC#
```

show ip ospf asbr

Display all autonomous system boundary router (ASBR) routers visible to OSPF.

Syntax

```
show ip ospf [process-id | vrf vrf-name] asbr
```

Parameters

process-id Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support of Multi-Process OSPF.
7.8.1.0	Added the *process-id* option, in support of Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

To isolate problems with external routes, use this command. In OSPF, external routes are calculated by adding the LSA cost to the cost of reaching the ASBR router. If an external route does not have the correct cost, use this command to determine if the path to the originating router is correct. The display output is not sorted in any order.

NOTE: ASBRs that are not in directly connected areas are also displayed.

You can determine if an ASBR is in a directly connected area (or not) by the flags. For ASBRs in a directly connected area, E flags are set. In the following example, router 1.1.1.1 is in a directly connected area since the Flag is E/-/-/. For remote ASBRs, the E flag is clear (-/-/-/).

Example

```
DellEMC# show ip ospf 1asbr

RouterID  Flags   Cost Nexthop   Interface Area
```

```
3.3.3.3   -/-/-/  2   10.0.0.2   Tf 1/1    1
1.1.1.1   E/-/-/  0   0.0.0.0    -         0
DellEMC#
```

show ip ospf database

Display all LSA information. If you do not enable OSPF on the switch, no output is generated.

Syntax `show ip ospf process-id [vrf vrf-name] database [database-summary]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to view LSA information on OSPF processes corresponding to that VRF.
database-summary	(OPTIONAL) Enter the keywords `database-summary` to the display the number of LSA types in each area and the total number of LSAs.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support of Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information The following describes the `show ip ospf process-id database` command shown in the following example.

Field	Description
Link ID	Identifies the router ID.
ADV Router	Identifies the advertising router's ID.
Age	Displays the link state age.
Seq#	Identifies the link state sequence number. This number allows you to identify old or duplicate link state advertisements.
Checksum	Displays the Fletcher checksum of an LSA's complete contents.
Link count	Displays the number of interfaces for that router.

Example

```
DellEMC> show ip ospf 1 database

     OSPF Router with ID (11.1.2.1) (Process ID 1)
                 Router (Area 0.0.0.0)
Link ID      ADV Router    Age  Seq#       Checksum Link count
11.1.2.1     11.1.2.1      673  0x80000005 0x707e   2
13.1.1.1     13.1.1.1      676  0x80000097 0x1035   2
192.68.135.2 192.68.135.2 1419 0x80000294 0x9cbd   1

                Network (Area 0.0.0.0)
Link ID      ADV Router    Age  Seq#       Checksum
10.2.3.2     13.1.1.1      676  0x80000003 0x6592
10.2.4.2     192.68.135.2 908  0x80000055 0x683e

                Type-5 AS External
Link ID      ADV Router    Age  Seq#       Checksum Tag
0.0.0.0      192.68.135.2 908  0x80000052 0xeb83   100
1.1.1.1      192.68.135.2 908  0x8000002a 0xbd27   0
10.1.1.0     11.1.2.1      718  0x80000002 0x9012   0
10.1.2.0     11.1.2.1      718  0x80000002 0x851c   0
10.2.2.0     11.1.2.1      718  0x80000002 0x7927   0
10.2.3.0     11.1.2.1      718  0x80000002 0x6e31   0
10.2.4.0     13.1.1.1      1184 0x80000068 0x45db   0
11.1.1.0     11.1.2.1      718  0x80000002 0x831e   0
11.1.2.0     11.1.2.1      718  0x80000002 0x7828   0
12.1.2.0     192.68.135.2 1663 0x80000054 0xd8d6   0
13.1.1.0     13.1.1.1      1192 0x8000006b 0x2718   0
13.1.2.0     13.1.1.1      1184 0x8000006b 0x1c22   0
172.16.1.0   13.1.1.1      148  0x8000006d 0x533b   0
DellEMC>
```

Related Commands

- show ip ospf database asbr-summary — display only ASBR summary LSA information.

show ip ospf database asbr-summary

Display information about autonomous system (AS) boundary LSAs.

Syntax

```
show ip ospf [process-id] database asbr-summary [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs

adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf database asbr-summary` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. • E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the advertising router's ID.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.

Field	Description
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.
TOS	Displays the Type of Service (TOS) options. Option 0 is the only option.
Metric	Displays the LSA metric.

Example

```
DellEMC# show ip ospf 100 database asbr-summary

     OSPF Router with ID (1.1.1.10) (Process ID 100)

       Summary Asbr (Area 0.0.0.0)

LS age: 1437
Options: (No TOS-capability, No DC, E)
LS type: Summary Asbr
Link State ID: 103.1.50.1
Advertising Router: 1.1.1.10
LS Seq Number: 0x8000000f
Checksum: 0x8221
Length: 28
Network Mask: /0
      TOS: 0 Metric: 2

LS age: 473
Options: (No TOS-capability, No DC, E)
LS type: Summary Asbr
Link State ID: 104.1.50.1
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000010
Checksum: 0x4198
Length: 28
--More--
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database external

Display information on the AS external (type 5) LSAs.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database external [link-state-id]
[adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on AS external LSAs corresponding to the OSPF processes that are tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC

- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database external` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: ● TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. ● DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. ● E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Identifies the link state sequence number. This number enables you to identify old or duplicate LSAs.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.

Field	Description
Metrics Type	Displays the external type.
TOS	Displays the Type of Service (TOS) options. Option 0 is the only option.
Metric	Displays the LSA metric.
Forward Address	Identifies the address of the forwarding router. Data traffic is forwarded to this router. If the forwarding address is 0.0.0.0, data traffic is forwarded to the originating router.
External Route Tag	Displays the 32-bit field attached to each external route. The OSPF protocol does not use this field, but you can use the field for external route management.

Example

```
DellEMC# show ip ospf 1 database external

    OSPF Router with ID (20.20.20.5) (Process ID 1)

         Type-5 AS External

LS age: 612
Options: (No TOS-capability, No DC, E)
LS type: Type-5 AS External
Link State ID: 12.12.12.2
Advertising Router: 20.31.3.1
LS Seq Number: 0x80000007
Checksum: 0x4cde
Length: 36
Network Mask: /32
     Metrics Type: 2
     TOS: 0
     Metrics: 25
     Forward Address: 0.0.0.0
     External Route Tag: 43

LS age: 1868
Options: (No TOS-capability, DC)
LS type: Type-5 AS External
Link State ID: 24.216.12.0
Advertising Router: 20.20.20.8
LS Seq Number: 0x80000005
Checksum: 0xa00e
Length: 36
Network Mask: /24
     Metrics Type: 2
     TOS: 0
     Metrics: 1
     Forward Address: 0.0.0.0
     External Route Tag: 701
DellEMC#
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database network

Display the network (type 2) LSA information.

Syntax

```
show ip ospf [process-id] database network [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.

link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: ● the network's IP address for Type 3 LSAs or Type 5 LSAs ● the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs ● the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf process-id database network` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: ● TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. ● DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. ● E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.

Field	Description
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
Checksum	Identifies the link state sequence number. This number enables you to identify old or duplicate LSAs.
Length	Displays the Fletcher checksum of an LSA's complete contents.
Network Mask	Displays the length in bytes of the LSA.
Attached Router	Identifies the IP address of routers attached to the network.

Example

```
DellEMC# show ip ospf 1 data network

    OSPF Router with ID (20.20.20.5) (Process ID 1)

        Network (Area 0.0.0.0)
 LS age: 1372
Options: (No TOS-capability, DC, E)
LS type: Network
Link State ID: 202.10.10.2
Advertising Router: 20.20.20.8
LS Seq Number: 0x80000006
Checksum: 0xa35
Length: 36
Network Mask: /24
     Attached Router: 20.20.20.8
     Attached Router: 20.20.20.9
     Attached Router: 20.20.20.7

         Network (Area 0.0.0.1)

LS age: 252
Options: (TOS-capability, No DC, E)
LS type: Network
Link State ID: 192.10.10.2
Advertising Router: 192.10.10.2
LS Seq Number: 0x80000007
Checksum: 0x4309
Length: 36
Network Mask: /24
     Attached Router: 192.10.10.2
     Attached Router: 20.20.20.1
     Attached Router: 20.20.20.5
DellEMC#
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database nssa-external

Display NSSA-External (type 7) LSA information.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database nssa-external [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followeed by the name of the VRF to view NSSA-External LSA information corresponding to the OSPF process that is tied to a specific VRF.

	link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
	adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Related Commands

-
- show ip ospf database — display OSPF database information.

show ip ospf database opaque-area

Display the opaque-area (type 10) LSA information.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database opaque-area [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view opaque-area LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: ● the network's IP address for Type 3 LSAs or Type 5 LSAs ● the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs ● the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database opaque-area` command shown in the following example.

Item	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: ● TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. ● DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. ● E or No E is displayed on whether the originating router can accept AS External LSAs.

Item	Description
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the advertising router's ID.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Opaque Type	Displays the Opaque type field (the first 8 bits of the Link State ID).
Opaque ID	Displays the Opaque type-specific ID (the remaining 24 bits of the Link State ID).

Example

```
DellEMC> show ip ospf 1 database opaque-area

    OSPF Router with ID (3.3.3.3) (Process ID 1)
         Type-10 Opaque Link Area (Area 0)

LS age: 1133
Options: (No TOS-capability, No DC, E)
LS type: Type-10 Opaque Link Area
Link State ID: 1.0.0.1
Advertising Router: 10.16.1.160
LS Seq Number: 0x80000416
Checksum: 0x376
Length: 28
Opaque Type: 1
Opaque ID: 1
Unable to display opaque data

LS age: 833
Options: (No TOS-capability, No DC, E)
LS type: Type-10 Opaque Link Area
Link State ID: 1.0.0.2
Advertising Router: 10.16.1.160
LS Seq Number: 0x80000002
Checksum: 0x19c2
--More--
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database opaque-as

Display the opaque-as (type 11) LSA information.

Syntax

```
show ip ospf process-id database opaque-as [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database opaque-link

Display the opaque-link (type 9) LSA information.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database opaque-link [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view opaque-link LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` then the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database router

Display the router (type 1) LSA information.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database router [link-state-id]
[adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view the router LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` followed by the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes

- EXEC

- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added supported for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.20	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf process-id database router` command shown in the following example.

Item	Description
LS Age	Displays the LSA age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: ● TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. ● DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. ● E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Displays the link state sequence number. This number detects duplicate or old LSAs.
Checksum	Displays the Fletcher checksum of an LSA's complete contents.
Length	Displays the length in bytes of the LSA.

Item	Description
Number of Links	Displays the number of active links to the type of router (Area Border Router or AS Boundary Router) listed in the previous line.
Link connected to:	Identifies the type of network to which the router is connected.
(Link ID)	Identifies the link type and address.
(Link Data)	Identifies the router interface address.
Number of TOS Metric	Lists the number of TOS metrics.
TOS 0 Metric	Lists the number of TOS 0 metrics.

Example

```
DellEMC# show ip ospf 100 database router

     OSPF Router with ID (1.1.1.10) (Process ID 100)

         Router (Area 0)

LS age: 967
Options: (No TOS-capability, No DC, E)
LS type: Router
Link State ID: 1.1.1.10
Advertising Router: 1.1.1.10
LS Seq Number: 0x8000012f
Checksum: 0x3357
Length: 144
AS Boundary Router
Area Border Router
  Number of Links: 10

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.129.1
    (Link Data) Router Interface address: 192.68.129.1
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.130.1
    (Link Data) Router Interface address: 192.68.130.1
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.142.2
    (Link Data) Router Interface address: 192.68.142.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.141.2
    (Link Data) Router Interface address: 192.68.141.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.140.2
    (Link Data) Router Interface address: 192.68.140.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

Link connected to: a Stub Network
    (Link ID) Network/subnet number: 11.1.5.0
--More--
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf database summary

Display the network summary (type 3) LSA routing information.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] database summary [link-state-id]
[adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view LSA routing information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` then the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf process-id database summary` command shown in the following example.

Item	Description
LS Age	Displays the LSA age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. • E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Displays the link state sequence number. This number allows you to identify old or duplicate LSAs.
Checksum	Displays the Fletcher checksum of an LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.
TOS	Displays the TOS options. Option 0 is the only option.
Metric	Displays the LSA metrics.

Example

```
DellEMC# show ip ospf 100 database summary

    OSPF Router with ID (1.1.1.10) (Process ID 100)

        Summary Network (Area 0.0.0.0)

LS age: 1551
Options: (No TOS-capability, DC, E)
LS type: Summary Network
Link State ID: 192.68.16.0
Advertising Router: 192.168.17.1
LS Seq Number: 0x80000054
Checksum: 0xb5a2
Length: 28
Network Mask: /24
    TOS: 0 Metric: 1

LS age: 9
Options: (No TOS-capability, No DC, E)
LS type: Summary Network
Link State ID: 192.68.32.0
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000016
Checksum: 0x987c
Length: 28
Network Mask: /24
   TOS: 0 Metric: 1

LS age: 7
Options: (No TOS-capability, No DC, E)
LS type: Summary Network
Link State ID: 192.68.33.0
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000016
Checksum: 0x1241
Length: 28
Network Mask: /26
   TOS: 0 Metric: 1
```

```
DellEMC#
```

Related Commands

- show ip ospf database — display OSPF database information.

show ip ospf interface

Display the OSPF interfaces configured. If OSPF is not enabled on the switch, no output is generated.

Syntax

```
show ip ospf [process-id | vrf vrf-name] interface [interface]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show the OSPF processes that are tied to a specific VRF.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a port channel interface, enter the keywords `port-channel` then a number. • For a Null interface, enter the keyword null then the Null interface number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `interface` command shown in the following example.

Item	Description
GigabitEthernet...	This line identifies the interface type slot/port and the status of the OSPF protocol on that interface.
Internet Address...	This line displays the IP address, network mask and area assigned to this interface.
Process ID...	This line displays the OSPF Process ID, Router ID, Network type and cost metric for this interface.
Transmit Delay...	This line displays the interface's settings for Transmit Delay, State, and Priority. In the State setting, BDR is Backup Designated Router.
Designated Router...	This line displays the ID of the Designated Router and its interface address.
Backup Designated...	This line displays the ID of the Backup Designated Router and its interface address.
Timer intervals...	This line displays the interface's timer settings for Hello interval, Dead interval, Transmit Delay (Wait), and Retransmit Interval.
Hello due...	This line displays the amount time until the next Hello packet is sent out this interface.
Neighbor Count...	This line displays the number of neighbors and adjacent neighbors. Listed below this line are the details about each adjacent neighbor.

Example

```
DellEMC> show ip ospf int

twentyFiveGigE 1/7 is up, line protocol is up
  Internet Address 192.168.1.2/30, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 192.168.253.2, Interface address 192.168.1.2
  Backup Designated Router (ID) 192.168.253.1, Interface address
192.168.1.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:02
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 192.168.253.1 (Backup Designated Router)

twentyFiveGigE 1/8 is up, line protocol is up
  Internet Address 192.168.0.1/24, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DROTHER, Priority 1
  Designated Router (ID) 192.168.253.5, Interface address 192.168.0.4
  Backup Designated Router (ID) 192.168.253.3, Interface address
```

```
192.168.0.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:08
  Neighbor Count is 3, Adjacent neighbor count is 2
    Adjacent with neighbor 192.168.253.5 (Designated Router)
    Adjacent with neighbor 192.168.253.3 (Backup Designated Router)

Loopback 0 is up, line protocol is up
  Internet Address 192.168.253.2/32, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host.
DellEMC>
```

show ip ospf neighbor

Display the OSPF neighbors connected to the local router.

Syntax `show ip ospf [process-id | vrf vrf-name ] neighbor`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show information corresponding to the OSPF neighbors that are tied to a specific VRF.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000..
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf process-id neighbor` command shown in the following example.

Item	Description
Neighbor ID	Displays the neighbor router ID.
Pri	Displays the priority assigned neighbor.
State	Displays the OSPF state of the neighbor.
Dead Time	Displays the expected time until the Dell OS declares the neighbor dead.
Address	Displays the IP address of the neighbor.
Interface	Displays the interface type slot/port information.
Area	Displays the neighbor's area (process ID).

Example

```
DellEMC# show ip ospf 34 neighbor

Neighbor ID Pri State       Dead Time Address  Interface Area
20.20.20.7  1 FULL/DR     00:00:32 182.10.10.3 Tf 1/1   0.0.0.2
192.10.10.2 1 FULL/DR     00:00:37 192.10.10.2 Tf 1/2   0.0.0.1
20.20.20.1  1 FULL/DROTHER00:00:36 192.10.10.4 Tf 1/3   0.0.0.1
DellEMC#
```

show ip ospf routes

Display routes OSPF calculates and stores in OSPF RIB.

Syntax

```
show ip ospf [process-id | vrf vrf-name ] routes
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show the OSPF RIB information corresponding to the OSPF processes that are tied to a specific VRF.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

This command is useful in isolating routing problems between the OSPF and the RTM. For example, if a route is missing from the RTM/FIB but is visible from the display output of this command, the problem is with downloading the route to the RTM.

This command has the following limitations:

- The display output is sorted by prefixes; intra-area ECMP routes are not displayed together.
- For Type 2 external routes, Type 1 cost is not displayed.

NOTE: Starting with Version 9.4(0.0), the loopback IP address advertised to the neighbor is not displayed in the output because they are not accounted as inactive OSPF routes, whereas the loopback IP address is displayed until Dell EMC Networking OS Version 9.3(0.0). Starting with Version 9.4(0.0), the show ip ospf routes command displays the interface and area ID information of connected networks in addition to the other settings, whereas these details are not displayed until Dell EMC Networking OS Version 9.3(0.0). Starting with Version 9.4(0.0), the metric of E2 routes in the output is displayed as an external metric, whereas until Dell EMC Networking OS Version 9.3(0.0), the number of hops to the ASBR for E2 routes are displayed in the output.

Example

```
DellEMC# show ip ospf 100 route

Prefix         Cost Nexthop    Interface Area  Type
1.1.1.1         1   0.0.0.0    Lo 0       0     Intra-Area
3.3.3.3         2   13.0.0.3   Tf 1/4     1     Intra-Area
13.0.0.0        1   0.0.0.0    Tf 1/4     0     Intra-Area
150.150.150.0   2   13.0.0.3   Tf 1/4     -     External
172.30.1.0      2   13.0.0.3   Tf 1/4     1     Intra-Area
DellEMC#
```

show ip ospf statistics

Display OSPF statistics.

Syntax

```
show ip ospf [process-id | vrf vrf-name] statistics global | [interface
name {neighbor router-id}]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display statistics corresponding to the OSPF process that is tied to a specific VRF.
global	Enter the keyword `global` to display the packet counts received on all running OSPF interfaces and packet counts OSPF neighbors receive and transmit.
interface *name*	(OPTIONAL) Enter the keyword `interface` then one of the following interface keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

neighbor *router-id* (OPTIONAL) Enter the keyword `neighbor` then the neighbor's router-id in dotted decimal format (A.B.C.D.).

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information The following describes the `show ip ospf statistics` *process-id* `global` command shown in the following example.

Row Heading	Description
Total	Displays the total number of packets the OSPF process receives/transmits.

Row Heading	Description
Error	Displays the error count while receiving and transmitting packets by the OSPF process.
Hello	Number of OSPF Hello packets.
DDiscr	Number of database description packets.
LSReq	Number of link state request packets.
LSUpd	Number of link state update packets.
LSAck	Number of link state acknowledgement packets.
TxQ-Len	The transmission queue length.
RxQ-Len	The reception queue length.
Tx-Mark	The highest number mark in the transmission queue.
Rx-Mark	The highest number mark in the reception queue.
Hello-Q	The queue, for transmission or reception, for the hello packets.
LSR-Q	The queue, for transmission or reception, for the link state request packets.
Other-Q	The queue, for transmission or reception, for the link state acknowledgement, database description, and update packets.

The following describes the error definitions for the `show ip ospf statistics` *`process-id`* `global` command.

Error Type	Description
Intf_Down	Received packets on an interface that is either down or OSPF is not enabled.
Non-Dr	Received packets with a destination address of ALL_DRS even though SELF is not a designated router.
Self-Org	Receive the self originated packet.
Wrong_Len	The received packet length is different to what was indicated in the OSPF header.
Invld-Nbr	LSA, LSR, LSU, and DDB are received from a peer which is not a neighbor peer.
Nbr-State	LSA, LSR, and LSU are received from a neighbor with stats less than the loading state.
Auth-Error	Simple authentication error.
MD5-Error	MD5 error
Cksum-Err	Checksum Error
Version	Version mismatch
AreaMismatch	Area mismatch
Conf-Issue	The received hello packet has a different hello or dead interval than the configuration.
No-Buffer	Buffer allocation failure.
Seq-no	A sequence no errors occurred during the database exchange process.
Socket	Socket Read/Write operation error.
Q-overflow	Packets dropped due to queue overflow.
Unknown-Pkt	Received packet is not an OSPF packet.

Example

```
DellEMC# show ip ospf 1 statistics global

OSPF Packet Count
   Total Error Hello DDiscr LSReq LSUpd LSAck
```

```
RX 10    0     8     2      0     0     0
TX 10    0     10    0      0     0     0

OSPF Global Queue Length
         TxQ-Len RxQ-Len Tx-Mark Rx-Mark
Hello-Q  0       0       0       2
LSR-Q    0       0       0       0
Other-Q  0       0       0       0

Error packets (Only for RX)

Intf-Down  0   Non-Dr     0   Self-Org 0
Wrong-Len  0   Invld-Nbr  0   Nbr-State 0
Auth-Err   0   MD5-Err    0   Chksum 0
Version    0   AreaMis    0   Conf-Issues 0
No-Buffer  0   Seq-No     0   Socket 0
Q-OverFlow 0   Unkown-Pkt 0

Error packets (Only for TX)

Socket Errors    0
DellEMC#
```

Usage Information

The `show ip ospf` *`process-id`* `statistics` command displays the error packet count received on each interface as:

- The hello-timer remaining value for each interface
- The wait-timer remaining value for each interface
- The grace-timer remaining value for each interface
- The packet count received and transmitted for each neighbor
- Dead timer remaining value for each neighbor
- Transmit timer remaining value for each neighbor
- The LSU Q length and its highest mark for each neighbor
- The LSR Q length and its highest mark for each neighbor

Example (Statistics)

```
DellEMC(conf-if-tf-1/6)# do show ip ospf statistics
Interface twentyFiveGigE 1/6
  Error packets (Receive statistics)
     Intf-Down 0 Non-Dr 0 Self-Org 0
     Wrong-Len 0 Invld-Nbr 0 Nbr-State 0
     Auth-Error 0 MD5-Error 0 Cksum-Err 0
     Version 0 AreaMisMatch 0 Conf-Issue 0
     SeqNo-Err 0 Unknown-Pkt 0 Bad-LsReq 0
     RtidZero 0
  Neighbor ID 4.4.4.4
     Packet Statistics
                Hello DDiscr LSReq LSUpd LSAck
        RX 5 2 1 3 2
        TX 6 5 1 3 3
     Timers
        Hello 0 Wait 0 Grace 0
        Dead 39 Transmit 4
     Queue Statistics
        LSU-Q-Len 0 LSU-Q-Wmark 1
        LSR-Q-Len 0 LSR-Q-Wmark 1

DellEMC(conf-if-tf-1/6)#
```

Related Commands

- clear ip ospf statistics — clear the packet statistics in all interfaces and neighbors.

show ip ospf timers rate-limit

Show the LSA currently in the queue waiting for timers to expire.

Syntax `show ip ospf [process-id] timers rate-limit`

Parameters

process-id Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Example

```
DellEMC# show ip ospf 10 timers rate-limit

List of LSAs in rate limit Queue
LSA id: 1.1.1.0 Type: 3 Adv Rtid: 3.3.3.3 Expiry time: 00:00:09.111
LSA id: 3.3.3.3 Type: 1 Adv Rtid: 3.3.3.3 Expiry time: 00:00:23.96
DellEMC#
```

show ip ospf topology

Display routers in directly connected areas.

Syntax `show ip ospf [process-id] topology`

Parameters

process-id Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information To isolate problems with inter-area and external routes, use this command. In OSPF inter-area and external routes are calculated by adding LSA cost to the cost of reaching the router. If an inter-area or external route is not of correct cost, the display can determine if the path to the originating router is correct or not.

Example

```
DellEMC# show ip ospf 1 topology

Router ID  Flags Cost  Nexthop   Interface Area
3.3.3.3    E/B/-/ 1    20.0.0.3  Tf 1/7   0
1.1.1.1    E/-/-/ 1    10.0.0.1  Tf 1/13    1
DellEMC#
```

summary-address

To advertise one external route, set the OSPF ASBR.

Syntax `summary-address` *`ip-address mask`* `[not-advertise] [tag` *`tag-value`*`]`

To disable summary address, use the `no summary-address` *`ip-address mask`* command.

Parameters

ip-address	Specify the IP address in dotted decimal format of the address to summarize.
mask	Specify the mask in dotted decimal format of the address to summarize.

not-advertise	(OPTIONAL) Enter the keywords `not-advertise` to suppress that match the network prefix/mask pair.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` then a value to match on routes redistributed through a route map. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information The `area range` command summarizes routes for the different areas.

With the `not-advertise` parameter configured, you can use this command to filter out some external routes. For example, if you want to redistribute static routes to OSPF, but you don't want OSPF to advertise routes with prefix 1.1.0.0, you can configure the summary-address 1.1.0.0 255.255.0.0 not-advertise to filter out all the routes fall in range 1.1.0.0/16.

Related Commands

- area range — summarize routes within an area.

timers spf

Set the time interval between when the switch receives a topology change and starts a shortest path first (SPF) calculation.

Syntax `timers spf` *`delay holdtime`* `msec`

To return to the default, use the `no timers spf` command.

Parameters

delay	Enter a number as the delay. The range is from 0 to 2147483647. The default is **5 seconds**.
holdtime	Enter a number as the hold time. The range is from 0 to 2147483647. The default is **10 seconds**.
msec	Enter the keyword `msec` to specify the time interval value in milli seconds. **NOTE:** If you do not specify the msec option, the timer values are considered as seconds.

Defaults

- delay = 5 seconds
- holdtime = 10 seconds

Command Modes ROUTER OSPFv2

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the keyword `msec`.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

Usage Information Setting the *delay* and *holdtime* parameters to a low number enables the switch to an alternate path quickly but requires more CPU usage.

Example

```
DellEMC# conf
DellEMC(conf)# router ospf 1
DellEMC(conf-router_ospf-1)# timer spf 2 5 msec
DellEMC(conf-router_ospf-1)# show config
!
router ospf 1
timers spf 2 5 msec
DellEMC(conf-router_ospf-1)# end
```

timers throttle lsa all

Configure LSA transmit intervals.

Syntax

```
timers throttle lsa all {start-interval | hold-interval | max-interval}
```

To return to the default, use the `no timers throttle lsa` command.

Parameters

start-interval	Set the minimum interval between initial sending and resending the same LSA. The range is from 0 to 600,000 milliseconds.
hold-interval	Set the next interval to send the same LSA. This interval is the time between sending the same LSA after the start-interval has been attempted. The range is from 1 to 600,000 milliseconds.
max-interval	Set the maximum amount of time the system waits before sending the LSA. The range is from 1 to 600,000 milliseconds.

Defaults

- start-interval: **0 msec**
- hold-interval: **5000 msec**
- max-interval: **5000 msec**

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
9.0.2.0	Introduced on the S6000..
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

Usage Information LSAs are sent after the start-interval and then after hold-interval until the maximum interval is reached. In throttling, exponential backoff is used when sending same LSA, so that the interval is multiplied until the maximum time is reached. For example, if the *start-interval 5000* and *hold-interval 1000* and *max-interval 100,000*, the LSA is sent at 5000 msec, then 1000 msec, then 2000 msec, them 4000 until 100,000 msec is reached.

timers throttle lsa arrival

Configure the LSA acceptance intervals.

Syntax

`timers throttle lsa arrival` *`arrival-time`*

To return to the default, use the `no timers throttle lsa` command.

Parameters

arrival-time Set the interval between receiving the same LSA repeatedly, to allow sufficient time for the system to accept the LSA. The range is from 0 to 600,000 milliseconds.

Defaults **1000 msec**

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.

OSPFv3 Commands

Open shortest path first version 3 (OSPFv3) for IPv6 is supported on the platform.

The fundamental mechanisms of OSPF (flooding, DR election, area support, SPF calculations, and so on) remain unchanged. However, OSPFv3 runs on a per-link basis instead of on a per-IP-subnet basis. Most changes were necessary to handle the increased address size of IPv6.

The Dell EMC Networking OS implementation of OSPFv3 is based on IETF RFC 2740.

area authentication

Configure an IPsec authentication policy for OSPFv3 packets in an OFSPFv3 area.

Syntax

```
area area-id authentication ipsec spi number {MD5 | SHA1} [key-encryption-type] key
```

Parameters

area *area-id*	Area for which OSPFv3 traffic is to be authenticated. For area-id, you can enter a number. The range is from 0 to 4294967295.
ipsec spi *number*	Security Policy index (SPI) value that identifies an IPsec security policy. The range is from 256 to 4294967295.
MD5 | SHA1	Authentication type: Message Digest 5 (MD5) or Secure Hash Algorithm 1 (SHA-1).
key-encryption-type	(OPTIONAL) Specifies if the key is encrypted. The values are 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in authentication. For MD5 authentication, the key must be 32 hex digits (non-encrypted) or 64 hex digits (encrypted). For SHA-1 authentication, the key must be 40 hex digits (non-encrypted) or 80 hex digits (encrypted).

Defaults Not configured.

Command Modes ROUTER OSPFv3

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
8.4.2.0	Introduced on the E-Series.

Usage Information Before you enable IPsec authentication on an OSPFv3 area, you must first enable OSPFv3 globally on the router. Configure the same authentication policy (same SPI and key) on each interface in an OSPFv3 link.

An SPI number must be unique to one IPsec security policy (authentication or encryption) on the router.

If you have enabled IPsec encryption in an OSPFv3 area with the `area encryption` command, you cannot use the `area authentication` command in the area at the same time.

The configuration of IPsec authentication on an interface-level takes precedence over an area-level configuration. If you remove an interface configuration, an area authentication policy that has been configured is applied to the interface.

To remove an IPsec authentication policy from an OSPFv3 area, enter the `no area area-id authentication spi number` command.

Related Commands

- ipv6 ospf authentication – configure an IPsec authentication policy on an OSPFv3 interface.
- show crypto ipsec policy – display the configuration of IPsec authentication policies.

area encryption

Configure an IPsec encryption policy for OSPFv3 packets in an OSPFv3 area.

Syntax

```
area area-id encryption ipsec spi number esp encryption-algorithm [key-encryption-type] key authentication-algorithm [key-encryption-type] key
```

Parameters

area *area-id*	Area for which OSPFv3 traffic is to be encrypted. For *area-id*, enter a number. The range is from 0 to 4294967295.
ipsec spi *number*	Security Policy index (SPI) value that identifies an IPsec security policy. The range is from 256 to 4294967295.
esp encryption-algorithm	Encryption algorithm used with ESP. Valid values are: 3DES, DES, AES-CBC, and NULL. For AES-CBC, only the AES-128 and AES-192 ciphers are supported.
key-encryption-algorithm	(OPTIONAL) Specifies if the key is encrypted. Valid values: 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in encryption. The required lengths of a non-encrypted or encrypted key are: 3DES - 48 or 96 hex digits; DES - 16 or 32 hex digits; AES-CBC -32 or 64 hex digits for AES-128 and 48 or 96 hex digits for AES-192.
authentication-algorithm	Specifies the authentication algorithm to use for encryption. Valid values are `MD5` or `SHA1`.
key-encryption-type	(OPTIONAL) Specifies if the authentication key is encrypted. Valid values: 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in authentication. For MD5 authentication, the key must be 32 hex digits (non-encrypted) or 64 hex digits (encrypted). For SHA-1 authentication, the key must be 40 hex digits (non-encrypted) or 80 hex digits (encrypted).
null	Causes an encryption policy configured for the area to not be inherited on the interface.

Defaults Not configured.

Command Modes ROUTER OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

Before you enable IPsec encryption on an OSPFv3 interface, first enable OSPFv3 globally on the router. Configure the same encryption policy (same SPI and keys) on each interface in an OSPFv3 link.

An SPI value must be unique to one IPsec security policy (authentication or encryption) on the router.

When you configure encryption for an OSPFv3 area with the `area encryption` command, you enable both IPsec encryption and authentication. However, when you enable authentication on an area with the `area authentication` command, you do not enable encryption at the same time.

If you have enabled IPsec authentication in an OSPFv3 area with the `area authentication` command, you cannot use the `area encryption` command in the area at the same time.

The configuration of IPsec encryption on an interface-level takes precedence over an area-level configuration. If you remove an interface configuration, an area encryption policy that has been configured is applied to the interface.

To remove an IPsec encryption policy from an interface, enter the no area *area-id* encryption spi *number* command.

Related Commands

- ipv6 ospf encryption – configure an IPsec encryption policy on an OSPFv3 interface.
- show crypto ipsec policy – display the configuration of IPsec encryption policies.

auto-cost

Specify how the OSPF interface cost is calculated based on the reference bandwidth method.

Syntax

`auto-cost [reference-bandwidth ref-bw]`

To return to the default bandwidth or to assign cost based on the interface type, use the `no auto-cost [reference-bandwidth ref-bw]` command.

Parameters

ref-bw	(OPTIONAL) Specify a reference bandwidth in megabits per second. The range is from 1 to 4294967. The default is **100 megabits per second**.

Defaults

100 megabits per second.

Command Modes

ROUTER OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.9(0.0)	Introduced on the S6000-ON, S6000, S4820T, S4810, S5000, Z9500, S3048-ON, and S4048-ON

Usage Information

Example

```
DellEMC# show running-config ospf
!
ipv6 router ospf 10
 log-adjacency-changes
 auto-cost reference-bandwidth 2000
DellEMC(conf-ipv6-router_ospf)# auto-cost reference-bandwidth ?
<1-4294967>             Reference bandwidth in Mbits/second (default =
100)
DellEMC(conf-ipv6-router_ospf)# no auto-cost ?
reference-bandwidth     Use reference bandwidth method to assign OSPF
cost
<cr>
DellEMC(conf-ipv6-router_ospf)#
```

clear ipv6 ospf process

Reset an OSPFv3 router process without removing or re-configuring the process.

Syntax `clear ipv6 ospf [vrf vrf-name] process`

Parameters

vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to clear IPv6 routes corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for C-Series.
7.4.1.0	Introduced on the E-Series.

debug ipv6 ospf bfd

Display debug information and interface types for bidirectional forwarding detection (BFD) on OSPF IPv6 packets.

Syntax `[no] debug ipv6 ospf bfd [interface] [vrf vrf-name]`

Parameters

interface (OPTIONAL) Enter one of the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

vrf *vrf-name* Enter the keyword `vrf` to view debugging information on OSPF corresponding to that VRF.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.1P1)	Introduced VRF support.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Introduced on the S4820T, S4810, and Z9000.

Usage Information

The following section describes the command fields.

Lines Beginning With or Including	Description
OSPFv3...	Debugging is on for all OSPFv3 packets and all interfaces.
05:21:01	Displays the time stamp.
Sending Ver:3	Sending OSPF3 version..

Example

```
DellEMC(conf-if-tf-1/2)# do debug ipv6 ospf bfd twentyFiveGigE 1/2
OSPFv3 bfd related debugging is on for twentyFiveGigE 1/2
00:59:26 : OSPFv3INFO: Received Interface mode bfd config command on
interface Tf 1/2 Enable 1, interval 0, min_rx 0, Multiplier 0, role 0,
Disable 0
00:59:26 : OSPFv3INFO: Enabling BFD on interface Tf 1/2 Cmd Add Session
00:59:27 : OSPFv3INFO: Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
00:59:27 : OSPFv3INFO: Completed Enabling BFD on interface Tf 1/2
00:59:27 : OSPFv3INFO: Completed Interface mode BFD configuration on Tf
1/2!!
00:59:27 : OSPFv3INFO: Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
00:59:27 : OSPFv3INFO: Ospf3_register_bfd ospf key 27648
00:59:27 : OSPFv3INFO: OSPFV3 Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720 Interface Tf 1/2 IfIndex 34145282
00:59:27 : OSPFv3INFO: BFD parameters interval 100 min_rx 100 mult 3
role active
00:59:27 : OSPFv3INFO: BFD parameters interval 100 min_rx 100 mult 3
role active
00:59:27 : OSPFv3INFO: Completed Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
Aug 25 11:19:59: %STKUNIT0-M:CP %BFDMGR-1-BFD_STATE_CHANGE: Changed
session state to Init for neighbor fe80::201:e8ff:fe8b:7720 on interface
Tf 1/2 (diag: NBR_DN)
Aug 25 11:20:00: %STKUNIT0-M:CP %BFDMGR-1-BFD_STATE_CHANGE: Changed
session state to Up for neighbor fe80::201:e8ff:fe8b:7720 on interface
Tf 1/2 (diag: NO_DIAG)
00:59:45 : OSPFv3INFO: OSPFV3 got BFD msg
00:59:45 : OSPFv3INFO: Bfd Msg Type Up for interface Tf 1/2
00:59:45 : OSPFv3INFO: OSPFV3 updating NBR state
```

debug ipv6 ospf packet

Display debug information and interface types on OSPF IPv6 packets.

Syntax

```
debug ipv6 ospf packet [interface] [vrf vrf-name] [detail]
```

Parameters

interface

(OPTIONAL) Enter one of the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

vrf *vrf-name* Enter the keyword `vrf` to view debugging information on OSPF corresponding to that VRF.

detail Enter the keyword `detail` to view detailed debugging information.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14.1.0	The `detail`option is introduced on the S4810 and S4820T.
9.13(0.0)	Added support for detailed debugging.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for C-Series.
7.4.1.0	Introduced on E-Series.

Example

```
DellEMC# debug ipv6 ospf packet
OSPFv3 packet related debugging is on for all interfaces
05:21:01 : OSPFv3: Sending, Ver:3, Type:1(Hello), Len:40, Router
ID:223.255.255.254, Area ID:0, Inst:0, on Po 255
05:21:03 : OSPFv3: Received, Ver:3, Type:1(Hello), Len:40, Router
ID:223.255.255.255, Area ID:0, Chksum:a177, Inst:0, from Vl 100
05:20:25 : OSPFv3: Sending, Ver:3, Type:4(LS Update), Len:580, Router
ID:223.255.255.254, Area ID:0, Inst:0, on Vl 1000
07:21:40 : OSPFv3: Received, Ver:3, Type:1(Hello), Len:40, Router
ID:223.255.255.254, Area ID:0, Chksum:af8f, Inst:0, from Tf 1/6
DellEMC#
```

Example (detail)

```
DellEMC# debug ipv6 ospf packet te 0/7 detail

00:37:52 : OSPFv3: Rcv,V:3 Type:4(LSUpd) RId:10,130.254.101 Area:0
Inst:0 Len:96 Cksum:0x6779 #LSA:2
                          -LSA:ASExt Age:3600 LSId:0.0.0.1
RId:10.130.254.101 Seq:0x80000001
                              Met:20(E2) Opt:0x10(DN ) Prefix:9001::/64
                          -LSA:Router Age:1 LSId:0.0.0.0
RId:10.130.254.101 Seq:0x80000003
                              Flags:0x2(E) Opt:0x13(R E V6) #Links:1
                                  -Type:TRNET Met:1 IntfId:1049476
NbrIntfId:1049476 NbrRId:10.160.3.37 from Te 0/7
DellEMC#
```

Command Fields

Lines Beginning With or Including	Description
OSPFv3...	Debugging is on for all OSPFv3 packets and all interfaces.
05:21:01	Displays the time stamp.
Sending Ver:3	Sending OSPF3 version..
type:	Displays the type of packet sent: ● 1 - Hello packet ● 2 - database description ● 3 - link state request ● 4 - link state update ● 5 - link state acknowledgement
Length:	Displays the OSPFv3 packet length.
Router ID:	Displays the OSPFv3 router ID.
Area ID:	Displays the OSPFv3 area ID.
Chksum:	Displays the OSPFv3 checksum.

debug ipv6 ospf spf

Display debug information for SPF timers on OSPF IPv6 packets.

Syntax `[no] debug ipv6 ospf spf [vrf vrf-name]`

Parameters

interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: ● For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. ● For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. ● For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. ● For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. ● For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. ● For a port channel interface, enter the keywords `port-channel` then a number. ● For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
vrf *vrf-name*	Enter the keyword `vrf` to view debugging information on OSPF corresponding to that VRF.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information

The following section describes the command fields.

Lines Beginning With or Including	Description
OSPFv3...	Debugging is on for all OSPFv3 packets and all interfaces.
05:21:01	Displays the time stamp.
Sending Ver:3	Sending OSPF3 version..

Example

```
DellEMC(conf-if-tf-1/2)# do debug ipv6 ospf bfd tw 1/2
OSPFv3 bfd related debugging is on for twentyFiveGigE 1/2
00:59:26 : OSPFv3INFO: Received Interface mode bfd config command on
interface Tf 1/2 Enable 1, interval 0, min_rx 0, Multiplier 0, role 0,
Disable 0
00:59:26 : OSPFv3INFO: Enabling BFD on interface Tf 1/2 Cmd Add Session
00:59:27 : OSPFv3INFO: Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
00:59:27 : OSPFv3INFO: Completed Enabling BFD on interface Tf 1/2
00:59:27 : OSPFv3INFO: Completed Interface mode BFD configuration on Tf
1/2!!
00:59:27 : OSPFv3INFO: Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
00:59:27 : OSPFv3INFO: Ospf3_register_bfd ospf key 27648
00:59:27 : OSPFv3INFO: OSPFV3 Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720 Interface Tf 1/2 IfIndex 34145282
00:59:27 : OSPFv3INFO: BFD parameters interval 100 min_rx 100 mult 3
role active
00:59:27 : OSPFv3INFO: BFD parameters interval 100 min_rx 100 mult 3
role active
00:59:27 : OSPFv3INFO: Completed Enabling BFD for NBRIP
fe80:0000:0000:0000:0201:e8ff:fe8b:7720
Aug 25 11:19:59: %STKUNIT0-M:CP %BFDMGR-1-BFD_STATE_CHANGE: Changed
session state to Init for neighbor fe80::201:e8ff:fe8b:7720 on interface
Tf 1/2 (diag: NBR_DN)
Aug 25 11:20:00: %STKUNIT0-M:CP %BFDMGR-1-BFD_STATE_CHANGE: Changed
session state to Up for neighbor fe80::201:e8ff:fe8b:7720 on interface
Tf 1/2 (diag: NO_DIAG)
00:59:45 : OSPFv3INFO: OSPFV3 got BFD msg
00:59:45 : OSPFv3INFO: Bfd Msg Type Up for interface Tf 1/2
00:59:45 : OSPFv3INFO: OSPFV3 updating NBR state
```

default-information originate

Configure the Dell EMC Networking OS to generate a default external route into an OSPFv3 routing domain.

Syntax

`default-information originate [always] [metric` *`metric-value`*`] [metric-type` *`type-value`*`] [route-map` *`map-name`*`]`

To return to the default values, use the `no default-information originate` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to specify that default route information must always be advertised.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number to configure a metric value for the route. The range is from 1 to 16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then an OSPFv3 link state type of 1 or 2 for default routes. The values are: • 1 = Type 1 external route • 2 = Type 2 external route

	route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of an established route map.

Defaults Disabled.

Command Modes ROUTER OSPFv3

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for C-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- redistribute — redistribute routes from other routing protocols into OSPFv3.

graceful-restart grace-period

Enable OSPFv3 graceful restart globally by setting the grace period (in seconds) that an OSPFv3 router's neighbors continues to advertise the router as adjacent during a graceful restart.

Syntax `graceful-restart grace-period` *seconds*

To disable OSPFv3 graceful restart, enter `no graceful-restart grace-period`.

Parameters	***seconds***	Time duration, in seconds, that specifies the duration of the restart process before OSPFv3 terminates the process. The range is from 40 to 1800 seconds.

Defaults OSPFv3 graceful restart is disabled and functions in a helper-only role.

Command Modes ROUTER OSPFv3

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.2	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

By default, OSPFv3 graceful restart is disabled and functions only in a helper role to help restarting neighbor routers in their graceful restarts when it receives a Grace LSA.

To enable OSPFv3 graceful restart, enter the ipv6 router ospf command to enter OSPFv3 configuration mode and then configure a grace period using the graceful-restart grace-period command. The grace period is the length of time that OSPFv3 neighbors continue to advertise the restarting router as though it is fully adjacent. When graceful restart is enabled (restarting role), an OSPFv3 restarting expects its OSPFv3 neighbors to help when it restarts by not advertising the broken link.

When you enable the helper-reject role on an interface with the ipv6 ospf graceful-restart helper-reject command, you reconfigure OSPFv3 graceful restart to function in a "restarting-only" role. In a "restarting-only" role, OSPFv3 does not participate in the graceful restart of a neighbor.

graceful-restart mode

Specify the type of events that trigger an OSPFv3 graceful restart.

Syntax

```
graceful-restart mode {planned-only | unplanned-only}
```

To disable graceful restart mode, enter `no graceful-restart mode`.

Parameters

planned-only	(OPTIONAL) Enter the keywords `planned-only` to indicate graceful restart is supported in a planned restart condition only.
unplanned-only	(OPTIONAL) Enter the keywords `unplanned-only` to indicate graceful restart is supported in an unplanned restart condition only.

Defaults

OSPFv3 graceful restart supports both planned and unplanned failures.

Command Modes

ROUTER OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.2	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

OSPFv3 graceful restart supports planned-only and/or unplanned-only restarts. The default is support for both planned and unplanned restarts.

- A planned restart occurs when you enter the `redundancy force-failover rpm` command to force the primary RPM to switch to the backup RPM. During a planned restart, OSPF sends out a Type-11 Grace LSA before the system switches over to the backup RPM.
- An unplanned restart occurs when an unplanned event causes the active RPM to switch to the backup RPM, such as when an active process crashes, the active RPM is removed, or a power failure happens. During an unplanned restart, OSPF sends out a Grace LSA when the backup RPM comes online.

By default, both planned and unplanned restarts trigger an OSPFv3 graceful restart. Selecting one or the other mode restricts OSPFv3 to the single selected mode.

ipv6 ospf area

Enable IPv6 OSPF on an interface.

Syntax

`ipv6 ospf process id areaarea id`

To disable OSPFv6 routing for an interface, use the `no ipv6 ospf process-id area area-id` command.

Parameters

process-id	Enter the process identification number.
area *area-id*	Specify the OSPF area. The range is from 0 to 4294967295.

Defaults

None

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.2)	Increased the area ID value from 65535 to 4294967295.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.

Version	Description
7.4.1.0	Introduced on the E-Series and C-Series.

ipv6 ospf authentication

Configure an IPsec authentication policy for OSPFv3 packets on an IPv6 interface.

Syntax

```
ipv6 ospf authentication {null | ipsec spi number {MD5 | SHA1} [key-encryption-type] key}}
```

Parameters

null	Causes an authentication policy configured for the area to not be inherited on the interface.
ipsec spi number	Security Policy index (SPI) value that identifies an IPsec security policy. The range is from 256 to 4294967295.
MD5 | SHA1	Authentication type: Message Digest 5 (MD5) or Secure Hash Algorithm 1 (SHA-1).
key-encryption-type	(OPTIONAL) Specifies if the key is encrypted. Valid values: 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in authentication. For MD5 authentication, the key must be 32 hex digits (non-encrypted) or 64 hex digits (encrypted). For SHA-1 authentication, the key must be 40 hex digits (non-encrypted) or 80 hex digits (encrypted).

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on S4810 and Z9000.
8.4.2.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information Before you enable IPsec authentication on an OSPFv3 interface, first enable IPv6 unicast routing globally, configure an IPv6 address and enable OSPFv3 on the interface, and assign the interface to an area.

An SPI value must be unique to one IPsec security policy (authentication or encryption) on the router. Configure the same authentication policy (same SPI and key) on each OSPFv3 interface in a link.

To remove an IPsec authentication policy from an interface, enter the no ipv6 ospf authentication `spi` *`number`* command. To remove null authentication on an interface to allow the interface to inherit the authentication policy configured for the OSPFv3 area, enter the `no ipv6 ospf authentication null` command.

ipv6 ospf cost

Explicitly specify the cost of sending a packet on an interface.

Syntax `ipv6 ospf` *`interface-cost`*

Parameters

interface-cost Enter a unsigned integer value expressed as the link-state metric. The range is from 1 to 65535.

Defaults Default cost based on the bandwidth.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
7.8.1.0	Added support for C-Series.
7.4.1.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information In general, the path cost is calculated as:

10^8 / bandwidth

Using this formula, the default path cost is calculated as:

- GigabitEthernet — Default cost is 1
- TenGigabitEthernet — Default cost is 1
- FortygigEthernet — Default cost is 1
- Ethernet — Default cost is 10

ipv6 ospf dead-interval

Set the time interval since the last hello-packet was received from a router. After the time interval elapses, the neighboring routers declare the router down.

Syntax

```
ipv6 ospf dead-interval seconds
```

To return to the default time interval, use the `no ipv6 ospf dead-interval` command.

Parameters

seconds	Enter the time interval in seconds. The range is from 1 to 65535 seconds.

Defaults 40 seconds (Ethernet).

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
7.8.1.0	Added support for C-Series.
7.4.1.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information By default, the dead interval is four times longer than the default hello-interval.

Related Commands

- ipv6 ospf hello-interval – specify the time interval between hello packets.

ipv6 ospf encryption

Configure an IPsec encryption policy for OSPFv3 packets on an IPv6 interface.

Syntax

```
ipv6 ospf encryption {null | ipsec spi number esp encryption-algorithm
[key-encryption-type] key athentication-algorithm [key-encryption-type]
key}}
```

Parameters

null	Causes an encryption policy configured for the area to not be inherited on the interface.
ipsec spi number	Security Policy index (SPI) value that identifies an IPsec security policy. The range is from 256 to 4294967295.

esp *encryption-algorithm*	Encryption algorithm used with ESP. Valid values are: 3DES, DES, AES-CBC, and NULL. For AES-CBC, only the AES-128 and AES-192 ciphers are supported.
key-encryption-type	(OPTIONAL) Specifies if the key is encrypted. Valid values: 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in authentication. The required lengths of a non-encrypted or encrypted key are: 3DES - 48 or 96 hex digits; DES - 16 or 32 hex digits; AES-CBC -32 or 64 hex digits for AES-128 and 48 or 96 hex digits for AES-192.
authentication-algorithm	Specifies the authentication algorithm to use for encryption. Valid values are `MD5` or `SHA1`.
key-encryption-type	(OPTIONAL) Specifies if the authentication key is encrypted. Valid values: 0 (key is not encrypted) or 7 (key is encrypted).
key	Text string used in authentication. For MD5 authentication, the key must be 32 hex digits (non-encrypted) or 64 hex digits (encrypted). For SHA-1 authentication, the key must be 40 hex digits (non-encrypted) or 80 hex digits (encrypted).

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information Before you enable IPsec encryption on an OSPFv3 interface, first enable IPv6 unicast routing globally, configure an IPv6 address and enable OSPFv3 on the interface, and assign the interface to an area.

An SPI value must be unique to one IPsec security policy (authentication or encryption) on the router. Configure the same encryption policy (same SPI and key) on each OSPFv3 interface in a link.

To remove an IPsec encryption policy from an interface, enter the `no ipv6 ospf encryption spi` *`number`* command. To remove null authentication on an interface to allow the interface to inherit the

authentication policy configured for the OSPFv3 area, enter the `no ipv6 ospf no ipv6 ospf encryption null` command.

ipv6 ospf graceful-restart helper-reject

Configure an OSPFv3 interface to not act upon the Grace LSAs that it receives from a restarting OSPFv3 neighbor.

Syntax

`ipv6 ospf graceful-restart helper-reject`

To disable the helper-reject role, enter `no ipv6 ospf graceful-restart helper-reject`.

Defaults

The helper-reject role is not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.2	Introduced on E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

By default, OSPFv3 graceful restart is disabled and functions only in a helper role to help restarting neighbor routers in their graceful restarts when it receives a Grace LSA.

When configured in a helper-reject role, an OSPFv3 router ignores the Grace LSAs that it receives from a restarting OSPFv3 neighbor.

The graceful-restart role command is not supported in OSPFv3. When you enable the helper-reject role on an interface, you reconfigure an OSPFv3 router to function in a “restarting-only” role.

ipv6 ospf hello-interval

Specify the time interval between the hello packets sent on the interface.

Syntax

`ipv6 ospf hello–interval` *`seconds`*

To return to the default time interval, enter `no ipv6 ospf hello–interval`.

Parameters

seconds Enter the time interval in seconds as the time between hello packets. The range is from 1 to 65525 seconds.

Defaults 10 seconds (Ethernet).

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information The time interval between hello packets must be the same for routers in a network.

Related Commands

- ipv6 ospf dead-interval – specify the time interval between hello packets was received from a router.

ipv6 ospf priority

To determine the Designated Router for the OSPFv3 network, set the priority of the interface.

Syntax `ipv6 ospf priority` *number*

To return to the default time interval, use the `no ipv6 ospf priority` command.

Parameters

number	Enter the number as the priority. The range is from 1 to 255.

Defaults 1

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

Setting a priority of 0 makes the router ineligible for election as a Designated Router or Backup Designated Router.

Use this command for interfaces connected to multi-access networks, not point-to-point networks.

ipv6 router ospf

Enable OSPF for IPv6 router configuration.

Syntax

`ipv6 router ospf process-id [vrf vrf-name]`

To exit OSPF for IPv6, use the `no ipv6 router ospf process-id` command.

Parameters

process-id	Enter the process identification number. The range is from 1 to 65535.
vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to install IPv6 routes in that VRF.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.

Version	Description
7.4.1.0	Introduced on the E-Series.

maximum-paths

Enable the software to forward packets over multiple paths.

Syntax `maximum-paths number`

To disable packet forwarding over multiple paths, use the `no maximum-paths` command.

Parameters

number	Specify the number of paths. The range is from 1 to 64. The default is **8** paths.

Defaults 8

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Added support for Multi-Process OSPF.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.1	Introduced on the E-Series.

max-metric router-lsa

Configure the maximum cost of 65535 on a new router so that it functions as a stub router in the network and OSPF traffic destined to other networks is not forwarded on a path through the router.

C-Series, E-Series, Z-Series, S4810

Syntax **max-metric router-lsa** [**on-startup** {*announce-time* | **wait-for-bgp** [*wait-time*]}]

To remove the maximum metric assignment from an OSPF router and send LSAs with the currently configured cost, enter **no max-metric router-lsa** [**on-startup** {*announce-time* | **wait-for-bgp** [*wait-time*]}].

Parameters

on-startup *announce-time*	Enter the time (in seconds) following boot-up during which the maximum cost (65535) for transmitting OSPF traffic on router interfaces is announced in LSAs and the router functions as a stub router. Range: 5 to 86400 seconds.
on-startup wait-for-bgp [*wait-time*]	Enable the router to announce the maximum metric in OSPF LSAs until the BGP routing table converges with updated routes. Default: 600 seconds. You can also specify the time (in seconds) that the router waits for the BGP routing table to converge before it stops advertising the maximum cost in LSAs and advertises the router's currently configured OSPF cost. Range: 5 to 86400 seconds.

Defaults Not Configured.

Command Modes ROUTER OSPF

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.5	Introduced on C-Series and E-Series TeraScale.
8.4.1.3	Introduced on E-Series ExaScale.

Usage Information

When you bring a new router onto an OSPF network, you can configure the router to function as a stub router by globally reconfiguring the OSPF link cost so that other routers do not use a path that forwards traffic destined to other networks through the new router for a specified time until the router's switching and routing functions are up and running, and the routing tables in network routers have converged.

By using the **max-metric router-lsa** command, you force the link cost of all OSPF non-stub links to the maximum link cost (65535). The advertisement of this maximum metric causes other routers to assign a cost to the new router that is higher than the cost of using an alternate path. Because of the high cost assigned to paths that pass through the new router, other routers will not use a path through the router as a transit path to forward traffic to other networks.

Use the **max-metric router-lsa** command to gracefully shut down or reload a router without dropping packets destined for other networks.

NOTE: If you enter the **max-metric router-lsa** command without an option (**on-startup** *announce-time* or **on-startup wait-for-bgp** [*wait-time*]), the maximum metric of 65535 is always announced in LSAs sent by the router.

Example

max-metric router-lsa

```
DellEMC(conf)#router ospf 10
DellEMC(conf-router_ospf)#log-adjacency-changes
DellEMC(conf-router_ospf)#network 4.1.1.0/24 area 0
DellEMC(conf-router_ospf)#network 1.1.1.0/24 area 1
DellEMC(conf-router_ospf)#max-metric router-lsa on-startup wait-for-bgp
DellEMC(conf-router_ospf)#exit

DellEMC(conf)#show ip ospf
Routing Process ospf 10 with ID 100.1.1.1 Virtual router default-vrf
Supports only single TOS (TOS0) routes
It is an Area Border Router
Originating router lsas with maximum metric
```

```
Time remaining 00:07:07
Condition : On-Startup while BGP is converging for 600 secs. State :
Active
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Convergence Level 0
Min LSA origination 5 secs, Min LSA arrival 1 secs
Number of area in this router is 2, normal 2 stub 0 nssa 0
 Area BACKBONE (0)
  Number of interface in this area is 1
  SPF algorithm executed 3 times
  Area ranges are
 Area 1
  Number of interface in this area is 1
  SPF algorithm executed 3 times
  Area ranges are

DellEMC(conf)#show ip ospf database router
Exception Flag: Announcing maximum link costs
  LS age: 198
  Options: (No TOS-capability, DC)
  LS Type: Router Links
  Link State ID: 2.1.1.1
  Advertising Router: 2.1.1.1
  LS Seq Number: 80000005
  Checksum: 0x9F5D
  Length: 48
  Number of Links: 2
```

passive-interface

Disable (suppress) sending routing updates on an interface.

Syntax

`passive—interface` *interface*

To enable sending routing updates on an interface, use the `no passive-interface` *interface* command.

Parameters

interface

Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Enabled, that is sending of routing updates are enabled by default.

Command Modes

ROUTER OSPF for OSPFv2

ROUTER OSPFv3 for OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

By default, no interfaces are *passive*. Routing updates are sent to all interfaces on which the routing protocol is enabled.

If you disable the sending of routing updates on an interface, the particular address prefix continues to be advertised to other interfaces, and updates from other routers on that interface continue to be received and processed.

OSPFv3 for IPv6 routing information is not sent or received through the specified router interface. The specified interface address appears as a stub network in the OSPFv3 for IPv6 domain.

On configuring suppression using the passive-interface command, the state of the OSPF neighbor does not change to INIT; instead, the state of the OSPF neighbor changes to DOWN after the dead-timer expires.

redistribute

Redistribute into OSPFv3.

Syntax

`redistribute {bgp` *`as number`*`}{connected | static}[metric` *`metric-value`* `| metric-type` *`type-value`*`] [route-map` *`map-name`*`] [tag` *`tag-value`*`]`

To disable redistribution, use the `no redistribute {connected | static}` command.

Parameters

bgp *as number*
Enter the keyword `bgp` then the autonomous system number.
The range is from 1 to 65535.

connected
Enter the keyword `connected` to redistribute routes from physically connected interfaces.

static
Enter the keyword `static` to redistribute manually configured routes.

metric *metric-value*
Enter the keyword `metric` then the metric value.
The range is from 0 to 16777214.
The default is **20**.

metric-type *type-value*
(OPTIONAL) Enter the keywords `metric-type` then the OSPFv3 link state type of 1 or 2 for default routes. The values are:

- 1 for a type 1 external route

- 2 for a type 2 external route

The default is **2**.

route-map *map-name* (OPTIONAL) Enter the keywords `route-map` then the name of an established route map. If the route map is not configured, the default is **deny** (to drop all routes).

tag *tag-value* (OPTIONAL) Enter the keyword `tag` to set the tag for routes redistributed into OSPFv3.

The range is from 0 to 4294967295

The default is **0**.

Defaults Not configured.

Command Modes ROUTER OSPF for OSPFv2

ROUTER OSPFv3 for OSPFv3

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information To redistribute the default route (x:x:x:x::x), use the `default-information originate` command.

router-id

Designate a fixed router ID.

Syntax `router-id ip-address`

To return to the previous router ID, use the `no router-id ip-address` command.

Parameters

ip-address Enter the router ID in the dotted decimal format.

Defaults The router ID is selected automatically from the set of IPv4 addresses configured on a router.

Command Modes ROUTER OSPF for OSPFv2

ROUTER OSPFv3 for OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

You can configure an arbitrary value in the IP address for each router. However, each router ID must be unique.

If this command is used on an OSPFv3 process that is already active (has neighbors), all the neighbor adjacencies are brought down immediately and new sessions are initiated with the new router ID.

show crypto ipsec policy

Display the configuration of IPsec authentication and encryption policies.

Syntax **show crypto ipsec policy** `[name name]`

Parameters

name *name*	(OPTIONAL) Displays configuration details about a specified policy.

Defaults No default behavior or values.

Command Modes EXEC

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

The `show crypto ipsec policy` command output displays the AH and ESP parameters configured in IPsec security policies, including the SPI number, keys, and algorithms used.

When configured in a helper-reject role, an OSPFv3 router ignores the Grace LSAs that it receives from a restarting OSPFv3 neighbor.

Related Commands

show crypto ipsec sa ipv6– displays the IPsec security associations used on OSPFv3 interfaces.

Example

```
DellEMC# show crypto ipsec policy

Crypto IPSec client security policy data

Policy name : OSPFv3-1-502
Policy refcount : 1
Inbound ESP SPI : 502 (0x1F6)
Outbound ESP SPI : 502 (0x1F6)
Inbound ESP Auth Key : 123456789a123456789b123456789c12
Outbound ESP Auth Key : 123456789a123456789b123456789c12
Inbound ESP Cipher Key :
123456789a123456789b123456789c123456789d12345678
Outbound ESP Cipher Key :
123456789a123456789b123456789c123456789d12345678
Transform set : esp-3des esp-md5-hmac

Crypto IPSec client security policy data

Policy name : OSPFv3-0-501
Policy refcount : 1
Inbound ESP SPI : 501 (0x1F5)
Outbound ESP SPI : 501 (0x1F5)
Inbound ESP Auth Key :
bbdd96e6eb4828e2e27bc3f9ff541e43faa759c9ef5706ba8ed8bb5efe91e97eb7c0
c30808825fb5
Outbound ESP Auth Key :
bbdd96e6eb4828e2e27bc3f9ff541e43faa759c9ef5706ba8ed8bb5efe91e97eb7c0
c30808825fb5
Inbound ESP Cipher Key :
bbdd96e6eb4828e2e27bc3f9ff541e43faa759c9ef5706ba10345a1039ba8f8a
Outbound ESP Cipher Key :
bbdd96e6eb4828e2e27bc3f9ff541e43faa759c9ef5706ba10345a1039ba8f8a
Transform set : esp-128-aes esp-sha1-hmac
```

show crypto ipsec policy Command Fields

Field	Description
Policy name	Displays the name of an IPsec policy.
Policy refcount	Number of interfaces on the router that use the policy.
Inbound ESP SPI and Outbound ESP SPI	The encapsulating security payload (ESP) security policy index (SPI) for inbound and outbound links.
Inbound ESP Auth Key and	The ESP authentication key for inbound and outbound links.

Field	Description
Outbound Auth Key	
Inbound ESP Cipher Key and Outbound ESP Cipher Key	The ESP encryption key for inbound and outbound links.
Transform set	The set of security protocols and algorithms used in the policy.
Inbound AH SPI and Outbound AH SPI	The authentication header (AH) security policy index (SPI) for inbound and outbound links.
Inbound AH Key and Outbound AH Key	The AH key for inbound and outbound links.

show crypto ipsec sa ipv6

Display the IPsec security associations (SAs) used on OSPFv3 interfaces.

Syntax `show crypto ipsec sa ipv6 [interface interface]`

Parameters

interface *interface*

(OPTIONAL) Displays information about the SAs used on a specified OSPFv3 interface, where *interface* is one of the following values:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults No default behavior or values.

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced on the S4810 and Z9000.
8.4.2.0	Introduced on the E-Series.
8.3.19.0	Introduced on the S4820T.

Usage Information

The `show crypto ipsec sa ipv6` command output displays security associations set up for OSPFv3 links in IPsec authentication and encryption policies on the router.

Related Commands

show crypto ipsec policy – displays the configuration of IPsec authentication and encryption policies.

Example

```
DellEMC# show crypto ipsec policy
DellEMC# show crypto ipsec sa ipv6

Interface: twentyFiveGigE  1/1
 Link Local address: fe80::201:e8ff:fe40:4d10
 IPSecv6 policy name: OSPFv3-1-500

 inbound ah sas
  spi : 500 (0x1f4)
   transform : ah-md5-hmac
   in use settings : {Transport, }
   replay detection support : N
   STATUS : ACTIVE

 outbound ah sas
  spi : 500 (0x1f4)
   transform : ah-md5-hmac
   in use settings : {Transport, }
   replay detection support : N
   STATUS : ACTIVE

 inbound esp sas

 outbound esp sas


Interface: twentyFiveGigE 1/2
 Link Local address: fe80::201:e8ff:fe40:4d11
 IPSecv6 policy name: OSPFv3-1-600

 inbound ah sas

 outbound ah sas

 inbound esp sas
  spi : 600 (0x258)
   transform : esp-des esp-sha1-hmac
   in use settings : {Transport, }
   replay detection support : N
   STATUS : ACTIVE

 outbound esp sas
  spi : 600 (0x258)
   transform : esp-des esp-sha1-hmac
   in use settings : {Transport, }
   replay detection support : N
   STATUS : ACTIVE
```

show crypto ipsec sa ipv6 Command Fields

Field	Description
Interface	IPv6 interface
Link local address	IPv6 address of interface
IPSecv6 policy name	Name of the IPsec security policy applied to the interface.
inbound/ outbound ah	Authentication policy applied to inbound or outbound traffic.
inbound/ outbound esp	Encryption policy applied to inbound or outbound traffic.
spi	Security policy index number used to identify the policy.
transform	Security algorithm that is used to provide authentication, integrity, and confidentiality.
in use settings	Transform that the SA uses (only transport mode is supported).
replay detection support	Y: An SA has enabled the replay detection feature. N: The replay detection feature is not enabled.
STATUS	ACTIVE: The authentication or encryption policy is enabled on the interface.

show ipv6 ospf database

Display information in the OSPFv3 database, including link-state advertisements (LSAs) in detail.

Syntax

```
show ipv6 ospf [process-number] [vrf vrf-name] database [database-summary | grace-lsa | external | inter-area-prefix | inter-area-router | intra-area-prefix | link | network | router | nssa-external]
```

Parameters

process-number	Enter the OSPF process number.
vrf *vrf-name*	(Optional) Enter the keyword vrf followed by the name of the VRF to display neighbors corresponding to that VRF. **NOTE:** If you do not specify this option, neighbors corresponding to the default VRF are displayed.
database-summary	(OPTIONAL) Enter the keyword `database-summary` to view a summary of database LSA information.
external	(OPTIONAL): Enter the keyword `external` to display the external link states.
grace-lsa	(OPTIONAL): Enter the keyword `grace-lsa` to display the Type-11 Grace LSAs sent and received on an OSPFv3 router.
inter-area-prefix	(OPTIONAL): Enter the keyword `inter-area-prefix` to display the inter area prefix link states.
inter-area-router	(OPTIONAL): Enter the keyword `inter-area-router` to display the inter area router link states.
intra-area-prefix	(OPTIONAL): Enter the keyword `intra-area-prefix` to display the intra area prefix link states.
link	(OPTIONAL): Enter the keyword `link` to display the link states.
network	(OPTIONAL): Enter the keyword `network` to display the network link states.
nssa-external	(OPTIONAL): Enter the keyword `nssa-external` to display the nssa link state information.

router (OPTIONAL): Enter the keyword `router` to display the router link states.

Defaults None

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14.1.0	The support to display detailed information of all the types of LSAs is introduced in S4810 and S4820T.
9.13(0.0)	Added support to display all the types of LSAs in detail.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Added support for OSPFv3 on the S4810 and Z9000.
8.4.2.2	Added support for the display of graceful restart parameters and Type-11 Grace LSAs on E-Series routers.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for C-Series.

Usage Information The `show ipv6 ospf database` command output displays detailed information on the OSPFv3 database, including link-state advertisements (LSAs).

Example (grace-lsa)

```
DellEMC# show ipv6 ospf 3 database grace-lsa
!
Type-11 Grace LSA (Area 0)

LS Age : 10
Link State ID : 6.16.192.66
Advertising Router : 100.1.1.1
LS Seq Number : 0x80000001
Checksum : 0x1DF1
Length : 36
Associated Interface : Tf 1/3
Restart Interval : 180
Restart Reason : Switch to Redundant Processor
```

Example (database-summary)

```
DellEMC# show ipv6 ospf 3 database database-summary

OSPFv3 Router with ID (1.1.1.1) (Process ID 1)

Process 1 database summary
Type         Count/Status
Oper Status         1
```

```
Admin Status          1
Area Bdr Rtr Status          1
AS Bdr Rtr Status          1
AS Scope LSA Count      0
AS Scope LSA Cksum sum      0
Originate New LSAS      50
Rx New LSAS          22
Ext LSA Count          0
Rte Max Eq Cost Paths      10
GR grace-period          180
GR mode          planned and unplanned

Area 0 database summary
Type         Count/Status
Brd Rtr Count          1
AS Bdr Rtr Count          1
LSA count          6
Rtr LSA Count          2
Net LSA Count          1
Inter Area Pfx LSA Count 1
Inter Area Rtr LSA Count      0
Group Mem LSA Count      0
Type-7 LSA count          0
Intra Area Pfx LSA Count      2
Intra Area TF LSA Count     2

Area 1 database summary
Type          Count/Status
Brd Rtr Count          1
AS Bdr Rtr Count          1
LSA count          8
Rtr LSA Count          1
Net LSA Count          0
Inter Area Pfx LSA Count      5
Inter Area Rtr LSA Count      0
Group Mem LSA Count      0
Type-7 LSA count          0
Intra Area Pfx LSA Count      2
Intra Area TF LSA Count      2
E1200-T2C2#sh ipv6 ospf neighbor

Neighbor ID     Pri     State          Dead Time     Interface ID
Interface
63.114.8.36     1     FULL/DR          00:00:37          4 Tf 1/4
```

Example (external)

```
DellEMC# show ipv6 ospf database external

      OSPFv3 Router with ID (10.160.3.37) (Process ID 6)

                        AS External Link States (Area 0)

  LS Age: 1651
  LS Type: OSPFv3 AS external LSA
  Link State ID: 0.0.0.1
  Advertising Router: 10.130.254.101
  LS Seq Number: 0x80000001
  Checksum: 0xF038
  Length: 36
        Prefix: 9001::/64
        Prefix Options: 0x10 ( DN  )
        Metric Type: 2  Metric: 20
```

Example (nssa-external)

```
DellEMC#show ipv6 ospf 10 database nssa-external

             OSPFv3 Router with ID (1.1.1.1) (Process ID 10)

                    AS External Link States (Area 1)

  LS Age: 35
```

```
LS Type: OSPFv3 NSSA LSA
Link State ID: 0.0.0.1
Advertising Router: 1.1.1.1
LS Seq Number: 0x80000001
Checksum: 0xD2DD
Length: 52
     Prefix: 101:101:1::/64
     Prefix Options: 0x8 ( P  )
     Metric Type: 2  Metric: 20
     Forwarding Address: 101:101:1::1
```

show ipv6 ospf interface

View OSPFv3 interface information.

Syntax `show ipv6 ospf [process-number] [vrf vrf-name] [interface]`

Parameters

process-number	Enter the OSPF process number.
vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display neighbors corresponding to that VRF. **NOTE:** If you do not specify this option, neighbors corresponding to the default VRF are displayed.
interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.2.(0.0)	Added support for showing BFD status on the S4820T, S4810, and Z9000.
9.1.(0.0)	Added support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

If you enable BFD at the global level, *show ipv6 ospf interface* shows the BFD provisioning.

If you enable BFD at the interface level, *show ipv6 ospf interface* shows the BFD interval timers.

Example

```
DellEMC# show ipv6 ospf 3 interface twentyFiveGigE 1/2

twentyFiveGigE 1/2 is up, line protocol is up
  Link Local Address fe80::201:e8ff:fe17:5bbd, Interface ID 67420217
  Area 0, Process ID 1, Instance ID 0, Router ID 11.1.1.1
  NetworkType BROADCAST, Cost: 1, Passive: No
  Transmit Delay is 100 sec, State DR, Priority 1
  Interface is using OSPF global mode BFD configuration.
  Designated router on this network is 11.1.1.1 (local)
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 1, Retransmit 5

DellEMC#
```

show ipv6 ospf neighbor

Display the OSPF neighbor information on a per-interface basis.

Syntax

```
show ipv6 ospf [process-number] [vrf vrf-name] neighbor [interface]
```

Parameters

process-number Enter the OSPF process number.

vrf *vrf-name* (OPTIONAL) Enter the keyword vrf followed by the name of the VRF to display OSPF neighbors corresponding to that VRF.

NOTE: If you do not specify this option, neighbors corresponding to the default VRF are displayed.

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults None

Command Modes EXEC

EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.1.(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
8.3.19.0	Introduced on the S4820T.
7.8.1.0	Added support for the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ipv6 ospf 3 neighbor tw 1/2

Neighbor ID  Pri   State        Dead Time   Interface   ID Interface
63.114.8.36  1   FULL/DR   00:00:38       4               Tf 1/2/1

DellEMC#
```

snmp context

Configure SNMPv3 context name to map multiple OSPFv3 VRF instances.

Syntax `snmp context {context-name}`

To clear snmp context, use the `no snmp context {context-name}` command.

Parameters

context-name Enter the SNMP context name. The maximum length is 32 alphanumeric characters.

Defaults None.

Command Modes IPv6 ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6010–ON, S6100–ON, Z9100–ON, Z9500, S6000–ON, C9010, MXL, and FN IOM.

Usage Information Use SNMPv3 context configuration to distinguish between various OSPFv3 VRF instances.

Example

```
DellEMC(conf-ipv6-router_ospf)#snmp context ospf1
```

```
DellEMC>show runnig-config ospf
!
ipv6 router ospf 10
 router-id 10.10.10.1
 snmp context ospf1
!
DellEMC>
```

timers spf

Set the time interval between when the switch receives a topology change and starts a shortest path first (SPF) calculation.

Syntax `timers spf` *`delay holdtime`* `msec`

To return to the default, use the `no timers spf` command.

Parameters

delay	Enter a number as the delay. The range is from 0 to 2147483647. The default is **5 seconds**. When configured in milli seconds, 100 is the least value that is allowed to be configured.
holdtime	Enter a number as the hold time. The range is from 0 to 2147483647. The default is **10 seconds**. When configured in milli seconds, 200 is the least value that is allowed to be configured.
msec	Enter the keyword `msec` to specify the time interval value in milli seconds. **NOTE:** If you do not specify the msec option, the timer values are considered as seconds.

Defaults

- delay = 5 seconds
- holdtime = 10 seconds

Command Modes ROUTER OSPFv3 for OSPFv3 and ROUTER OSPFv2 for OSPFv2

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the keyword `msec`.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S6000-ON, S6000, S4820T, S4810, S5000.

Usage Information

Setting the *delay* and *holdtime* parameters to a low number enables the switch to an alternate path quickly but requires more CPU usage.

Example

```
DellEMC# conf
DellEMC(conf)# ipv6 router ospf 1
DellEMC(conf-ipv6-router_ospf)# timer spf 2 5 msec
DellEMC(conf-ipv6-router_ospf)# show config
!
ipv6 router ospf 1
timers spf 2 5 msec
DellEMC(conf-ipv6-router_ospf)#
DellEMC(conf-ipv6-router_ospf)# end
DellEMC#
```

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Policy-based Routing (PBR)

Policy-based routing (PBR) allows you to apply routing policies to specific interfaces. To enable PBR, create a redirect list and apply it to the interface. After the redirect list is applied to the interface, all traffic passing through the interface is subject to the rules defined in the redirect list. PBR is supported by the Dell EMC Networking OS.

You can apply PBR to physical interfaces and logical interfaces (such as a link aggregation group [LAG] or virtual local area network [VLAN]). Trace lists and redirect lists do not function correctly when you configure both in the same configuration.

NOTE: Apply PBR to Layer 3 interfaces only.

NOTE: For more information , see Content Addressable Memory (CAM).

Topics:

- ip redirect-group
- ip redirect-list
- permit
- redirect
- seq
- show cam pbr
- show ip redirect-list

ip redirect-group

Apply a redirect list (policy-based routing) on an interface. You can apply multiple redirect lists to an interface by entering this command multiple times.

Syntax

`ip redirect-group` *`redirect-list-name`* `test [l2-switch]`

To remove a redirect list from an interface, use the `no ip redirect-group` *`name`* command.

Parameters

redirect-list-name	Enter the name of a configured redirect list.
l2–switch	Enter the keyword `l2-switch` to enable PBR on Layer2 (switched) traffic.

Defaults

None

Command Modes

INTERFACE (conf-if-vl-)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P1)	Introduced the `l2-switch` attribute.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.
8.4.2.0	Introduced on the E-Series.
7.7.1.0	Introduced on the E-Series.

Usage Information

You can apply any number of redirect-groups to an interface. A redirect list can contain any number of configured rules. These rules includes the next-hop IP address where the incoming traffic is to be redirected.

If the next hop address is reachable, traffic is forwarded to the specified next hop. Otherwise, the normal routing table is used to forward traffic. When a redirect-group is applied to an interface and the next-hop is reachable, the rules are added into the PBR CAM region. When incoming traffic hits an entry in the CAM, the traffic is redirected to the corresponding next-hop IP address specified in the rule.

NOTE: Apply the redirect list to physical, VLAN, or LAG interfaces only.

The Layer2 PBR option matches the layer2 traffic flow. If you un-configure this option, then the Layer2 traffic is not matched. You can apply the `l2-switch` option to redirect Layer2 traffic only on a VLAN interface. This VLAN interface must be configured with an IP address for ARP resolution.

NOTE: The `l2-switch` option that redirects Layer2 traffic is applicable only on VLAN interfaces.

The Layer3 routing is not affected on the same interface on which Layer2 PBR is applied. The port from which Layer2 packets egress and the destination MAC are re-written from static ARP. Layer 2 packets with the re-written destination MAC are forwarded through the outgoing port on the same incoming VLAN interface. The l2-switch option ensures that the outgoing VLAN and MAC-SA are changed and TTL is not decremented.

Related Commands

- show cam pbr – display the content of the PBR CAM.
- show ip redirect-list – display the redirect-list configuration.

ip redirect-list

Configure a redirect list and enter REDIRECT-LIST mode.

Syntax

```
ip redirect-list redirect-list-name
```

To remove a redirect list, use the `no ip redirect-list` command.

Parameters

redirect-list-name	Enter the name of a redirect list.

Defaults None

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.
8.4.2.0	Introduced on the E-Series.
6.5.3.0	Introduced on the E-Series.

permit

Configure a permit rule. A permit rule excludes the matching packets from PBR classification and routes them using conventional routing.

Syntax

`permit {ip-protocol-number | protocol-type} {source mask | any | host ip-address} {destination mask | any | host ip-address} [bit] [operators]`

To remove the rule, use one of the following:

- If you know the filter sequence number, use the `no seq sequence-number` syntax command.
- You can also use the `no permit {ip-protocol-number | protocol-type} {source mask | any | host ip-address} {destination mask | any | host ip-address} [bit] [operators]` command.

Parameters

ip-protocol-number	Enter a number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (`/x`).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then he IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function

- `rst` = reset the connection
- `syn` = synchronize sequence number
- `urg` = urgent field

operator (OPTIONAL) For TCP and UDP parameters only. Enter one of the following logical operand:

- `eq` = equal to
- `neq` = not equal to
- `gt` = greater than
- `lt`= less than
- `range` = inclusive range of ports (you must specify two ports for the `port`command parameter.)

Defaults None

Command Modes REDIRECT-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.
8.4.2.0	Introduced on the E-Series.
7.5.1.0	Introduced on the E-Series.

redirect

Configure a rule for the redirect list.

Syntax `redirect {ip-address | slot/port} | tunnel tunnel-id}[track <obj-id>] {ip-protocol-number | protocol-type [bit]} {source mask | any | host ip-address} {destination mask | any | host ip-address} [operator]`

To remove this filter, use one of the following:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- You can also use the `no redirect {ip-address | slot/port}| tunnel tunnel-id} [track <obj-id>] {ip-protocol-number [bit] | protocol-type} {source mask | any | host ip-address} {destination mask | any | host ip-address} [operator]` command.

Parameters

redirect Enter the keyword `redirect` to assign the sequence to the redirect list.

ip-address	Enter the IP address of the forwarding router.
slot/port	Enter the keyword `slot / port` followed by the slot/port information.
tunnel	Enter the keyword `tunnel` to configure the tunnel setting.
tunnel-id	Enter the keyword `tunnel-id` to redirect the traffic.
track	Enter the keyword `track` to enable the tracking.
track <obj-id>	Enter the keyword `track <obj-id>` to track object-id.
ip-protocol-number	Enter a number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function • `rst` = reset the connection • `syn` = synchronize sequence number • `urg` = urgent field
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (`/x`).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
operator	(OPTIONAL) For TCP and UDP parameters only. Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the`port` command parameter.)

Defaults None

Command Modes REDIRECT-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Added support for the track-id on the S4810, S4820T, S6000, and Z9000.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.
8.4.2.1	Introduced on the C-Series and S-Series.
8.4.2.0	Introduced on the E-Series.
7.7.1.0	Introduced on the E-Series.

seq

Configure a filter with an assigned sequence number for the redirect list.

Syntax

```
seq sequence-number {permit | redirect {ip-address | tunnel tunnel-id}
[track <obj-id>] }} {ip-protocol-number | protocol-type} {source mask
| any | host ip-address} {destination mask | any | host ip-address}
[bit] [operator]{source-port source-port| source-port-range start-port -
end-port} {destination-port destination-port| destination-port-range start-
port - end-port}
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 1 to 65535.
permit	Enter the keyword `permit` assign the sequence to the permit list.
redirect	Enter the keyword `redirect` to assign the sequence to the redirect list.
ip-address	Enter the keyword `IP address` of the forwarding router.
tunnel	Enter the keyword `tunnel` to configure the tunnel setting.
tunnel-id	Enter the keyword `tunnel-id` to redirect the traffic.
track	Enter the keyword `track` to enable the tracking.
track <obj-id>	Enter the keyword `track <obj-id>` to track object-id.
ip-protocol-number	Enter the keyword `ip-protocol-number` then the number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (`/x`).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.

bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function • `rst` = reset the connection • `syn` = synchronize sequence number • `urg` = urgent field
operator	(OPTIONAL) For the TCP and UDP parameters only. Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt`= less than • `range` = inclusive range of ports (you must specify two ports for the port command parameter.)
source port	Enter the keywords `source-port` then the port number to be matched in the ACL rule in the ICAP rule
destination-port	Enter the keywords `destination-port` then the port number to be matched in the ACL rule in the ICAP rule.
source-port-range	Enter the keywords `Source-port-range` then the range of the start port to end port to be matched in the ACL rule in the ICAP rule.
destination-port-range	Enter the keywords `destination-port-range` then the range of the start port to end port to be matched in the ACL rule in the ICAP rule.

Defaults none

Command Modes REDIRECT-LIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for the track-id on the S4810, S4820T, S6000, S6000-ON, and Z9000.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

show cam pbr

Display the PBR CAM content.

Syntax

```
show cam pbr {interface interface | stack–unit slot-number port-set number
[pipeline number]} [summary]
```

Parameters

interface *interface*	Enter the keyword `interface` then the name of the interface.
stack–unit *number*	Enter the keyword `stack-unit` then the slot number.
port-set *number*	Enter the keywords `port-set` then the port-pipe number.
summary	Enter the keyword `summary` to view only the total number of CAM entries.
pipeline *number*	Enter the keyword `pipeline` and a number to which the interface belongs. The range is from 0 to 3.

Defaults none

Command Modes EXEC

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information The `show cam pbr` command displays the PBR CAM content.

Example

```
DellEMC# show cam pbr stack-unit 1 port-set 0

TCP Flag: Bit 5 - URG, Bit 4 - ACK, Bit 3 - PSH, Bit 2 - RST,
Bit 1 - SYN, Bit 0 - FIN

Cam   Port VlanID Proto Tcp   Src   Dst   SrcIp           DstIp          Next-hop        Egress
Index                   Flag  Port  Port                                 MAC               Port
-------------------------------------------------------------------------------------------------
00000 5    N/A    IP    0x0   0     0     22.22.2.22/32   33.33.3.0/24   00:01:e8:8a:fd:76 0/0
00001 5    N/A    145   0x0   0     0     0.0.0.0/0       44.4.4.4/32    00:01:e8:8a:fd:76 Vl 100(0/1)
00002 5    N/A    TCP   0x0   0     0     55.1.3.0/24     66.6.6.6/32    00:01:e8:8a:fd:76 Po 128
00003 5    N/A    UDP   0x0   0     0     55.1.3.0/24     66.6.6.6/32    00:01:e8:8a:fd:76 Po 128
00004 5    N/A    IP    0x0   0     0     0.0.0.0/0       0.0.0.0/0      00:01:e8:8a:fd:76 Vl 1020(Po 100)
DellEMC#
```

Related Commands

- ip redirect-group – applies a redirect group to an interface.
- show ip redirect-list – displays the redirect-list configuration.

show ip redirect-list

View the redirect list configuration and the interfaces it is applied to.

Syntax `show ip redirect-list redirect-list-name`

Parameters

redirect-list-name	Enter the name of a configured Redirect list.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Example

```
DellEMC# show ip redirect-list explicit_tunnel
IP redirect-list explicit_tunnel:
Defined as:
seq 5 redirect tunnel 1 track 1 tcp 155.55.2.0/24 222.22.2.0/24, Track 1 [up],
Next-hop reachable (via Tf 1/32)
seq 10 redirect tunnel 1 track 1 tcp any any, Track 1 [up],
Next-hop reachable (via Tf 1/32)
seq 15 redirect tunnel 2 udp 155.55.0.0/16 host 144.144.144.144, Track 1 [up],
Next-hop reachable (via Tf 1/32)
seq 35 redirect 155.1.1.2 track 5 ip 7.7.7.0/24 8.8.8.0/24, Track 5 [up],
Next-hop reachable (via Po 5)
seq 30 redirect 155.1.1.2 track 6 icmp host 8.8.8.8 any, Track 5 [up],
Next-hop reachable (via Po 5)
seq 35 redirect 42.1.1.2 icmp host 8.8.8.8 any, Next-hop reachable (via Vl 20)
seq 40 redirect 43.1.1.2 tcp 155.55.2.0/24 222.22.2.0/24,
Next-hop reachable (via Vl 30)
seq 45 redirect 31.1.1.2 track 200 ip 12.0.0.0 255.0.0.197 13.0.0.0 255.0.0.197,
Track 200 [up], Next-hop reachable (via Tf 1/32)

, Track 200 [up], Next-hop reachable (via Vl 20)

, Track 200 [up], Next-hop reachable (via Po 5)

, Track 200 [up], Next-hop reachable (via Po 7)

, Track 200 [up], Next-hop reachable (via Tf 1/18)

, Track 200 [up], Next-hop reachable (via Tf 1/19)
DellEMC#
```

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PIM-Sparse Mode (PIM-SM)

The protocol-independent multicast (PIM) commands are supported by the Dell EMC Networking operating software on the platform.

The following describes the IPv4 PIM-SIM commands.

Topics:

- IPv4 PIM-Sparse Mode Commands

IPv4 PIM-Sparse Mode Commands

The following describes the IPv4 PIM-sparse mode (PIM-SM) commands.

clear ip pim rp-mapping

The bootstrap router (BSR) feature uses this command to remove all or particular rendezvous point (RP) advertisement.

Syntax `clear ip pim [vrf vrf-name] rp-mapping [rp-address]`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

rp-address (OPTIONAL) Enter the RP address in dotted decimal format (A.B.C.D).

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information This command re-applies the RP mapping logic for all the groups learnt by the node. Any stale information corresponding to the existing mapping configuration is updated. The existing BSR cache and the *,G's are deleted only if these entries are stale.

clear ip pim tib

Clear PIM tree information from the PIM database.

Syntax `clear ip pim [vrf vrf-name] tib [group]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
group	(OPTIONAL) Enter the multicast group address in dotted decimal format (A.B.C.D).

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information If you use this command on a local VLT node, all multicast routes from the local PIM TIB, the entire multicast route table, and all the entries in the data plane are deleted. The local VLT node sends a request to the peer VLT node to download multicast routes learned by the peer. Both local and synced routes are removed from the local VLT node multicast route table. The peer VLT node clears synced routes from the node.

If you use this command on a peer VLT node, only the synced routes are deleted from the multicast route table.

debug ip pim

View IP PIM debugging messages.

Syntax

```
debug ip pim [vrf vrf-name] [bsr | events | group | packet [in | out] |
register | state | timer [assert | hello | joinprune | register]]
```

To disable PIM debugging, use the `no debug ip pim [vrf vrf-name]` command or use the `undebug all` to disable all debugging command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to view IP PIM debugging messages corresponding to that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
bsr	(OPTIONAL) Enter the keyword `bsr` to view PIM Candidate RP/BSR activities.
events	(OPTIONAL) Enter the keyword `group` to view PIM messages for a specific group.
group	(OPTIONAL) Enter the keyword `group` to view PIM messages for a specific group.
packet [in | out]	(OPTIONAL) Enter the keyword `packet` to view PIM packets. Enter one of the optional parameters: • `in`: to view incoming packets • `out`: to view outgoing packets
register	(OPTIONAL) Enter the keyword `register` to view PIM register address in dotted decimal format (A.B.C.D).
state	(OPTIONAL) Enter the keyword `state` to view PIM state changes.
timer [assert | hello | joinprune | register]	(OPTIONAL) Enter the keyword `timer` to view PIM timers. Enter one of the optional parameters: • `assert`: to view the assertion timer • `hello`: to view the PIM neighbor keepalive timer • `joinprune`: to view the expiry timer (join/prune timer) • `register`: to view the register suppression timer

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

ip pim bsr-border

Define the border of PIM domain by filtering inbound and outbound PIM-BSR messages per interface.

Syntax

```
ip pim bsr-border
```

To return to the default value, use the `no ip pim bsr-border` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information This command is applied to the subsequent PIM-BSR. Existing BSR advertisements are cleaned up by time-out. To clean the candidate RP advertisements, use the `clear ip pim rp-mapping` command.

ip pim bsr-candidate

To join the Bootstrap election process, configure the PIM router.

Syntax

`ip pim [vrf vrf-name] bsr-candidate interface [hash-mask-length] [priority]`

To return to the default value, use the `no ip pim bsr-candidate [vrf vrf-name]` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure the PIM router on a VRF.
interface	Enter the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
hash-mask-length	(OPTIONAL) Enter the hash mask length. The range is from four (4) to 32. The default is **four (4)**.
priority	(OPTIONAL) Enter the priority used in Bootstrap election process. The range is from zero (0) to 255. The default is **zero (0)**.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
6.1.1.0	Added support for the VLAN interface.

ip pim dr-priority

Change the designated router (DR) priority for the interface.

Syntax `ip pim dr-priority priority-value`

To remove the DR priority value assigned, use the `no ip pim dr-priority` command.

Parameters

priority-value	Enter a number. Preference is given to larger/higher number. The range is from 0 to 4294967294. The default is 1.

Defaults **1**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series on port-channels and the S-Series.

Usage Information The router with the largest value assigned to an interface becomes the designated router. If two interfaces contain the same designated router priority value, the interface with the largest interface IP address becomes the designated router.

ip pim join-filter

Permit or deny PIM Join/Prune messages on an interface using an extended IP access list. This command prevents the PIM-SM router from creating state based on multicast source and/or group.

Syntax

```
ip pim join-filter ext-access-list [in | out]
```

To remove the access list, use the `no ip pim join-filter ext-access-list` command.

Parameters

ext-access-list Enter the name of an extended access list.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Removed the in and out parameters. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.
7.7.1.0	Introduced on the E-Series.

Usage Information When you configure a join filter, it is applicable for both ingress and egress flows. There is no option to specify in or out parameters while configuring a join filter.

Example

```
DellEMC(conf)# ip access-list extended iptv-channels
DellEMC(config-ext-nacl)# permit ip 10.1.2.3/24 225.1.1.0/24
DellEMC(config-ext-nacl)# permit ip any 232.1.1.0/24
DellEMC(config-ext-nacl)# permit ip 100.1.1.0/16 any
DellEMC(config-if-tf-1/1)# ip pim join-filter iptv-channels
DellEMC(config-if-tf-1/1)# ip pim join-filter iptv-channels
```

Related Commands

- ip access-list extended — configure an access list based on IP addresses or protocols.

ip pim neighbor-filter

To prevent a router from participating in protocol independent multicast (PIM), configure this feature.

Syntax

`ip pim [vrf vrf-name] neighbor-filter {access-list}`

To remove the restriction, use the `no ip pim [vrf vrf-name] neighbor-filter {access-list}` command.

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to prevent that VRF from participating in PIM.

NOTE: Applies to specific VRF if input is provided, else applies to default VRF.

access-list Enter the name of a standard access list. Maximum 16 characters.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series and S-Series.
7.6.1.0	Introduced on the E-Series.

Usage Information Do not enter this command before creating the access-list.

ip pim query-interval

Change the frequency of PIM Router-Query messages.

Syntax

`ip pim query-interval seconds`

To return to the default value, use the `no ip pim query-interval seconds` command.

Parameters

seconds Enter a number as the number of seconds between router query messages. The range is from 0 to 65535. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.

ip pim register-filter

To prevent a PIM source DR from sending register packets to an RP for the specified multicast source and group, use this feature.

Syntax `ip pim [vrf vrf-name] register-filter access-list`

To return to the default, use the `no ip pim [vrf vrf-name] register-filter access-list` command.

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

access-list Enter the name of an extended access list. Maximum 16 characters.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.
7.6.1.0	Introduced

Usage Information The access name is an extended IP access list that denies PIM register packets to RP at the source DR based on the multicast and group addresses. Do not enter this command before creating the access-list.

ip pim rp-address

Configure a static PIM rendezvous point (RP) address for a group or access-list.

Syntax

```
ip pim [vrf vrf-name] rp-address address {group-address group-address mask}
[override]
```

To remove an RP address, use the `no ip pim [vrf vrf-name] rp-address address {group-address group-address mask} [override]` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
address	Enter the RP address in dotted decimal format (A.B.C.D).
group-address *group-address mask*	Enter the keywords `group-address` then a group-address mask, in dotted decimal format (/xx), to assign that group address to the RP.
override	Enter the keyword `override` to override the BSR updates with static RP. The override takes effect immediately during enable/disable. **NOTE:** This option is applicable to multicast group range.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information First-hop routers use this address by to send register packets on behalf of source multicast hosts. The RP addresses are stored in the order in which they are entered. The RP is chosen based on a longer prefix match for a group. The RP selection does not depend on dynamic or static RP assignments.

ip pim rp-candidate

Configure a PIM router to send out a Candidate-RP-Advertisement message to the bootstrap (BS) router or define group prefixes that are defined with the RP address to PIM BSR.

Syntax

```
ip pim [vrf vrf-name] rp-candidate {interface [priority] [acl-name]}
```

To return to the default value, use the `no ip pim [vrf vrf-name] rp-candidate {interface [priority]}` command.

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.

- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

priority	(OPTIONAL) Enter the priority used in Bootstrap election process. The range is zero (0) to 255. The default is **192**.
acl-name	(OPTIONAL) Enter the name of an ACL to configure a PIM router to act as an RP for a specific set of multicast group addresses that are defined in the ACL.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the *acl-name* parameter.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information Priority is stored at BSR router when receiving a Candidate-RP-Advertisement.

ip pim sparse-mode

Enable PIM sparse mode and IGMP on the interface.

Syntax `ip pim sparse-mode`

To disable PIM sparse mode and IGMP, use the `no ip pim sparse-mode` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.

Usage Information The interface must be enabled (the `no shutdown` command) and not have the `switchport` command configured. Multicast must also be enabled globally (using the `ip multicast-lag-hashing` command). PIM is supported on the port-channel interface.

ip pim sparse-mode sg-expiry-timer

Enable expiry timers globally for all sources.

Syntax `ip pim [vrf vrf-name] sparse-mode sg-expiry-timer seconds [access-list-name]`

To disable configured timers and return to default mode, use the `no ip pim [vrf vrf-name] sparse-mode sg-expiry-timer` command.

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf followed by the name of the VRF to enable expiry timer for all sources on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
seconds	Enter the number of seconds the S, G entries are retained. The range is from 211 to 65535.
access-list-name	(OPTIONAL) Enter the name of a previously configured Extended ACL to enable the expiry time to specified S,G entries.

Defaults Disabled. The default expiry timer (with no times configured) is 210 sec.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Removed the acl-access-list parameter. Modified the max value of S, G entry second range from 86400 to 65535. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.
7.7.1.1	Introduced

Usage Information

This command configures an expiration timer for all S.G entries, unless they are assigned to an Extended ACL.

Even though the FHR nodes act as RPs, these nodes still send *Register encap* messages to themselves and expect to receive a *Register stop* message (for Anycast RP support). As a result, if the DLT timer expires, SG is not deleted until the register state is deleted in the node. This register state expires 210 seconds after the last Null register is received.

ip pim ssm-range

Specify the SSM group range using an access list.

Syntax

```
ip pim [vrf vrf-name] ssm-range {access_list_name}
```

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to specify the SSM group range for that VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

access_list_name Enter the name of the access list.

Defaults

Default SSM range is 232/8 and ff3x/32

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added support for VRF on S6000, S4810, S4820T, Z9000, Z9500, and S6000–ON.
9.7(0.0)	Added support for VRF.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

Usage Information

Dell EMC Networking OS supports standard access lists for the SSM range. You cannot use extended ACLs for configuring the SSM range. If you configure an extended ACL and then used in the `ip pim ssm-range {access list name}` configuration, an error is reported.

However, if you configure `ip pim ssm-range {access list name}` first and then you configure the ACL as an Extended ACL, an error is not reported and the ACL is not applied to the SSM range.

Dell EMC Networking OS-recommended best-practices are to configure the standard ACL, and then apply the ACL to the SSM range. After the SSM range is applied, the changes are applied internally without requiring clearing of the tree information base (TIB).

When the ACL rules change, the ACL and protocol-independent multicast (PIM) modules apply the new rules automatically.

When you configure the SSM range, Dell EMC Networking OS supports SSM for configured group range as well as the default SSM range.

When you remove the SSM ACL, PIM SSM is supported for the default SSM range only.

ip pim spt-threshold

To switch to the shortest path tree when the traffic reaches the specified threshold value, configure the PIM router.

Syntax

`ip pim [vrf vrf-name] spt-threshold [value | infinity]`

To return to the default value, use the `no ip pim [vrf vrf-name] spt-threshold [infinity]` command.

Parameters

value	(OPTIONAL) Enter the traffic value in kilobits per second. The default is 10 packets per second . A value of zero (0) causes a switchover on the first packet.
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure the PIM router on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
infinity	(OPTIONAL) Enter the keyword `infinity` to never switch to the source-tree.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.

Usage Information This command is applicable to last hop routers on the shared tree towards the rendezvous point (RP).

show ip pim bsr-router

View information on the Bootstrap router.

Syntax `show ip pim [vrf vrf-name] bsr-router`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword vrf followed by the name of the VRF to configure this setting on VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Example

```
DellEMC# show ip pim bsr-router
PIMv2 Bootstrap information
This system is the Bootstrap Router (v2)
  BSR address: 7.7.7.7 (?)
  BSR Priority: 0, Hash mask length: 30
  Next bootstrap message in 00:00:08

This system is a candidate BSR
  Candidate BSR address: 7.7.7.7, priority: 0, hash mask length: 30
DellEMC#
```

show ip pim interface

View information on the interfaces with IP PIM enabled.

Syntax `show ip pim [vrf vrf-name] interface`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on this VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim interface` command shown in the following example.

Field	Description
Address	Lists the IP addresses of the interfaces participating in PIM.
Interface	List the interface type, with either slot/port information or ID (VLAN or Port Channel), of the interfaces participating in PIM.
Ver/Mode	Displays the PIM version number and mode for each interface participating in PIM: • v2 = PIM version 2 • S = PIM Sparse mode
Nbr Count	Displays the number of PIM neighbors discovered over this interface.
Query Intvl	Displays the query interval for Router Query messages on that interface (configured with `ip pim query-interval` command).
DR Prio	Displays the Designated Router priority value configured on the interface (use the `ip pim dr-priority` command).
DR	Displays the IP address of the Designated Router for that interface.

The `show ip pim interface` command does not display information corresponding to the loop-back interfaces.

Example

```
DellEMC# show ip pim interface
Address          Interface   Ver/    Nbr     Query   DR      DR
                             Mode    Count   Intvl   Prio
165.87.34.5      Tf 1/10     v2/S    0       30      1       165.87.34.5
10.1.1.2         Vl 10       v2/S    1       30      1       10.1.1.2
20.1.1.5         Vl 20       v2/S    1       30      1       20.1.1.5
165.87.31.200    Vl 30       v2/S    1       30      1       165.87.31.201
DellEMC#
```

show ip pim neighbor

View PIM neighbors.

Syntax `show ip pim [vrf vrf-name] neighbor`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim neighbor` command shown in the following example.

Field	Description
Neighbor address	Displays the IP address of the PIM neighbor.
Interface	List the interface type, with either slot/port information or ID (VLAN or Port Channel), on which the PIM neighbor was found.
Uptime/expires	Displays the amount of time the neighbor has been up then the amount of time until the neighbor is removed from the multicast routing table (that is, until the neighbor hold time expires).
Ver	Displays the PIM version number. ● v2 = PIM version 2
DR prio/Mode	Displays the Designated Router priority and the mode. ● 1 = default Designated Router priority (use the `ip pim dr-priority` command) ● DR = Designated Router ● S = Sparse mode

Example

```
DellEMC# show ip pim neighbor
Neighbor   Interface  Uptime/Expires    Ver   DR
Address                                     Prio/Mode
127.87.3.4 Tf 1/16    09:44:58/00:01:24  v2   1 / S
DellEMC#
```

show ip pim rp

View all multicast groups-to-RP mappings.

Syntax `show ip pim [vrf vrf-name] rp [mapping | group-address]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.
mapping	(OPTIONAL) Enter the keyword `mapping` to display the multicast groups-to-RP mapping and information on how RP is learnt.
group-address	(OPTIONAL) Enter the multicast group address mask in dotted decimal format to view RP for a specific group.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Example

```
DellEMC# show ip pim rp
Group           RP
224.2.197.115   165.87.20.4
224.2.217.146   165.87.20.4
224.3.3.3       165.87.20.4
225.1.2.1       165.87.20.4
225.1.2.2       165.87.20.4
229.1.2.1       165.87.20.4
229.1.2.2       165.87.20.4
DellEMC#
```

Example (Mapping)

```
DellEMC# show ip pim rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
```

```
  RP: 50.40.4.4, v2
DellEMC#
```

Example (Address)

```
DellEMC# show ip pim rp 229.1.2.1
Group          RP
229.1.2.1    165.87.20.4
DellEMC#
```

show ip pim ssm-range

Display the non-default groups added using the SSM range feature.

Syntax `show ip pim [vrf vrf-name] ssm-range`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON. Added support for VRF on S6000, S4810, S4820T, Z9000, Z9500, and S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.
7.7.1.0	Introduced on the C-Series.
7.5.1.0	Introduced on the E-Series.

Example

```
Group Address   / MaskLen
```

show ip pim summary

View information about PIM-SM operation.

Syntax `show ip pim [vrf vrf-name] summary`

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF.

NOTE: Applies to specific VRF if input is provided, else applies to Default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.4.1.1	Support for the display of PIM-SM snooping status was added on E-Series.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Example

```
DellEMC# show ip pim summary

PIM TIB version 495
Uptime 22:44:52
Entries in PIM-TIB/MFC : 2/2

Active Modes :
        PIM-SNOOPING

Interface summary:
        1 active PIM interface
        0 passive PIM interfaces
        3 active PIM neighbors

TIB summary:
       1/1 (*,G) entries in PIM-TIB/MFC
       1/1 (S,G) entries in PIM-TIB/MFC
       0/0 (S,G,Rpt) entries in PIM-TIB/MFC
```

```
        0 PIM nexthops
        0 RPs
        0 sources
        0 Register states

Message summary:
        2582/2583 Joins sent/received
        5/0 Prunes sent/received
        0/0 Candidate-RP advertisements sent/received
        0/0 BSR messages sent/received
        0/0 State-Refresh messages sent/received
        0/0 MSDP updates sent/received
        0/0 Null Register messages sent/received
        0/0 Register-stop messages sent/received

Data path event summary:
        0 no-cache messages received
        0 last-hop switchover messages received
        0/0 pim-assert messages sent/received
        0/0 register messages sent/received
DellEMC#
```

show ip pim tib

View the PIM tree information base (TIB).

Syntax `show ip pim [vrf vrf-name] tib [group-address [source-address]]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` followed by the name of the VRF to configure this setting on that VRF. **NOTE:** Applies to specific VRF if input is provided, else applies to Default VRF.
group-address	(OPTIONAL) Enter the group address in dotted decimal format (A.B.C.D).
source-address	(OPTIONAL) Enter the source address in dotted decimal format (A.B.C.D).

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.12.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim tib` command shown in the following example.

Field	Description
(S, G)	Displays the entry in the multicast PIM database.
uptime	Displays the amount of time the entry has been in the PIM route table.
expires	Displays the amount of time until the entry expires and is removed from the database.
RP	Displays the IP address of the RP/source for this entry.
flags	List the flags to define the entries: ● D = PIM Dense Mode ● S = PIM Sparse Mode ● C = directly connected ● L = local to the multicast group ● P = route was pruned ● R = the forwarding entry is pointing toward the RP ● F = Dell EMC Networking OS is registering this entry for a multicast source ● T = packets were received via Shortest Tree Path ● J = first packet from the last hop router is received and the entry is ready to switch to SPT ● K = acknowledge pending state
Incoming interface	Displays the reverse path forwarding (RPF) interface towards the RP/ source.
RPF neighbor	Displays the next hop from this interface towards the RP/source.
Outgoing interface list:	Lists the interfaces that meet one of the following criteria: ● a directly connect member of the Group ● statically configured member of the Group ● received a (*,G) Join message

Example

```
DellEMC# do show ip pim tib

PIM Multicast Routing Table
Flags: D - Dense, S - Sparse, C - Connected, L - Local, P - Pruned,
       R - RP-bit set, F - Register flag, T - SPT-bit set, J - Join SPT,
       M - MSDP created entry, A - Candidate for MSDP Advertisement
       K - Ack-Pending State
Timers: Uptime/Expires
Interface state: Interface, next-Hop, State/Mode

(*, 225.1.1.1), uptime 00:40:16, expires 00:00:00, RP 20.40.4.4, flags:
SCJ
  Incoming interface: Vlan 2007, RPF neighbor 20.30.124.4
  Outgoing interface list:
    Vlan 2006  Forward/Sparse   00:06:21/Never

(20.10.4.9, 225.1.1.1), uptime 00:06:21, expires 00:02:06, flags: CT
  Incoming interface: Vlan 2007, RPF neighbor 20.30.124.4
  Outgoing interface list:
    Vlan 2006  Forward/Sparse   00:06:21/Never

(*, 225.1.1.2), uptime 00:40:15, expires 00:00:00, RP 20.40.4.4, flags:
```

```
SCJ
  Incoming interface: Vlan 2007, RPF neighbor 20.30.124.4
  Outgoing interface list:
    Vlan 2006  Forward/Sparse   00:06:21/Never

(20.10.4.9, 225.1.1.2), uptime 00:06:21, expires 00:02:06, flags: CT
  Incoming interface: Vlan 2007, RPF neighbor 20.30.124.4
  Outgoing interface list:
    Vlan 2006  Forward/Sparse   00:06:21/Never
DellEMC#
```

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Port Monitoring

The port monitoring feature allows you to monitor network traffic by forwarding a copy of each incoming or outgoing packet from one port to another port.

Important Points to Remember

- Port monitoring is supported on physical ports and logical interfaces, such as port channels and virtual local area networks (VLANs).
- The monitoring (destination, "MG") and monitored (source, "MD") ports must be on the same switch.
- In general, a monitoring port should have `no ip address` and `no shutdown` as the only configuration; Dell EMC Networking OS permits a limited set of commands for monitoring ports; display them using the `?` command. A monitoring port also may not be a member of a VLAN.
- A total of 4 MG may be configured in a single port-pipe.
- MG and MD ports can be reside anywhere across a port-pipe.
- The Dell EMC Networking OS supports multiple source ports to be monitored by a single destination port in one monitor session.
- One monitor session can have only one MG port.

NOTE: The monitoring port should not be a part of any other configuration.

Topics:

- description
- erpm
- ip access-group
- ipv6 access-group
- monitor multicast-queue
- monitor session
- rate-limit
- show config
- show monitor session
- show running-config monitor session
- source (port monitoring)

description

Enter a description of this monitoring session.

Syntax	`description {description}` To remove the description, use the `no description {description}` command.	
Parameters	**description**	Enter a description regarding this session (80 characters maximum).
Defaults	none	
Command Modes	CONFIGURATION	
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.	

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-7.7.1.0	Introduced on the E-Series.

Related Commands

- monitor session — enables a monitoring session.

erpm

Configure the source and destination IP address for ERPM traffic.

Syntax

`erpm source-ip` *`ip-address`* `dest-ip` *`ip-address`* `[gre-protocol` *`value`*`]`

To remove the configuration, use the `no erpm source-ip` *`IP-address`* `dest-ip` *`IP-address`* `[gre-protocol` *`value`*`]` command.

Parameters

source–ip *ip-address*	Enter the keywords `source-ip` then the source IP address in dotted decimal format.
destination–ip *ip-address*	Enter the keywords `dest-ip` then the destination IP address in dotted decimal format.
gre–protocol *value*	(OPTIONAL) Enter the keywords `gre-protocol` then the protocol type value for ERPM type monitor session. The range is from 1 to 65535.

Command Modes MONITOR SESSION (conf-mon- *sess-session-ID*)

Example

```
DellEMC(conf-mon-sess-10)#erpm source-ip 10.10.10.1 dest-ip 5.1.1.2 gre-
protocol 1111
```

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced GRE protocol support.

ip access-group

Assign an IP access list (IP ACL) in the monitor session mode.

Syntax `ip access-group access-list-name`

Parameters

access-list-name Enter the name of a configured access list, up to 140 characters.

Defaults Not enabled.

Command Modes MONITOR SESSION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the command under the MONITOR SESSION mode on the S6000, S6100–ON, and Z9100–ON.

ipv6 access-group

Assign an IPv6 access list (IPv6 ACL) in the monitor session mode.

Syntax `ipv6 access-group access-list-name`

Parameters

access-list-name Enter the name of a configured access list, up to 140 characters.

Defaults Not enabled.

Command Modes MONITOR SESSION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced the command under the MONITOR SESSION mode on the S6100–ON, Z9100–ON, S6000, S6000–ON, and S5048F-ON.

monitor multicast-queue

Configure monitor QoS multicast queue ID.

Syntax `monitor multicast-queue queue-id`

To remove the configuration, use the `no monitor multicast-queue` command.

Parameters

queue-id Enter the QoS multicast queue ID. The range is from 0 to 9.

Defaults *queue-id*: 0

Enable status: Disabled

Command Modes CONFIGURATION

Example

```
DellEMC(conf)#monitor multicast-queue 7
```

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S6000, Z9500, S6000-ON.

Related Commands show running-config monitor session — displays information about monitor configurations.

monitor session

Create a session for monitoring traffic with port monitoring.

Syntax

```
monitor session session-ID [type { rpm | erpm [set ip dscp dscp_value | set ip ttl ttl_value]}] [drop]
```

To delete a session, use the `no monitor session session-ID` command.

To delete all monitor sessions, use the `no monitor session all` command.

Parameters

session-ID	Enter a session identification number. The range is from 0 to 65535.If you apply ACLs within the monitor session context, the range is from 0 to 32767.
type	Specifies one of the following type: • `rpm` • `erpm`
rpm	Creates a remote port monitoring (rpm) session.
erpm	Creates an encapsulated remote port monitoring (erpm) session.
set ip dscp	Configures the Differentiated Services Code Point (DSCP) value of the packets in the Encapsulated Remote Switched Port Analyzer (ERSPAN) traffic. To revert to the default value, use the no form of this command.
dscp_value	DSCP value of the packets in the ERSPAN traffic. The range is from 0 to 63. The default value is 0.
set ip ttl	Configures the IP time-to-live (TTL) value of the Encapsulated Remote Switched Port Analyzer (ERSPAN) traffic. To revert to the default configuration, use the no form of this command.
ttl_value	IP TTL value of the ERSPAN traffic. The range is from 1 to 255. The default value is 255.

	drop	Monitors only the dropped packets in the Ingress.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the drop parameter.
9.7(0.0)	Introduced on the S6000-ON. Introduced the `set ip dscp` and `set ip ttl` parameters.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.
9.0.2.0	Introduced on the S6000.
9.0.2.0	Introduced on the MXL.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information The `monitor` command is saved in the running configuration at Monitor Session mode level and can be restored after a chassis reload.

Example

```
DellEMC# show monitor session
  SessID  Source         Destination         Dir  Mode  Source IP      Dest IP
DSCP  TTL
  ------  ------         -----------         ---  ----  ---------      --------
----  ---
     0   Tf 1/12           remote-ip         rx   Flow 1.1.1.1         7.1.1.2         0
   255
     0   Po 1              remote-ip         tx   Flow 1.1.1.1         7.1.1.2         0
   255
     1   Vl 11             remote-ip         rx   Flow 5.1.1.1         3.1.1.2         0
   255
```

Related Command

- show monitor session — displays the monitor session.
- show running-config monitor session — displays the running configuration of a monitor session.

rate-limit

Configure the rate-limit to limit the mirrored packets.

Syntax `rate-limit` *`limit`*

To remove the limit, use the `no rate-limit` *`limit`* command.

Parameters

limit	Enter the rate-limit value. The range is from 0 to 40000 Megabits per second.

Defaults 60

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000-ON, Z9500.

Related Commands

- monitor session — enable a monitoring session.
- show monitor session — display the monitor session.

show config

Display the current monitor session configuration.

Syntax `show config`

Defaults none

Command Modes MONITOR SESSION (conf-mon-*sess-session-ID*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.

Version	Description
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC(conf-mon-sess-1)# show config
!
monitor session 1
 source twentyFiveGigE 1/1 destination Port-channel 1 direction rx
```

show monitor session

Display information about monitoring sessions.

Syntax `show monitor session {session-ID} [access-list]`

To display monitoring information for all sessions, use the `show monitor session` command.

Parameters

session-ID	(OPTIONAL) Enter a session identification number. The range is from 0 to 65535.
[access-list]	(OPTIONAL) Enter the `access-list` keyword to display the ACLs applied to monitor sessions.

Defaults none

Command Modes

- EXEC
- as
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Updated to display the IPv6 ACLs applied to monitor session on the S6000, S6000–ON, S5048F-ON, S6100–ON, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `access-list` optional keyword to display the ACLs applied to monitor sessions on the S6000, S6100–ON and Z9100–ON.
9.11(0.0)	Introduced the support for GRE Protocol and FC Monitor in the command output.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4.0.0	Added support for the RPM / ERPM.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC# show monitor session 1
SessID  Source          Destination          Dir  Mode  Source IP
Dest IP          DSCP  TTL   Drop  Rate     Gre-Protocol FcMonitor
------  ------          -----------          ---  ----  ---------
--------         ----  ---   ----  ----     -----------  ---------
   1    Tf 1/2          remote-ip            rx   Port   0.0.0.0
0.0.0.0           0     0     No    N/A        N/A        yes
DellEMC#

DellEMC# show monitor session
SessID  Source          Destination          Dir  Mode  Source IP
Dest IP          DSCP  TTL   Drop  Rate     Gre-Protocol FcMonitor
------  ------          -----------          ---  ----  ---------
--------         ----  ---   ----  ----     -----------  ---------
   1    Tf 1/2          remote-ip            rx   Port   0.0.0.0
0.0.0.0           0     0     No    N/A        N/A        yes
DellEMC#
```

Example (show monitor session access-list)

The following is an example output of the `show monitor session access-list` command.

```
DellEMC#sho monitor session 13 access-list
  Monitor session - 13
  Interface          Direction   Mirror-access-list
  ---------          ---------   ------------------
   Tf 1/1            rx          mtacl
                                 mtv6acl(ipv6)
```

Related Commands

- monitor session — creates a monitoring session.
- rate-limit — configures the rate-limit.

show running-config monitor session

Display the running configuration of all monitor sessions or a specific session.

Syntax

`show running-config monitor session {session-ID}`

To display the running configuration for all monitor sessions, use the `show running-config monitor session` command.

Parameters

session-ID (OPTIONAL) Enter a session identification number. The range from 0 to 65535.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the S4810.
8.3.11.1	Introduced on the Z9000.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

The `monitoring` command is saved in the running configuration at the Monitor Session mode level and can be restored after a chassis reload.

Example

```
DellEMC# show running-config monitor session
!
monitor session 1
source twentyFiveGigE 1/1 destination twentyFiveGigE 1/2 direction rx
!
monitor multicast-queue 7
DellEMC#
```

Related Commands

- monitor session — creates a monitoring session.
- show monitor session — displays a monitoring session.

source (port monitoring)

Configure a port monitor source.

Syntax

`source {`*`interface`* `|` *`range`* `| any} destination` *`interface`* `direction {rx | tx | both}`

To disable a monitor source, use the `no source` *`interface`* `destination` *`interface`* `direction {rx | tx | both}` command.

Parameters

source *interface* Enter one of the following keywords and slot/port information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface enter the keyword `VLAN` followed by a number from 1 to 4094.
- For a port channel interface, enter the keywords `port-channel` then a number.

range Enter the keyword `range` to specify the list of interfaces.

any Enter the keyword `any` to specify all interfaces.

NOTE: This option is applicable only with drop monitor session.

destination Enter the keyword `destination` to specify the destination interface.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

interface Enter one of the following keywords and slot/port information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a port channel interface, enter the keywords `port-channel` then a number.

direction {rx | tx | both} Enter the keyword `direction` then one of the packet directional indicators.

- `rx`: to monitor receiving packets only.
- `tx`: to monitor transmitting packets only.
- `both`: to monitor both transmitting and receiving packets.

Defaults none

Command Modes MONITOR SESSION (conf-mon- *sess-session-ID*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the `any` parameter.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4.0.0	Added support for Source and destination.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Example

```
DellEMC# monitor session 0
source Port-channel 10 destination twentyFiveGigE 1/3 direction tx
DellEMC#
```

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Private VLAN (PVLAN)

The private VLAN (PVLAN) feature of the Dell EMC Networking OS is supported on the platforms.

Private VLANs extend the Dell EMC Networking OS security suite by providing Layer 2 isolation between ports within the same private VLAN. A private VLAN partitions a traditional VLAN into subdomains identified by a primary and secondary VLAN pair. The Dell EMC Networking OS private VLAN implementation is based on RFC 3069.

For more information, see the following commands. The command output is augmented in Dell EMC Networking OS version 7.8.1.0 at later to provide PVLAN data:

- show arp
- show vlan

Private VLAN Concepts

Primary VLAN:

The primary VLAN is the base VLAN and can have multiple secondary VLANs. There are two types of secondary VLAN — community VLAN and isolated VLAN:

- A primary VLAN can have any number of community VLANs and isolated VLANs.
- Private VLANs block all traffic to isolated ports except traffic from promiscuous ports. Traffic received from an isolated port is forwarded only to promiscuous ports or trunk ports.

Community VLAN:

A community VLAN is a secondary VLAN of the primary VLAN:

- Ports in a community VLAN can talk to each other. Also, all ports in a community VLAN can talk to all promiscuous ports in the primary VLAN and vice versa.
- Devices on a community VLAN can communicate with each other using member ports, while devices in an isolated VLAN cannot.

Isolated VLAN:

An isolated VLAN is a secondary VLAN of the primary VLAN:

- Ports in an isolated VLAN cannot talk to each other. Servers would be mostly connected to isolated VLAN ports.
- Isolated ports can talk to promiscuous ports in the primary VLAN, and vice versa.

Port Types:

- *Community port* — a community port is a port that belongs to a community VLAN and is allowed to communicate with other ports in the same community VLAN and with promiscuous ports.
- *Isolated port* — an isolated port is a port that, in Layer 2, can only communicate with promiscuous ports that are in the same PVLAN.
- *Promiscuous port* — a promiscuous port is a port that is allowed to communicate with any other port type.
- *Trunk port* — a trunk port carries VLAN traffic across switches:
  - A trunk port in a PVLAN is always tagged.
  - A trunk port in Tagged mode carries primary or secondary VLAN traffic. The tag on the packet helps identify the VLAN to which the packet belongs.
  - A trunk port can also belong to a regular VLAN (non-private VLAN).

Topics:

- ip local-proxy-arp
- private-vlan mode
- private-vlan mapping secondary-vlan
- switchport mode private-vlan

ip local-proxy-arp

Enable/disable Layer 3 communication between secondary VLANs in a private VLAN.

Syntax

```
[no] ip local-proxy-arp
```

To disable Layer 3 communication between secondary VLANs in a private VLAN, use the `no ip local-proxy-arp` command in INTERFACE VLAN mode for the primary VLAN.

To disable Layer 3 communication in a particular secondary VLAN, use the `no ip local-proxy-arp` command in INTERFACE VLAN mode for the selected secondary VLAN.

NOTE: Even after you disable `ip-local-proxy-arp` (use `no ip-local-proxy-arp`) in a secondary VLAN, Layer 3 communication may happen between some secondary VLAN hosts, until the address resolution protocol (ARP) timeout happens on those secondary VLAN hosts.

Defaults Layer 3 communication is disabled between secondary VLANs in a private VLAN.

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

- private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.
- private-vlan mapping secondary-vlan — maps secondary VLANs to the selected primary VLAN.
- show arp — displays the ARP table.
- switchport mode private-vlan — sets PVLAN mode of the selected port.

private-vlan mode

Set PVLAN mode of the selected VLAN to community, isolated, or primary.

Syntax

```
[no] private-vlan mode {community | isolated | primary}
```

To remove the PVLAN configuration, use the `no private-vlan mode {community | isolated | primary}` command syntax.

Parameters

community	Enter the keyword `community` to set the VLAN as a community VLAN.
isolated	Enter the keyword `isolated` to configure the VLAN as an isolated VLAN.
primary	Enter the keyword `primary` to configure the VLAN as a primary VLAN.

Defaults none

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information The VLAN:

- can be in only one mode, either `community`, `isolated`, or `primary`.
- mode to `community` or `isolated` even before associating it to a primary VLAN. This secondary VLAN continues to work normally as a normal VLAN even though it is not associated to a primary VLAN. (A syslog message indicates this.)
- must not have a port in it when VLAN mode is being set.

Only ports (and port channels) configured as promiscuous, host, or PVLAN trunk ports (as previously described) can be added to the PVLAN. No other regular ports can be added to the PVLAN.

After using this command to configure a VLAN as a primary VLAN, use the `private-vlan mapping secondary-vlan` command to map secondary VLANs to this VLAN.

Related Commands

- private-vlan mapping secondary-vlan — maps secondary VLANs to the selected primary VLAN.
- switchport mode private-vlan — sets PVLAN mode of the selected port.

private-vlan mapping secondary-vlan

Map secondary VLANs to the selected primary VLAN.

Syntax `[no] private-vlan mapping secondary-vlan` *`vlan-list`*

To remove specific secondary VLANs from the configuration, use the `no private-vlan mapping secondary-vlan vlan-list` command syntax.

Parameters

vlan-list	Enter the list of secondary VLANs to associate with the selected primary VLAN. The list can be in comma-delimited or hyphenated-range format, following the convention for the range input.

Defaults none

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information The list of secondary VLANs can be:

- Specified in comma-delimited or hyphenated-range format.
- Specified with this command even before they have been created.
- Amended by specifying the new secondary VLAN to be added to the list.

Related Commands

- private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.
- switchport mode private-vlan — sets PVLAN mode of the selected port.

switchport mode private-vlan

Set PVLAN mode of the selected port.

Syntax `[no] switchport mode private-vlan {host | promiscuous | trunk}`

To remove PVLAN mode from the selected port, use the `no switchport mode private-vlan` command.

Parameters

host	Enter the keyword `host` to configure the selected port or port channel as an isolated interface in a PVLAN.

promiscuous	Enter the keyword `promiscuous` to configure the selected port or port channel as an promiscuous interface.
trunk	Enter the keyword `trunk` to configure the selected port or port channel as a trunk port in a PVLAN.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information The assignment of the various PVLAN port types to port and port channel (LAG) interfaces is shown in the following example.

Example

```
DellEMC# conf
DellEMC(conf)# interface twentyFiveGigE 1/1
DellEMC(conf-if-tf-1/1)# switchport mode private-vlan promiscuous

DellEMC(conf)# interface twentyFiveGigE 1/2
DellEMC(conf-if-tf-1/2)# switchport mode private-vlan host

DellEMC(conf)# interface twentyFiveGigE 1/3
DellEMC(conf-if-tf-1/3)# switchport mode private-vlan trunk

DellEMC(conf)# interface port-channel 10
DellEMC(conf-if-tf-1/3)# switchport mode private-vlan promiscuous
DellEMC(conf-if-tf-1/3)#
```

Related Commands

- private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.
- private-vlan mapping secondary-vlan — sets the mode of the selected VLAN to primary and then associates the secondary VLANs to it.

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Per-VLAN Spanning Tree Plus (PVST+)

The Dell EMC Networking OS implementation of per-VLAN spanning tree plus (PVST+) is based on the IEEE 802.1w standard spanning tree protocol.

Dell EMC Networking OS supports PVST+ on the platform.

NOTE: For easier command line entry, the plus (+) sign is not used at the command line.

Topics:

- description
- disable
- extend system-id
- protocol spanning-tree pvst
- show spanning-tree pvst
- spanning-tree pvst
- spanning-tree pvst err-disable
- tc-flush-standard
- vlan bridge-priority
- vlan forward-delay
- vlan hello-time
- vlan max-age

description

Enter a description of the PVST+.

Syntax `description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description Enter a description to identify the spanning tree (80 characters maximum).

Defaults none

Command Modes SPANNING TREE PVST+ (The prompt is "config-pvst".)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
pre- 7.7.1.1	Introduced.

Related Commands

- protocol spanning-tree pvst — enter SPANNING TREE mode on the switch.

disable

Disable PVST+ globally.

Syntax

```
disable
```

To enable PVST+, use the `no disable` command.

Defaults Disabled.

Command Modes CONFIGURATION (conf-pvst)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- protocol spanning-tree pvst — enter PVST+ mode.

extend system-id

To augment the Bridge ID with a VLAN ID so that PVST+ differentiate between BPDUs for each VLAN, use extend system ID. If the VLAN receives a BPDU meant for another VLAN, PVST+ does not detect a loop, and both ports can remain in Forwarding state.

Syntax `extend system-id`

Defaults Disabled

Command Modes PROTOCOL PVST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced.

Example

```
DellEMC(conf-pvst)# do show spanning-tree pvst vlan 5 brief
VLAN 5
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32773, Address 0001.e832.73f7
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 32773 (priority 32768 sys-id-ext 5), Address
0001.e832.73f7
We are the root of Vlan 5
Configured hello time 2, max age 20, forward delay 15

Interface Designated
Name    PortID  Prio  Cost  Sts Cost Bridge ID      PortID
-------------------------------------------------------------------
Tf 1/10 128.140 128  200000 FWD 0   32773 0001.e832.73f7 128.140
Tf 1/12 128.142 128  200000 DIS 0   32773 0001.e832.73f7 128.142

Interface
Name     Role PortID  Prio  Cost  Sts Cost Link-type Edge
-----------------------------------------------------------
```

```
Tf 1/10  Desg 128.140 128  200000 FWD 0    P2P       No
Tf 1/12  Dis  128.142 128  200000 DIS 0    P2P       No
DellEMC(conf-pvst)#
```

Related Commands

- protocol spanning-tree pvst – enter SPANNING TREE mode on the switch.

protocol spanning-tree pvst

To enable PVST+ on a device, enter the PVST+ mode.

Syntax `protocol spanning-tree pvst`

To disable PVST+, use the `disable` command.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
8.3.1.0	Introduced.

Example

```
DellEMC# conf
DellEMC(conf)# protocol spanning-tree pvst
DellEMC(conf-pvst)# no disable
DellEMC(conf-pvst)# vlan 2 bridge-priority 4096
DellEMC(conf-pvst)# vlan 3 bridge-priority 16384
DellEMC(conf-pvst)#
DellEMC(conf-pvst)# show config
!
protocol spanning-tree pvst
  no disable
  vlan 2 bridge-priority 4096
  vlan 3 bridge-priority 16384
DellEMC#
```

Usage Information

After you enable PVST+, the device runs an STP instance for each VLAN it supports.

Related Commands

- disable — disables PVST+.
- show spanning-tree pvst — displays the PVST+ configuration.

show spanning-tree pvst

View the Per-VLAN spanning tree configuration.

Syntax

```
show spanning-tree pvst [vlan vlan-id] [brief] [guard]
```

Parameters

vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID. The range is 1 to 4094.
brief	(OPTIONAL) Enter the keyword `brief` to view a synopsis of the PVST+ configuration information.
interface	(OPTIONAL) Enter one of the interface keywords along with the slot/port information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Port Channel interface, enter the keyword `port-channel` then a number:
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on a PVST interface and the current port state.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.4.2.1	Support for the optional `guard` keyword was added on the C-Series, S-Series, and E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.4.1.0	Expanded to display port error disable state (EDS) caused by loopback BPDU inconsistency and Port VLAN ID inconsistency.
6.2.1.1	Introduced.

Usage Information

The following describes the `show spanning-tree pvst` command shown in the following examples.

Field	Description
Interface Name	PVST interface.
Instance	PVST instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Brief)

```
DellEMC# show spanning-tree pvst vlan 3 brief
VLAN 3
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 4096, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 16384, Address 0001.e805.e306
Configured hello time 2, max age 20, forward delay 15

Interface                                Designated
Name    PortID  Prio Cost Sts Cost   Bridge ID      PortID
-------------------------------------------------------------
Tf 1/1   128.130 128 20000 FWD 20000 4096 0001.e801.6aa8  128.426
Tf 1/2   128.131 128 20000 BLK 20000 4096 0001.e801.6aa8  128.427
Tf 1/16  128.146 128 20000 FWD 20000 16384 0001.e805.e306 128.146
Tf 1/17  128.147 128 20000 FWD 20000 16384 0001.e805.e306 128.147

Interface
Name    Role PortID   Prio Cost  Sts Cost Link-type Edge
-----------------------------------------------------
Tf 1/1   Root 128.130  128  20000 FWD 20000 P2P      No
Tf 1/2   Altr 128.131  128  20000 BLK 20000 P2P      No
Tf 1/16  Desg 128.146  128  20000 FWD 20000 P2P      Yes
Tf 1/17  Desg 128.147  128  20000 FWD 20000 P2P      Yes
```

Example

```
DellEMC# show spanning-tree pvst vlan 2
VLAN 2
Root Identifier has priority 4096, Address 0001.e805.e306
Root Bridge hello time 2, max age 20, forward delay 15
Bridge Identifier has priority 4096, Address 0001.e805.e306
Configured hello time 2, max age 20, forward delay 15
We are the root of VLAN 2
Current root has priority 4096, Address 0001.e805.e306
Number of topology changes 3, last change occured 00:57:00
```

```
Port 130 (twentyFiveGigE 1/1) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier 128.130
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.130, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1567, received 3
The port is not in the Edge port mode

Port 131 (twentyFiveGigE 1/2) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier 128.131
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.131, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1567, received 0
The port is not in the Edge port mode

Port 146 (twentyFiveGigE 1/16) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier 128.146
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.146, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1578, received 0
The port is in the Edge port mode

Port 147 (twentyFiveGigE 1/17) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier 128.147
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.147, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1579, received 0
The port is in the Edge port mode
```

Example (EDS/ LBK)

```
DellEMC# show spanning-tree pvst vlan 2 interface twentyFiveGigE 1/1

twentyFiveGigE 1/1 of VLAN 2 is LBK_INC discarding

Edge port:no (default) port guard :none (default)
Link type: point-to-point (auto) bpdu filter:disable (default)
Bpdu guard :disable (default)
Bpdus sent 152, received 27562

Interface Designated
Name    PortID   Prio Cost  Sts Cost Bridge ID       PortID
-------------------------------------------------------------
Tf 1/1  128.1223 128  20000 EDS 0 32768 0001.e800.a12b 128.1223
```

Example (EDS/ PVID)

```
DellEMC# show spanning-tree pvst vlan 2 interface twentyFiveGigE 1/1

twentyFiveGigE 1/1 of VLAN 2 is PVID_INC discarding

Edge port:no (default) port guard :none (default)
Link type: point-to-point (auto) bpdu filter:disable (default)
Bpdu guard :disable (default)
Bpdus sent 1, received 0

Interface Designated
Name   PortID   Prio Cost  Sts Cost Bridge ID       PortID
-------------------------------------------------------------
Tf 1/1 128.1223 128 20000 EDS 0 32768 0001.e800.a12b 128.1223
```

Example (Guard)

```
DellEMC# show spanning-tree pvst vlan 5 guard
Interface
Name   Instance Sts        Guard type
```

```
----------------------------------
Tf 1/1 5        INCON(Root) Rootguard
Tf 1/2 5        FWD         Loopguard
Tf 1/3 5        EDS(Shut)   Bpduguard
DellEMC#
```

Related Commands

- spanning-tree pvst — configure PVST+ on an interface.

spanning-tree pvst

Configure a PVST+ interface with one of these settings: edge port with optional bridge port data unit (BPDU) guard, port disablement if an error condition occurs, port priority or cost for a VLAN range, loop guard, or root guard.

Syntax

```
spanning-tree pvst {edge-port [bpduguard [shutdown-on-violation]] | err-disable | vlan vlan-range {cost number | priority value} | loopguard | rootguard}
```

Parameters

edge-port	Enter the keywords `edge-port` to configure the interface as a PVST+ edge port.
bpduguard	Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails. Enter the keyword `bpduguard` to disable the port when it receives a BPDU.
shutdown-on-violation	(OPTIONAL) Enter the keywords `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.
err-disable	Enter the keywords `err-disable` to enable the port to be put into the error-disable state (EDS) if an error condition occurs.
vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
cost *number*	Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. Defaults: • 100 Mb/s Ethernet interface = **200000**. • 1-Gigabit Ethernet interface = **20000**. • 10-Gigabit Ethernet interface = **2000**. • Port Channel interface with one 100 Mb/s Ethernet = **200000**. • Port Channel interface with one 1 Gigabit Ethernet = **20000**. • Port Channel interface with one 10 Gigabit Ethernet = **2000**. • Port Channel with two 1 Gigabit Ethernet = **18000**. • Port Channel with two 10 Gigabit Ethernet = **1800**. • Port Channel with two 100 Mbps Ethernet = **180000**.
priority *value*	Enter the keyword `priority` then the Port priority value in increments of 16. The range is from 0 to 240. The default is **128**.
loopguard	(C-, S-, and E-Series only) Enter the keyword `loopguard` to enable loop guard on a PVST+ port or port-channel interface.
rootguard	(C-, S-, and E-Series only) Enter the keyword `rootguard` to enable root guard on a PVST+ port or port-channel interface.

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Introduced the `loopguard` and `rootguard` options on the E-Series, C-Series, and S-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced the hardware `shutdown-on-violation` option.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the optional Bridge Port Data Unit (BPDU) guard.
6.2.1.1	Introduced.

Usage Information

The BPDU guard option prevents the port from participating in an active STP topology in case a BPDU appears on a port unintentionally, or is misconfigured, or is subject to a DOS attack. This option places the port into the Error Disable state if a BPDU appears, and a message is logged so that the administrator can take corrective action.

NOTE: A port configured as an edge port, on a PVST switch, immediately transitions to the forwarding state. Only ports connected to end-hosts should be configured as an edge port. Consider an edge port similar to a port with a spanning-tree portfast enabled.

If you do not enable `shutdown-on-violation`, BPDUs are still sent to the route process module (RPM) CPU.

You cannot enable `root guard` and `loop guard` at the same time on a port. For example, if you configure `loop guard` on a port on which `root guard` is already configured, the following error message is displayed: `% Error: RootGuard is configured. Cannot configure LoopGuard`.

When used in a PVST+ network, loop guard is performed per-port or per-port channel at a VLAN level. If no BPDUs are received on a VLAN interface, the port or port-channel transitions to a Loop-Inconsistent (blocking) state only for this VLAN.

Enabling Portfast BPDU guard and loop guard at the same time on a port results in a port that remains in a Blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.
- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

Example

```
DellEMC(conf-if-tf-1/1)# spanning-tree pvst vlan 3 cost 1800
DellEMC(conf-if-tf-1/1)# end
DellEMC(conf-if-tf-1/1)# show config
!
interface twentyFiveGigE 1/1
  no ip address
  switchport
  spanning-tree pvst vlan 3 cost 18000
  no shutdown
DellEMC(conf-if-tf-1/1)# end

DellEMC#
```

Related Commands

- show spanning-tree pvst — views the PVST+ configuration.

spanning-tree pvst err-disable

Place ports in an Err-Disabled state if they receive a PVST+ BPDU when they are members an untagged VLAN.

Syntax `spanning-tree pvst err-disable cause invalid-pvst-bpdu`

Defaults Enabled; ports are placed in the Err-Disabled state if they receive a PVST+ BPDU when they are members of an untagged VLAN.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced.

Usage Information Some non-Dell EMC Networking systems which have hybrid ports participating in PVST+ transmit two kinds of BPDUs: an 802.1D BPDU and an untagged PVST+ BPDU.

Dell EMC Networking systems do not expect PVST+ BPDU on an untagged port. If this happens, Dell EMC Networking OS places the port in the Error-Disable state. This behavior might result in the network

not converging. To prevent Dell EMC Networking OS from executing this action, use the `no spanning-tree pvst err-disable` command cause `invalid-pvst-bpdu`.

Related Commands

- show spanning-tree pvst — views the PVST+ configuration.

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

Syntax

`tc-flush-standard`

To disable, use the `no tc-flush-standard` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced.

Usage Information

By default, Dell EMC Networking OS implements an optimized flush mechanism for PVST+. This implementation helps in flushing the MAC addresses only when necessary (and less often) allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, you can turn this *knob* command on to enable flushing MAC addresses after receiving every topology change notification.

vlan bridge-priority

Set the PVST+ bridge-priority for a VLAN or a set of VLANs.

Syntax

`vlan vlan-range bridge-priority value`

To return to the default value, use the `no vlan bridge-priority` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
bridge-priority *value*	Enter the keywords `bridge-priority` then the bridge priority value in increments of 4096. The range is from 0 to 61440. The default is **32768**.

Defaults **32768**

Command Modes CONFIGURATION (conf-pvst)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced.

Related Commands

- vlan forward-delay — changes the time interval before Dell EMC Networking OS transitions to the Forwarding state.
- vlan hello-time — change the time interval between BPDUs.
- vlan max-age — changes the time interval before PVST+ refreshes.
- show spanning-tree pvst — displays the PVST+ configuration.

vlan forward-delay

Set the amount of time the interface waits in the Listening state and the Learning state before transitioning to the Forwarding state.

Syntax `vlan vlan-range forward-delay seconds`

To return to the default setting, use the `no vlan forward-delay` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.

	forward-delay *seconds*	Enter the keywords `forward-delay` then the time interval, in seconds, that Dell EMC Networking OS waits before transitioning PVST+ to the forwarding state. The range is from 4 to 30 seconds. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes CONFIGURATION (conf-pvst)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced.

Related Commands

- vlan bridge-priority — sets the bridge-priority value.
- vlan hello-time — changes the time interval between BPDUs.
- vlan max-age — changes the time interval before PVST+ refreshes.
- show spanning-tree pvst — displays the PVST+ configuration.

vlan hello-time

Set the time interval between generation of PVST+ 7 BPDUs.

Syntax `vlan vlan-range hello-time seconds`

To return to the default value, use the `no vlan hello-time` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
hello-time *seconds*	Enter the keywords `hello-time` then the time interval, in seconds, between transmission of BPDUs. The range is from 1 to 10 seconds. The default is **2 seconds**.

Defaults **2 seconds**

Command Modes CONFIGURATION (conf-pvst)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced.

Related Commands

- vlan bridge-priority — sets the bridge-priority value.
- vlan forward-delay — changes the time interval before Dell EMC Networking OS transitions to the forwarding state.
- vlan max-age — changes the time interval before PVST+ refreshes.
- show spanning-tree pvst — displays the PVST+ configuration.

vlan max-age

To maintain configuration information before refreshing that information, set the time interval for the PVST+ bridge.

Syntax `vlan vlan-range max-age seconds`

To return to the default, use the `no vlan max-age` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
max-age *seconds*	Enter the keywords `max-age` then the time interval, in seconds, that Dell EMC Networking OS waits before refreshing configuration information. The range is from 6 to 40 seconds. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes CONFIGURATION (conf-pvst)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced.

Related Commands

- vlan bridge-priority — sets the bridge-priority value.
- vlan forward-delay — changes the time interval before Dell EMC Networking OS transitions to the forwarding state.
- vlan hello-time — changes the time interval between BPDUs.
- show spanning-tree pvst — displays the PVST+ configuration.

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Quality of Service (QoS)

The Dell EMC Networking OS commands for quality of service (QoS) include traffic conditioning and congestion control. QoS commands are not universally supported on all Dell EMC Networking products.

Topics:

- Global Configuration Commands
- Per-Port QoS Commands
- Policy-Based QoS Commands
- DSCP Color Map Commands

Global Configuration Commands

There is only one global configuration QoS command.

qos-rate-adjust

By default, while rate limiting, policing, and shaping, Dell EMC Networking OS does not include the Preamble, SFD, or the IFG fields. These fields are overhead; only the fields from MAC destination address to the CRC are used for forwarding and are included in these rate metering calculations. You can optionally include overhead fields in rate metering calculations by enabling QoS Rate Adjustment.

Syntax `qos-rate-adjustment overhead-bytes`

Parameters

overhead-bytes	Include a specified number of bytes of packet overhead to include in rate limiting, policing, and shaping calculations. The range is from 1 to 31.

Defaults QoS rate adjustment is disabled by default.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced.

Usage Information By default, when rate policing and shaping, the system does not include the Preamble, SFD, or the IFG fields. These fields are overhead; only the fields from MAC destination address to the CRC are used for forwarding and are included in these rate metering calculations.

service-class bandwidth-percentage

Specify a minimum bandwidth for queues.

Syntax `service-class bandwidth-percentage queue0 number queue1 number queue2 number queue3 number queue4 number queue5 number queue6 number queue7 number`

Parameters

number	Enter the bandwidth-weight, as a percentage.

Defaults none

Command Modes CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.1	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

Usage Information Guarantee a minimum bandwidth to different queues globally using the `service-class bandwidth-percentage` command from CONFIGURATION mode. The command is applied in the same way as the `bandwidth-percentage` command in an output QoS policy. The `bandwidth-percentage` command in QOS-POLICY-OUT mode supersedes the `service-class bandwidth-percentage` command.

service-class dot1p-mapping

Configure a service-class criterion based on a dot1p value.

Syntax

```
service-class dot1p-mapping {dot1p0 queue | dot1p1 queue | dot1p2 queue |
dot1p3 queue | dot1p4 queue| dot1p5 queue | dot1p6 queue | dot1p7 queue}
```

Parameters

queue	Enter a value from 0 to 7.

Defaults

For each dot1p Priority, the default CoS queue value is:

- Dot1p Priority : 0 1 2 3 4 5 6 7
- Queue : 1 0 2 3 4 5 6 7

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information

To apply dot1p-queue-mapping, use the `service-class dynamic dot1p` command.

Related Commands

- show qos dot1p-queue-mapping — displays the dot1p priority to queue mapping on the switch.

show qos dot1p-queue-mapping

Displays the dot1p priority to queue mapping on the switch.

Syntax

```
show qos dot1p-queue-mapping
```

Defaults

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information trust dot1p, do1p-priority, service-class dynamic dot1; all these features work over the mapping in this command output.

Related Commands
- service-class dot1p-mapping — Identifies the class map.

wred enable

Enable weighted random early detection (WRED) globally.

Syntax `wred enable`

To disable WRED globally, use the `no wred enable` command.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on the S6000, S6100–ON, and Z9100–ON.

Usage Information

By default, WRED is enabled on the system. To disable it globally, use the `no WRED enable` command.

The system does not show the `WRED enable` command in the running-configuration or startup-configuration. The system writes this configuration to the running-configuration or startup-configuration only when you use the `no WRED enable` command.

Related Commands
- wred-profile — creates a WRED profile and name that profile.

Per-Port QoS Commands

Per-port QoS (port-based QoS) allows you to define the QoS configuration on a per-physical-port basis.

dot1p-priority

Assign a value to the IEEE 802.1p bits on the traffic this interface receives.

Syntax

`dot1p-priority` *priority-value*

To delete the IEEE 802.1p configuration on the interface, use the `no dot1p-priority` command.

Defaults

none

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.5.1.0	Introduced on the C-Series.
pre- 6.1.1.1	Introduced on the E-Series.

Usage Information

The `dot1p-priority` command changes the priority of incoming traffic on the interface. The system places traffic marked with a priority in the correct queue and processes that traffic according to its queue.

When you set the priority for a port channel, the physical interfaces assigned to the port channel are configured with the same value. You cannot assign the `dot1p-priority` command to individual interfaces in a port channel.

rate police

Police the incoming traffic rate on the selected interface.

Syntax

`rate police [kbps]` *committed-rate* `[`*burst-KB*`] [peak [kbps]` *peak-rate* `[`*burst-KB*`]] [vlan` *vlan-id*`]`

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). The range is from 0 to 40000000100000000. The default granularity is Megabits per second (Mbps).
committed-rate	Enter the bandwidth in Mbps. The range is from 0 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 16 to 200000. The default is **50**.
peak *peak-rate*	(OPTIONAL) Enter the keyword `peak` then a number to specify the peak rate in Mbps. The range is from 0 to 40000.
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then a VLAN ID to police traffic to those specific VLANs. The range is from 1 to 4094.

Defaults Granularity for `commited-rate` and `peak-rate` is Mbps unless you use the `kbps` option.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added the `kbps` option on the C-Series, E-Series, and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

NOTE: Per Port rate police is supported for Layer 2 tagged and untagged switched traffic and for Layer 3 traffic. Per VLAN rate police is supported on only tagged ports with Layer 2 switched traffic.

S-Series

On one interface, you can configure the `rate police` command for a VLAN or you can configure the `rate police` command for an interface. For each physical interface, you can configure three `rate police` commands specifying different VLANS.

rate-shape

Shape the traffic output on the selected interface.

Syntax `rate shape [kbps] rate [burst-KB]`

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Enter the value in multiples of 64. The range is from 0 to 40000000100000000. The default granularity is Megabits per second (Mbps).
rate	The range is from 10 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 0 to 10000. The default is **50**.

Defaults Granularity for rate is **Mbps** unless you use the `kbps` option.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added the kbps option on the C-Series, E-Series, and S-Series.
7.6.1.0	Introduced on the S-Series and C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information If traffic is shaped between 64 and 1000 Kbs, for some values, the shaped rate is much less than the value configured.

On 40-port 10G stack-unit if the traffic is shaped between 64 and 1000 Kbs, for some values, the shaped rate is much less than the value configured.

NOTE: When packets of size greater than 7000 bytes are expected to be received from the network, Dell EMC Networking recommends that you configure the burst value to be more than 175 KB if you configured the rate shape. Such a setting ensures proper bandwidth sharing across queues.

Related Commands

- rate-shape — shapes traffic output as part of the designated policy.

service-class dynamic dot1p

Honor all 802.1p markings on incoming switched traffic on an interface (from INTERFACE mode) or on all interfaces (from CONFIGURATION mode). A CONFIGURATION mode entry supersedes an INTERFACE mode entry.

Syntax

```
service-class dynamic dot1p
```

To return to the default setting, use the `no service-class dynamic dot1p` command.

Defaults

All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command. The default mapping is as follows:

dot1p	Queue ID
0	1
1	0
2	2
3	3
4	4
5	5
6	6
7	7

Command Modes

- INTERFACE
- CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added the kbps option on the C-Series, E-Series, and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Expanded the command to permit configuration on port channels.

Version	Description
6.1.1.1	Introduced on the E-Series.

Usage Information

To honor all incoming 802.1p markings on incoming switched traffic on the interface, enter this command. By default, this facility is not enabled (that is, the 802.1p markings on incoming traffic are not honored).

You can apply this command on both physical interfaces and port channels. When you set the service-class dynamic for a port channel, the physical interfaces assigned to the port channel are automatically configured; you cannot assign the `service-class dynamic` command to individual interfaces in a port channel.

- All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command on an interface or globally.
- Layer 2 or Layer 3 service policies supersede dot1p service classes.

Policy-Based QoS Commands

Policy-based traffic classification is handled with class maps. These maps classify data traffic into one of eight classes eight classes. Dell EMC Networking OS enables you to match multiple class maps and specify multiple match criteria. Policy-based QoS is not supported on logical interfaces, such as port-channels, VLANS, or loopbacks.

bandwidth-percentage

Assign a percentage of weight to the class/queue.

Syntax `bandwidth-percentage` *percentage*

To remove the bandwidth percentage, use the `no bandwidth-percentage` command.

Parameters

percentage	Enter the percentage assignment of bandwidth to the class/queue. The range is from 1 to 100% (granularity 1%).

Defaults none

Command Modes CONFIGURATION (conf-qos-policy-out)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.1.9.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.2.1.1	Introduced on the E-Series.

Usage Information

The unit of bandwidth percentage is 1%. If the sum of the bandwidth percentages given to all eight classes exceeds 100%, the bandwidth percentage automatically scales down to 100%.

Related Commands

- qos-policy-output — creates a QoS output policy.

buffer-stats-snapshot

Enable the buffer statistics tracking utility and enter the Buffer Statistics Snapshot configuration mode. You must enable this utility to be able to configure the parameters for buffer statistics tracking.

Syntax

```
[No] buffer-stats-snapshot
```

To disable the buffer statistics tracking utility, enter the `disable` command from the BUFFER-STATS-SNAPSHOT mode.

Default

By default, buffer statistics tracking is disabled.

Command Modes

CONFIGURATION mode

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3.0.0	Introduced on the S6000 platform

Usage Information

Only the software-based trigger for retrieving and calculating the snapshots of the statistical counters of the buffer space is supported. Collection of snapshots of buffer statistical counters based on hardware threshold settings is not supported, which can be used to specify the type of hardware threshold and the threshold profile templates.

Example

```
DellEMC(conf)#buffer-stats-snapshot
DellEMC(conf-buffer-stats-snapshot)#?
disable                 Disable buffer-stats-snapshot globally
end                     Exit from configuration mode
exit                    Exit from buffer-stats-snapshot configuration
mode
no                      Negate a command or set its defaults
show                    Show buffer-stats-snapshot configuration
DellEMC(conf-buffer-stats-snapshot)#no disable
DellEMC(conf-buffer-stats-snapshot)#show configuration
!
buffer-stats-snapshot
 no disable
```

class-map

Create/access a class map. Class maps differentiate traffic so that you can apply separate quality-of-service policies to each class.

Syntax `class-map {match-all | match-any} class-map-name [cpu-qos] [layer2]`

Parameters

match-all	Determines how packets are evaluated when multiple match criteria exist. Enter the keywords `match-all` to determine that the packets must meet all the match criteria in order to be a member of the class.
match-any	Determines how packets are evaluated when multiple match criteria exist. Enter the keywords `match-any` to determine that the packets must meet at least one of the match criteria in order to be a member of the class.
class-map-name	Enter a name of the class for the class map in a character format (32 character maximum).
cpu-qos	Enter the keyword `cpu-qos` to assign this Class Map to control plane traffic only (CoPP).
layer2	Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults Layer 3

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Class-map names can be 32 characters. Layer2 available on the C-Series and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Expanded to add support for Layer 2.

Usage Information Packets arriving at the input interface are checked against the match criteria and configured using this command to determine if the packet belongs to that class. This command accesses CLASS-MAP mode, where the configuration commands include the`match ip` and `match mac` options.

When you create a class map to filter protocol traffic for CoPP, you must enter the keyword `cpu-qos` .

Related Commands

- ip access-list extended — configures an extended IP ACL.
- ip access-list standard — configures a standard IP ACL.
- match ip access-group — configures the match criteria based on the access control list (ACL).
- match ip precedence — identifies the IP precedence values as match criteria.
- match ip dscp — configures the match criteria based on the DSCP value.
- match mac access-group — configures a match criterion for a class map based on the contents of the designated MAC ACL.
- match mac dot1p — configures a match criterion for a class map based on a dot1p value.
- match mac vlan — configures a match criterion for a class map based on VLAN ID.
- service-queue — assigns a class map and QoS policy to different queues.
- show qos class-map — views the current class map information.

clear qos statistics

Clear qos statistics clears statistics from show qos statistics.

Syntax `clear qos statistics interface-name`

Parameters

interface-name Enter one of the following keywords:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.18.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Related Commands

- show qos statistics — displays the QoS statistics.

description

Add a description to the selected policy map or QoS policy.

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the policies (80 characters maximum).

Defaults

none

Command Modes

CONFIGURATION (policy-map-input and policy-map-output; conf-qos-policy-in and conf-qos-policy-out; wred)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
pre- 7.7.1.0	Introduced.

Related Commands

- policy-map-input — creates an input policy map.
- policy-map-output — creates an output policy map.
- qos-policy-input — creates an input QoS-policy on the router.
- qos-policy-output — creates an output QoS-policy on the router.

- wred-profile — creates a WRED profile.

match ip access-group

Configure match criteria for a class map, based on the access control list (ACL).

NOTE: IPv6 class-maps and IP-any class-maps do not match. This condition is true for IPv6 and IP-any class-maps on both ACLs as well as VLANs.

Syntax

`[seq sequence number] match ip access-group access-group-name [set-ip-dscp value | set-color value]`

To remove ACL match criteria from a class map, use the `no [seq sequence number] match ip access-group access-group-name [set-ip-dscp value | set-color value]` command.

Parameters

seq *sequence number*	(OPTIONAL) Enter the keyword seq then the sequence number. The range is from 1 to 100. By default, the sequence number are assigned in multiples of five.
access-group-name	Enter the ACL name whose contents are used as the match criteria in determining if packets belong to the class the class-map specifies.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.
set-color *value*	(Optional) Enter the keyword set-color followed by a color value. Traffic that fulfills the match criteria is marked with the color value that you specify. The default value is YellowGreen.

Defaults

none

Command Modes

CLASS-MAP CONFIGURATION (config-class-map)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `seq` option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added the DSCP Marking option support on the S-Series.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series; added support for the DSCP Marking option.
6.1.1.1	Introduced on the E-Series.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria. For class-map match-any, a maximum of five ACL match criteria are allowed. For `class-map match-all`, only one ACL match criteria is allowed.

Related Commands

- class-map — identifies the class map.

match ip dscp

Use a differentiated services code point (DSCP) value as a match criteria.

Syntax

`[seq sequence number] match {ip | ipv6 | ip-any} dscp dscp-list [set-ip-dscp value]`

To remove a DSCP value as a match criteria, use the `no [seq sequence number] match {ip | ipv6 | ip-any} dscp dscp-list [[multicast] set-ip-dscp value]` command.

Parameters

seq *sequence number*	(OPTIONAL) Enter the keyword seq then the sequence number. The range is from 1 to 100. By default, the sequence number are assigned in multiples of five.
ip	Enter the keyword `ip` to support IPv4 traffic.
ipv6	Enter the keyword `ipv6` to support IPv6 traffic.
ip-any	Enter the keyword `ip-any` to support IPv4 and IPv6 traffic.
dscp-list	Enter the IP DSCP values that is to be the match criteria. Separate values by commas — no spaces (1,2,3) or indicate a list of values separated by a hyphen (1-3). The range is from 0 to 63.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.

Defaults

none

Command Modes

CLASS-MAP CONFIGURATION (config-class-map)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `seq` option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.0)	Added the **ipv6** and **ip-any** options on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added the keyword `multicast` ; added the `DSCP` Marking option support on the S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series; added support for the DSCP Marking option.
6.2.1.1	Introduced on the E-Series.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

The `match ip dscp` and `match ip precedence` commands are mutually exclusive.

Up to 64 IP DSCP values can be matched in one match statement. For example, to indicate IP DCSP values 0 1 2 3 4 5 6 7, enter either the `match ip dscp 0,1,2,3,4,5,6,7` or `match ip dscp 0-7` command.

NOTE: Only one of the IP DSCP values must be a successful match criterion, not all of the specified IP DSCP values must match.

Related Commands

- class-map — identifies the class map.

match ip precedence

Use IP precedence values as a match criteria.

Syntax

`[seq` *`sequence number`*`] match {ip | ipv6 | ip-any} precedence ip-`*`precedence-list`* `[set-ip-dscp` *`value`*`]`

To remove IP precedence as a match criteria, use the `no match {ip | ipv6 | ip-any} precedence ip-`*`precedence-list`* `[[multicast] set-ip-dscp` *`value`*`]` command.

Parameters

seq *sequence number*	(OPTIONAL) Enter the keyword seq then the sequence number. The range is from 1 to 100. By default, the sequence number are assigned in multiples of five.
ip	Enter the keyword `ip` to support IPv4 traffic.
ipv6	Enter the keyword `ipv6` to support IPv6 traffic.
ip-any	Enter the keyword `ip-any` to support IPv4 and IPv6 traffic.
ip-precedence-list	Enter the IP precedence value(s) as the match criteria. Separate values by commas — no spaces (1,2,3) or indicate a list of values separated by a hyphen (1-3). The range is from 0 to 7.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.

Defaults none

Command Modes CLASS-MAP CONFIGURATION (config-class-map)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `seq` option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Added support for the ipv6 and ip-any options on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added the keyword multicast . Added support for the DSCP Marking option for the S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series. Added support for the DSCP Marking option.
6.1.1.1	Introduced on the E-Series.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

The `match ip precedence` command and the `match ip dscp` command are mutually exclusive.

Up to eight precedence values can be matched in one match statement. For example, to indicate the IP precedence values 0 1 2 3, enter either the `match ip precedence 0-3` or `match ip precedence 0,1,2,3` command.

NOTE: Only one of the IP precedence values must be a successful match criterion, not all of the specified IP precedence values must match.

Related Commands

- class-map — identifies the class map.

match mac access-group

Configure a match criterion for a class map, based on the contents of the designated MAC ACL.

Syntax `[seq sequence number] match mac access-group {mac-acl-name}`

Parameters

mac-acl-name	Enter a MAC ACL name. Its contents is used as the match criteria in the class map.

Defaults none

Command Modes CLASS-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the seq option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Available on the C-Series and S-Series.
7.5.1.0	Added support for the DSCP Marking option.
7.4.1.0	Introduced on the E-Series.

Usage Information To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

Related Commands

- class-map — identifies the class map.

match mac dot1p

Configure a match criterion for a class map based on a dot1p value.

Syntax `[seq sequence number] match mac dot1p {dot1p-list}`

Parameters

seq *sequence number*	(OPTIONAL) Enter the keyword seq then the sequence number. The range is from 1 to 100. By default, the sequence number are assigned in multiples of five.
dot1p-list	Enter a dot1p value. The range is from 0 to 7.

Defaults none

Command Modes CLASS-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.12(0.0)	Introduced the `seq` option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Available on the C-Series and S-Series.
7.5.1.0	Added support for the DSCP Marking option.
7.4.1.0	Introduced on the E-Series.

Usage Information To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

Related Commands

- class-map — identifies the class map.

match mac vlan

Configure a match criterion for a class map based on VLAN ID.

Syntax `[seq sequence number] match mac vlan number`

Parameters

seq *sequence number*	(OPTIONAL) Enter the keyword seq then the sequence number. The range is from 1 to 100. By default, the sequence number are assigned in multiples of five.
number	Enter the VLAN ID. The range is from 1 to 4094.

Defaults none

Command Modes CLASS-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `seq` option for the `class-map` on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced.

Usage Information To access this command, enter the `class-map` command. You can match against only one VLAN ID.

Related Commands

- class-map — identifies the class map.

policy-aggregate

Allow an aggregate method of configuring per-port QoS via policy maps. An aggregate QoS policy is part of the policy map (output) applied on an interface.

Syntax `policy-aggregate` *`qos-policy-name`*

To remove a policy aggregate configuration, use the `no policy-aggregate` *`qos-policy-name`* command.

Parameters

qos-policy-name Enter the name of the policy map in character format (32 characters maximum).

Defaults none

Command Modes CONFIGURATION (policy-map-input and policy-map-output)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Policy name character limit increased from 16 to 32.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

An aggregate output QoS policy applies to all outbound port traffic. An aggregate output QoS policy can coexist with per-queue output QoS policies. If the rate shape exists in both aggregate and per-queue qos-policy, minimum of 2 take effect. Some of all Queue-rate will not exceed aggregate.

Related Commands

- policy-map-input — creates an input policy map.
- policy-map-output — creates an output policy map.

policy-map-input

Create an input policy map.

Syntax

`policy-map-input` *`policy-map-name`* `cpu-qos | [layer2] [cpu-qos]`

To remove an input policy map, use the `no policy-map-input` *`policy-map-name`* `cpu-qos | [layer2] [cpu-qos]` command.

Parameters

policy-map-name	Enter the name of the `policy map` in character format (32 characters maximum).
cpu-qos	Enter the `cpu-qos` keyword to assign this ACL to control plane traffic only.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.
cpu-qos	(OPTIONAL) Enter the keyword cpu-qos to create an input policy to be used to rate-limit control-plane traffic (CoPP).

Defaults **Layer 3**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Policy name character limit increased from 16 to 32.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Expanded to add support for Layer 2.
6.1.1.1	Introduced on the E-Series.

Usage Information The input policy map is used to classify incoming traffic to different flows using class-map, QoS policy, or incoming packets DSCP. This command enables Policy-Map-Input Configuration mode (conf-policy-map-in). When you configure an input policy map for CoPP, you must enter the keyword cpu-qos .

Related Commands
- service-queue — assigns a class map and QoS policy to different queues.
- service-policy input — applies an input policy map to the selected interface.

policy-map-output

Create an output policy map.

Syntax `policy-map-output` *policy-map-name*

To remove a policy map, use the `no policy-map-output` *policy-map-name* command.

Parameters

policy-map-name Enter the name for the policy map in character format (32 characters maximum).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Policy name character limit increased from 16 to 32.
7.6.1.0	Introduced on the C-Series and S-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

To assign traffic to different flows using QoS policy, use the Output Policy map. This command enables Policy-Map-Output Configuration mode (conf-policy-map-out).

Related Commands

- service-queue — assigns a class map and QoS policy to different queues.
- policy-aggregate — allows an aggregate method of configuring per-port QoS using policy maps.
- service-policy output — applies an output policy map to the selected interface.

qos-policy-input

Create a QoS input policy on the router.

Syntax

`qos-policy-input` *`qos-policy-name`* `cpu-qos | layer2`

To remove an existing input QoS policy from the router, use the `no qos-policy-input` *`qos-policy-name`* `cpu-qos | layer2` command.

Parameters

qos-policy-name	Enter the name for the policy map in character format (32 characters maximum).
cpu-qos	(OPTIONAL) Enter the keyword `cpu-qos` keyword to assign this ACL to control plane traffic only.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults

Layer 3

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Policy name character limit increased from 16 to 32.
7.6.1.0	Introduced on the C-Series and S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

Use this command to specify the name of the input QoS policy. Once input policy is specified, rate-police can be defined. This command enables the qos-policy-input configuration mode— (conf-qos-policy-in).

When changing a Service-Queue configuration in a QoS policy map, all QoS rules are deleted and re-added automatically to ensure that the order of the rules is maintained. As a result, the Matched Packets value shown in the `show qos statistics` command is reset.

If you create create a QoS input policy to be used for CoPP, you must enter the keyword cpu-qos .

Related Commands

- rate police — incoming traffic policing function.

qos-policy-output

Create a QoS output policy.

Syntax

`qos-policy-output` *qos-policy-name*

To remove an existing output QoS policy, use the `no qos-policy-output` *qos-policy-name* command.

Parameters

qos-policy-name Enter your output QoS policy name in character format (32 characters maximum).

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.2.1.0	Policy name character limit increased from 16 to 32.
7.6.1.0	Introduced on the C-Series and S-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

Use this command to specify the name of the output QoS policy. Once output policy is specified, rate-shape, scheduler strict, bandwidth-percentage, and WRED can be defined. This command enables the qos-policy-output configuration mode—(conf-qos-policy-out).

Related Commands

- bandwidth-percentage — assigns percentage of bandwidth to the class/queue.
- wred — assigns yellow or green drop precedence.

rate-police

Specify the policing functionality on incoming traffic.

Syntax

`rate-police [kbps] committed-rate [burst-KB] [peak [kbps] peak-rate [burst-KB]]`

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Make the following value a multiple of 64. The range is from 0 to 40000000100000000. The default granularity is Megabits per second (Mbps).
committed-rate	Enter the bandwidth in Mbps. The range is from 0 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 16 to 200000. The default is **100**.
peak *peak-rate*	(OPTIONAL) Enter the keyword `peak` then a number to specify the peak rate in Mbps. The range is from 0 to 40000. The default is the same as designated for `committed-rate`.

Defaults

Burst size is 100KB. `peak-rate` is by default the same as `committed-rate`. Granularity for `committed-rate` and `peak-rate` is Mbps unless you use the `kbps` option.

Command Modes

QOS-POLICY-IN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added the kbps option on the C-Series, E-Series, and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information The default burst size is 100Kb. If a different value is required, you must configure the burst size to the required value.

Related Commands
- rate police — specifies traffic policing on the selected interface.
- qos-policy-input — creates a QoS output policy.

rate-shape

Shape traffic output as part of the designated policy.

Syntax
```
rate-shape [kbps | pps] peak-rate [burst-kbps | burst-packets] commited
[kbps | pps] commited-rate [burst-kbps | burst-packets]
```

Parameters

pps	Enter the keyword `pps` to specify the rate limit in packets per second (pps).
kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Make the following value a multiple of 64. The range is from 0 to 40000000100000000. The default granularity is Megabits per second (Mbps).
burst-kbps	(OPTIONAL) Enter the burst size in KB. The range is from 0 to 40000. The default is **100**.
burst-packets	Enter the peak rate or committed rate burst size in packets per seconds.

Defaults Burst size is 10KB. Granularity for rate is Mbps unless you use the `kbps` option.

Command Modes QOS-POLICY-OUT

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added the kbps option on the C-Series, E-Series, and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

On 40-port 10G stack-unit if the traffic is shaped between 64 and 1000 Kbs, for some values, the shaped rate is much less than the value configured.You must configure the peak rate and peak burst size using the same value: kilobits or packets per second. Similarly, you must configure the committed rate and committed burst size with the same measurement. Peak rate refers to the maximum rate for traffic arriving or exiting an interface under normal traffic conditions. Peak burst size indicates the maximum size of unused peak bandwidth that is aggregated. This aggregated bandwidth enables brief durations of burst traffic that exceeds the peak rate and committed burst. Committed rate refers to the guaranteed bandwidth for traffic entering or leaving the interface under normal network conditions. When traffic propagates at an average rate that is less than or equal to the committed rate, it is considered to be green-colored or coded. When the transmitted traffic falls below the committed rate, the bandwidth, which is not used by any traffic that is traversing the network, is aggregated to form the committed burst size. Traffic is considered to be green-colored up to the point at which the unused bandwidth does not exceed the committed burst size.

Related Commands

- rate shape — shapes traffic output as part of the designated policy.
- qos-policy-output — creates a QoS output policy.

resequence class-map

Allows you to renumber the rules in a class-map.

Syntax

```
resequence class-map {class-map name starting sequence number step-to-increment sequence number}
```

Parameters

class-map *class-map name*	Enter the keyword `class-map` then the class-map name.
starting sequence number	Enter the starting sequence number to resequence. The range is from 1 to 10.
step-to-increment sequence number	Enter the step to increment the sequence number. The range is from 1 to 10.

Defaults

None

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the resequence option for `class-map` on all the Dell EMC Networking OS platforms.

Usage Information

If there is no option to create a new rule and to avoid reconfiguring class-map, use the `resequence class-map` command. This allows you to create numbering spaces.

service-policy input

Apply an input policy map to the selected interface.

Syntax

`service-policy input policy-map-name [layer2]`

To remove the input policy map from the interface, use the `no service-policy input policy-map-name [layer2]` command.

Parameters

policy-map-name	Enter the name for the policy map in character format (32 characters maximum). You can identify an existing policy map or name one that does not yet exist.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults

Layer 3

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Expanded to add support for Layer 2.
6.1.1.1	Introduced on the E-Series.

Usage Information

You can attach a single policy-map to one or more interfaces to specify the service-policy for those interfaces. A policy map attached to an interface can be modified.

NOTE: The `service-policy` commands are not allowed on a port channel. The `service-policy input policy-map-name` command and the `service-class dynamic dot1p` command are not allowed simultaneously on an interface. However, the service-policy input command (without the policy-map-name option) and the service-class dynamic dot1p command are allowed on an interface.

Related Commands

- policy-map-input — creates an input policy map.

service-policy output

Apply an output policy map to the selected interface.

Syntax

`service-policy output` *policy-map-name*

To remove the output policy map from the interface, use the `no service-policy output` *policy-map-name* command.

Parameters

policy-map-name Enter the name for the policy map in character format (32 characters maximum). You can identify an existing policy map or name one that does not yet exist.

Defaults

none

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

A single policy-map can be attached to one or more interfaces to specify the service-policy for those interfaces. A policy map attached to an interface can be modified.

Related Commands

- policy-map-output — creates an output policy map.

service-queue

Assign a class map and QoS policy to different queues.

Syntax

`service-queue` *queue-id* `[class-map` *class-map-name*`] [qos-policy` *qos-policy-name*`]`

To remove the queue assignment, use the `no service-queue` *`queue-id`* `[class-map` *`class-map-name`*`] [qos-policy` *`qos-policy-name`*`]` command.

Parameters

queue-id	Enter the value used to identify a queue. The range is from 0 to 7.
class-map *class-map-name*	(OPTIONAL) Enter the keyword `class-map` then the class map name assigned to the queue in character format (32 character maximum). **NOTE:** This option is available under `policy-map-input` only.
qos-policy *qos-policy-name*	(OPTIONAL) Enter the keywords `qos-policy` then the QoS policy name assigned to the queue in text format (32 characters maximum). This specifies the input QoS policy assigned to the queue under `policy-map-input` and output QoS policy under `policy-map-output` context.

Defaults

none

Command Modes

CONFIGURATION (conf-policy-map-in and conf-policy-map-out)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Usage Information

There are eight queues per interface on the S6000 and four queues on the S-Series. This command assigns a class map or QoS policy to different queues.

Related Commands

- class-map — identifies the class map.
- service-policy input — applies an input policy map to the selected interface.
- service-policy output — applies an output policy map to the selected interface.

set

Mark outgoing traffic with a differentiated service code point (DSCP) or dot1p value.

Syntax `set {ip-dscp value | mac-dot1p value}`

Parameters

ip-dscp *value*	(OPTIONAL) Enter the keywords `ip-dscp` then the IP DSCP value. The range is from 0 to 63.
mac-dot1p *value*	Enter the keywords `mac-dot1p` then the dot1p value. The range is from 0 to 7.

Defaults none

Command Modes CONFIGURATION (conf-qos-policy-in)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Added mac-dot1p on the C-Series and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added support for mac-dot1p.
6.1.1.1	Introduced on the E-Series.

Usage Information After the IP DSCP bit is set, other QoS services can then operate on the bit settings.

show qos class-map

View the current class map information.

Syntax `show qos class-map [class-name]`

Parameters

class-name	(Optional) Enter the name of a configured class map.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the `seq` option on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos class-map

Class-map match-any CM
  seq 5 Match ip access-group ACL
DellEMC#
```

Related Commands
- class-map — identifies the class map.

show qos policy-map

View the QoS policy map information.

Syntax `show qos policy-map {summary [interface] | detail}`

Parameters

9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
summary *interface*	To view a policy map interface summary, enter the keyword `summary` and optionally one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

detail To view a policy map interface in detail, enter the keyword `detail` and optionally one of the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series only: Added `trust IPv6 diffserv`.
6.2.1.1	Introduced on the E-Series.

Example (IPv4)

```
DellEMC# show qos policy-map detail twentyFiveGigE 1/1
```

```
Interface twentyFiveGigE 1/1

Policy-map-input policy
Queue# Class-map-name Qos-policy-name
 0 -                        q0
 1          CM1             q1
 2          CM2             q2
 3          CM3             q3
 4          CM4             q4
 5          CM5             q5
 6          CM6             q6
 7          CM7             q7
DellEMC#
```

Example (IPv6)

```
DellEMC# show qos policy-map detail twentyFiveGigE 1/1

Interface twentyFiveGigE 1/1

Policy-map-input pmap1

Queue# Class-map-name Qos-policy-name
 0       c0             q0
 1       c1             q1
 2       c2             q2
 3       c3             q3
 4       c4             q4
 5       c5             -
 6       c6             q6
 7       c7             q7
DellEMC#
```

Example (Summary IPv4)

```
DellEMC# show qos policy-map summary

Interface policy-map-input policy-map-output
Tf 1/1     PM1                 -
Tf 1/2     PM2               PMOut
DellEMC#
```

show qos policy-map-input

View the input QoS policy map details.

Syntax `show qos policy-map-input [policy-map-name] [class class-map-name] [qos-policy-input qos-policy-name]`

Parameters

policy-map-name	Enter the policy map name.
class *class-map-name*	Enter the keyword `class` then the class map name.
qos-policy-input *qos-policy-name*	Enter the keyword `qos-policy-input` then the QoS policy name.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added Trust IPv6 diffserv.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos policy-map-input

Policy-map-input PolicyMapInput
Aggregate Qos-policy-name AggPolicyIn
Queue# Class-map-name  Qos-policy-name
 0      ClassMap1       qosPolicyInput
DellEMC#
```

Example

```
DellEMC# show qos policy-map-input

Policy-map-input pmap1
Trust ipv6-diffserv
Queue#  Class-map-name  Qos-policy-name
0       c0              q0
1       c1              q1
2       c2              q2
3       c3              q3
4       c4              q4
5       c5              -
6       c6              q6
7       c7              q7
DellEMC#
```

show qos policy-map-output

View the output QoS policy map details.

Syntax `show qos policy-map-output [policy-map-name] [qos-policy-output qos-policy-name]`

Parameters

policy-map-name	Enter the policy map name.
qos-policy-output *qos-policy-name*	Enter the keyword `qos-policy-output` then the QoS policy name.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos policy-map-output

Policy-map-output PolicyMapOutput
Aggregate Qos-policy-name AggPolicyOut
Queue#   Qos-policy-name
  0      qosPolicyOutput
DellEMC#
```

show qos qos-policy-input

View the input QoS policy details.

Syntax `show qos qos-policy-input [qos-policy-name]`

Parameters

qos-policy-name	Enter the QoS policy name.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos qos-policy-input

Qos-policy-input QosInput
        Rate-police 100 50 peak 100 50
        Dscp 32
DellEMC#
```

show qos qos-policy-output

View the output QoS policy details.

Syntax `show qos qos-policy-output [qos-policy-name]`

Parameters

qos-policy-name Enter the QoS policy name.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos qos-policy-output

Qos-policy-output qosOut
        Rate-limit 50 50 peak 50 50
        Wred yellow 1
        Wred green 1
DellEMC#
```

show qos statistics

View QoS statistics.

Syntax `show qos statistics {egress—queue [interface]} | {wred-profile [interface]} | [interface]`

Parameters

egress-queue ***interface***

Enter the keyword `egress-queue` to display the egress-queue statistics and optionally one o the following keywords and slot/port or number information.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

wred-profile ***interface***

Enter the keywords `wred-profile` and optionally one of the following keywords and slot/po or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

interface Enter one of the following keywords and slot/port or number information:
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults none

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Network OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Modified to display the global WRED state.
9.11(0.0)	Updated the `show qos statistics egress–queue` output to reflect per queue per port tx and drop rates.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the `egress-queue` keyword.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.1	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.1	Introduced on the E-Series.

Example of show qos statistics egress—queue with per queue per port tx and drop rates

```
DellEMC#show qos statistics egress-queue twentyFiveGigE 1/4

Interface Tf 1/4
Unicast/Multicast Egress Queue Statistics
Queue# Q# Type   TxPkts  TxPkts/s      TxBytes    TxBytes/s  DroppedPkts DroppedPkts/s  DroppedBytes DroppedBytes/
-------------------------------------------------------------------------------------------------------------------
  0    UCAST          0         0            0            0            0             0             0             0
  1    UCAST          0         0            0            0            0             0             0             0
  2    UCAST          0         0            0            0            0             0             0             0
  3    UCAST 1708252734   2340972 874625399808   1198000301   1357413570             0  694995747840             0
  4    UCAST          0         0            0            0            0             0             0             0
  5    UCAST          0         0            0            0            0             0             0             0
  6    UCAST          0         0            0            0            0             0             0             0
  7    UCAST          0         0            0            0            0             0             0             0
  8    UCAST          0         0            0            0            0             0             0             0
  9    UCAST       1132         1       143063          217            0             0             0             0
 10    MCAST          0         0            0            0            0             0             0             0
 11    MCAST          0         0            0            0            0             0             0             0
 12    MCAST          0         0            0            0            0             0             0             0
 13    MCAST          0         0            0            0            0             0             0             0
 14    MCAST          0         0            0            0            0             0             0             0
 15    MCAST          0         0            0            0            0             0             0             0
 16    MCAST          0         0            0            0            0             0             0             0
 17    MCAST          0         0            0            0            0             0             0             0
 18    MCAST          0         0            0            0            0             0             0             0
 19    MCAST          0         0            0            0            0             0             0             0
DellEMC#
```

Example of show qos statistics wred-profile

```
DellEMC(conf)#do show qos statistics wred-profile
Global Wred State : Enabled
Interface Tf 1/11
Drop-statistic  Dropped Pkts
Green           0
Yellow          6730113
Out of Profile  0
```

Usage Information

In a dual homing setup, you can use this command only from the primary VLT peer.

The following list describes output of the `show qos statistics` command in the example:

- **Queue #** — Queue Number.
- **Queued Bytes** — Snapshot of the byte count in that queue.
- **Queued Pkts** — Cumulative packet count in that queue.
- **Matched Pkts** — The number of packets that matched the class-map criteria.

  NOTE: When you configure `trust` , matched packet counters are not incremented in this field.
- **Matched Bytes** — The number of bytes that matched the class-map criteria.

  NOTE: When you configure `trust` , matched byte counters are not incremented in this field.
- **Dropped Pkts** — The total of the number of packets dropped for green, yellow and out-of-profile.

show qos statistics wred-ecn

Display the statistics of ECN marked packets.

Syntax `show qos statistics wred-ecn [interface Slot/Port[/Subport]]`

Parameters

wred-ecn	Enter the keyword `wred-ecn` to display the details of ECN marked packets.
interface Slot/ Port[/Subport]	Enter an interface to display the details of ECN marked packets specific to the interface.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.11.0.0	Introduced on the S6100 and Z9100.

Usage Information

This command displays the details of total number of packets marked with ECN and the total number of packets that got dropped. The total number of packets includes both the packets marked with ECN and packets not marked with ECN. Use the `clear hardware stack-unit` *`stack-unit-ID`* `unit` *`unit-number`* `counters` command to clear the ECN packet counters.

Example

```
DellEMC#show qos statistics wred-ecn

--------------------ECN Packet Counter Details-----------------------
Interface            MarkedTxPkts     TotalDropPkts(ECN Enabled Queues)
---------------------------------------------------------------------
Fo 1/49/1            122226925        122178941
Fo 1/50/1            340808237        169105794
Fo 1/51/1            0                0
```

```
DellEMC#show qos statistics wred-ecn fortyGigE 1/49/1

--------------------ECN Packet Counter Details-----------------------
Interface            MarkedTxPkts     TotalDropPkts(ECN Enabled Queues)
---------------------------------------------------------------------
Fo 1/49/1            122226925        122178941
```

show qos wred-profile

View the WRED profile details.

Syntax `show qos wred-profile` *`wred-profile-name`*

Parameters

wred-profile-name	Enter the WRED profile name to view the profile details.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Modified to display the global WRED state.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.1.1.1	Introduced on the E-Series.

Example

```
DellEMC# show qos wred-profile

Wred State: Enabled

Wred-profile-name                min-threshold  max-threshold  max-drop-
rate
wred_drop                        0              0              100
wred_fiftyg_y                    273            2731           75
wred_fiftyg_g                    273            2731           50
wred_fortyg_y                    273            2731           50
wred_fortyg_g                    273            2731           25
wred_hundredg_y                  273            2731           50
wred_hundredg_g                  273            2731           25
wred_teng_y                      273            2731           100
wred_teng_g                      273            2731           50
wred_twentyg_y                   273            2731           100
wred_twentyg_g                   273            2731           75
```

service-class buffer shared-threshold-weight

Create a service class and associate the threshold weight of the shared buffer with each of the queues per port in the egress direction.

Syntax

```
[No] Service-class buffer shared-threshold-weight {[queue0 number] ||
[queue1 number] || [queue2 number] || [queue3 number] || [queue4 number] ||
[queue5 number] || [queue6 number] || [queue7 number]}
```

Parameters

buffer	Define the shared buffer settings
shared-threshold-weight	Specify the weight of a queue for the shared buffer space
queue 0 to queue 7	To apply the shared-threshold weight, specify the queue number
number	Enter a weight for the queue on the shared buffer as a number in the range of 1 to 11.

Default The default threshold weight on the shared buffer for each queue is 9. Therefore, each queue can consume up to 66.67 percent of available shared buffer by default.

Command Modes INTERFACE mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.9(0.0)	Introduced on the Z9500, S4810, S4820T, S5000, and S4048–ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Introduced on the S6000.

Usage Information

You can configure all the data queues. You can configure queues 0-7.

The following table describes the mapping between the threshold weight of the shared buffer on the queue. It also shows the percentage of the available shared buffer used by the queues for each of the corresponding threshold weights of the shared buffer:

shared-threshold-weight on the queue	% of available shared buffer that can be consumed by the queue
0	No dynamic sharing; shared buffer = 0.
1	0.77%
2	1.54%
3	3.03%
4	5.88%
5	11.11%
6	20%
7	33.33%
8	50%
9	66.67%
10	80%
11	88.89%

Example

```
DellEMC(conf-if-tf-1/8)# Service-class buffer shared-threshold-weight
queue5 4 queue7 6
```

test cam-usage

Check the Input Policy Map configuration for the CAM usage.

Syntax

```
test cam-usage service-policy input policy-map stack-unit {[number port-set
portpipe number] | [all]}
```

Parameters

policy-map	Enter the policy map name.
stack-unit*number*	(OPTIONAL) Enter the keyword `stack-unit` then the stack-unit slot number.
port-set *portpipe number*	Enter the keywords `port-set` then the stack-unit port pipe number. The range is from 0 or 1.
stack-unit all	(OPTIONAL) Enter the keywords `stack-unit` all to indicate all stack-unit.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information

This feature allows you to determine if the CAM has enough space available before applying the configuration on an interface.

An input policy map with both Trust and Class-map configuration, the Class-map rules are ignored and only the Trust rule is programmed in the CAM. In such an instance, the Estimated CAM output column contains the size of the CAM space required for the Trust rule and not the Class-map rule.

The following describes the `test cam-usage service-policy input policy-map stack-unit` command shown in the following example.

Field	Description
stack-unit	Indicates the stack-unit slot number.
Portpipe	Indicates the portpipe number.
CAM Partition	The CAM space where the rules are added.
Available CAM	Indicates the free CAM space, in the partition, for the classification rules. **NOTE:** The CAM entries reserved for the default rules are not included in the Available CAM column; free entries, from the default rules space, cannot be used as a policy map for the classification rules.
Estimated CAM per Port	Indicates the number of free CAM entries required (for the classification rules) to apply the input policy map on a single interface. **NOTE:** The CAM entries for the default rule are not included in this column; a CAM entry for the default rule is always dedicated to a port and is always available for that interface.
Status (Allowed ports)	Indicates if the input policy map configuration on an interface belonging to a stack-unit/port-pipe is successful — Allowed (n) — or not successful — Exception. The allowed number (n) indicates the number of ports in that port-pipe on which the Policy Map can be applied successfully.

NOTE: In a Layer 2 Policy Map, IPv4/IPv6 rules are not allowed; therefore, the output contains only L2ACL CAM partition entries.

Example

```
DellEMC# test cam-usage service-policy input pmap_l2 stack-unit all
```

```
For a L2 Input Policy Map pmap_l2, the output must be as follows,

stack-unit|Portpipe|CAM Partition|Available CAM|Estimated CAM per Port |
Status
          |        |              |              |per Port
|(Allowed ports)
0           0          L2ACL        500           200
    Allowed (2)
0           1          L2ACL        100           200
Exception
1           0          L2ACL        1000          200
Allowed (5)
1           1          L2ACL        0             200
Exception
                       …
                       …
                       …
13          1          L2ACL         400          200             Allowed
(2)
DellEMC#
```

```
DellEMC# test cam-usage service-policy input pmap_l2 stack-unit all

For a L2 Input Policy Map pmap_l2, the output must be as follows,

stack-unit|Portpipe|CAM Partition|Available CAM|Estimated CAM per Port |
Status
          |        |              |              |per Port
|(Allowed ports)
0           0          L2ACL        500           200
    Allowed (2)
0           1          L2ACL        100           200
Exception
1           0          L2ACL        1000          200
Allowed (5)
1           1          L2ACL        0             200
Exception
                       …
                       …
                       …
13          1          L2ACL         400          200             Allowed
(2)
DellEMC#
```

```
DellEMC# test cam-usage service-policy input pmap_l2 stack-unit all
Stack-unit | Portpipe |   Tile   | CAM Partition | Available CAM | Estimated CAM per Port | Status
-------------------------------------------------------------------------------------------
```

threshold

Specify the minimum and maximum threshold values for the configured WRED profiles.

Syntax

`threshold min` *number* `max` *number* `max-drop-drop`

To remove the threshold values, use the `no threshold min` *number* `max` *number* command.

Parameters

min ***number***	Enter the keyword `min` then the minimum threshold number for the WRED profile. The range is from 1 to 9360.
max ***number***	Enter the keyword max then the maximum threshold number for the WRED profile. The range is from 1 to 9360 KB.
max-drop-drop ***number***	Enter the keyword **max-drop-drop** followed by the maximum number of packets for the WRED profile. The range is from 0 to 100 KB

Defaults none

Command Modes CONFIGURATION (config-wred)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.8.0	Introduced on the S4810.
6.1.1.1	Introduced on the E-Series.

Usage Information To configure the minimum and maximum threshold values for user-defined profiles, use this command. Additionally, to modify the minimum and maximum threshold values for the pre-defined WRED profiles, use this command. If you delete the threshold values of the pre-defined WRED profiles, the profiles revert to their original default values.

Related Commands

- wred-profile — creates a WRED profile.

trust

Specify dynamic classification (DSCP) or dot1p to trust.

Syntax `trust {diffserv [fallback]| dot1p [fallback]}`

Parameters

diffserv	Enter the keyword `diffserv` to specify trust of DSCP markings.
dot1p	Enter the keyword `dot1p` to specify trust dot1p configuration.
fallback	Enter the keyword `fallback` to classify packets according to their DSCP or dot1p value as a secondary option in case no match occurs against the configured class maps.

Defaults none

Command Modes CONFIGURATION (conf-policy-map-in)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added `fallback` to the E-Series.
8.2.1.0	Added `dot1p` to the C-Series and S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added `dot1p` and `IPv6 DSCP` .
6.1.1.1	Introduced on the E-Series.

Usage Information

When you configure `trust`, matched bytes/packets counters are not incremented in the `show qos statistics` command.

Dynamic mapping honors packets marked according to the standard definitions of DSCP. The following lists the default mapping.

Table 6. Default Mapping

DSCP/CP hex Range (XXX)	DSCP Definition	Traditional IP Precedence	S6000 Internal Queue ID	S-Series Internal Queue ID	DSCP/CP Decimal
111XXX		Network Control	7	3	48–63
110XXX		Internetwork Control	6	3	48–63
101XXX	EF (Expedited Forwarding)	CRITIC/ECP	5	2	32–47
100XXX	AF4 (Assured Forwarding)	Flash Override	4	2	32–47
011XXX	AF3	Flash	3	1	16–31
010XXX	AF2	Immediate	2	1	16–31
001XXX	AF1	Priority	1	0	0–15
000XXX	BE (Best Effort)	Best Effort	0	0	0–15

unsequence class-map all

Allows you to rewrite the running configuration for all the class-map match-any without sequence number.

Syntax `unsequence class-map all`

Defaults None

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced the command on all the Dell EMC Networking OS platforms.

Usage Information After upgrading to 9.12(0.0), if you want to downgrade to the previous Dell EMC Networking OS version, use the `unsequence class-map all` command. The class-map match-any in the start-up configuration will not be applied after the downgrade. To add/delete/edit any rules using sequence number in the class-map match-any, resequencing the class-map is mandatory.

Example

```
DellEMC# unsequence class-map all
```

wred

Designate the WRED profile to yellow or green traffic.

Syntax `wred {yellow | green} profile-name`

To remove the WRED drop precedence, use the no wred {yellow | green} [*profile-name]* command.

Parameters

yellow | green	Enter the keyword `yellow` for yellow traffic. A DSCP value of xxx110 and xxx100, xxx101 maps to yellow. Enter the keyword green for `green` traffic. A DSCP value of xxx0xx are green and DSCP 111111 are red packets.
profile-name	Enter your WRED profile name in character format (32 character maximum). Or use one of the five pre-defined WRED profile names. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_.

Defaults When WRED green is applied, default WRED yellow profiles take effect and vice-versa.

Command Modes CONFIGURATION (conf-qos-policy-out)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information To assign drop precedence to green or yellow traffic, use this command. If there is no honoring enabled on the input, all the traffic defaults to green drop precedence.

Related Commands
- wred-profile — creates a WRED profile and name that profile.
- trust — defines the dynamic classification to trust DSCP.

wred ecn

To indicate network congestion, rather than dropping packets, use explicit congestion notification (ECN).

Syntax `wred ecn`

To stop marking packets, use the `no wred ecn` command.

Defaults none

Command Modes CONFIGURATION (conf-qos-policy-out)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820t.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Usage Information

When you enable `wred ecn`, and the number of packets in the queue is below the minimum threshold, packets are transmitted per the usual WRED treatment.

When you enable `wred ecn`, and the number of packets in the queue is between the minimum threshold and the maximum threshold, one of the following two scenarios can occur:

- If the transmission endpoints are ECN-capable and traffic is congested, and the WRED algorithm determines that the packet should have been dropped based on the drop probability, the packet is transmitted and marked so the routers know the system is congested and can slow transmission rates.
- If neither endpoint is ECN-capable, the packet may be dropped based on the WRED drop probability. This behavior is the identical treatment that a packet receives when WRED is enabled without ECN configured on the router.

When you enable `wred ecn`, and the number of packets in the queue is above the maximum threshold, packets are dropped based on the drop probability. This behavior is the identical treatment a packet receives when WRED is enabled without ECN configured on the router.

Related Commands

- wred-profile — creates a WRED profile and name that profile.

wred weight

Configure the weight factor for computation of average-queue size. This weight value applies to front-end ports. This mechanism to configure a weight for WRED and ECN functionality for front-end ports is supported on the S6000 and Z9000 platforms.

Syntax `[no] wred weight number`

Parameters

weight	Define the weight factor to be used for computation of the WRED average-queue size to either enable WRED to discard packets or cause ECN to mark packets that exceed the minimum threshold configured. This setting applies to front-end ports only.
number	Enter the weight as a number to be used to calculate the average-queue size. The range is 1 to 15. The default is 0.

Default The default weight is zero.

Command Modes QOS-POLICY-OUT mode

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3.0.0	Introduced on the S6000 and Z9000 platforms

Usage Information

If the average queue size is more than the maximum threshold of WRED, the packet is dropped. If the average queue size is between the minimum and maximum threshold values, the decision to drop or queue the packet is taken based on the packet drop probability. The probability that a packet is dropped depends on the minimum threshold, maximum threshold, and mark probability denominator.

Example

```
DellEMC(conf-qos-policy-out) # wred weight 5
```

wred-profile

Create a WRED profile and name the profile.

Syntax

`wred-profile` *`wred-profile-name`*

To remove an existing WRED profile, use the `no wred-profile` command.

Parameters

wred-profile-name	Enter your WRED profile name in character format (32 character maximum). Or use one of the pre-defined WRED profile names. You can configure up to 26 WRED profiles plus the five pre-defined profiles, for a total of 31 WRED profiles. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_g.

Defaults

The five pre-defined WRED profiles. When you configure a new profile, the minimum and maximum threshold defaults to predefined wred_ge_g values.

If green profile is applied, default yellow also take effect and vice-versa.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
6.1.1.1	Introduced on the E-Series.

Usage Information

Use the default pre-defined profiles or configure your own profile. You cannot delete the pre-defined profiles or their default values. This command enables WRED configuration mode —(conf-wred).

Related Commands

- threshold — specifies the minimum and maximum threshold values of the WRED profile.

rate shape

Define the rate-shaping method to be either as a measure of bytes or packets for each of the hierarchical QoS (HQoS) nodes at the leaf level to be applied to each queue.

Syntax

```
[no] rate-shape [kbps | pps] peak-rate [burst-KB/Packets] [committed [kbps
| pps] committed-rate [burst-KB/Packets]]
```

Parameters

kbps	Enter the keyword kbps to specify the committed rate limit in Kilobits per second (Kbps). Specify this value as a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
pps	Enter the keyword pps to specify the committed rate limit in packets per second (pps). The range is from 1 to 268000000. The default granularity is Megabits per second (Mbps).
committed-rate	Define the committed rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the committed rate in Kbps. The range is from 0 to 40000000100000000. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)
burst-KB	(OPTIONAL) Enter the committed burst size in KB. The range is from 0 to 10000. The default is 50 KB. The default peak burst is regarded as the same value as the configured committed burst size.
Packets	(OPTIONAL) Enter the committed burst size as a count of packets. The range is from 1 to 1073000. The default is 50 packets. The default peak rate is regarded as the same value as the configured committed rate.
peak-rate	Define the peak rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the peak rate in Kbps. The range is from 0 to 40000000 for Kbps. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)
kbps	Enter the keyword kbps to specify the peak rate limit in Kilobits per second (Kbps). Specify this value as a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
pps	Enter the keyword pps to specify the peak rate limit in packets per second (pps). The range is from 1 to 268000000. The default granularity is Megabits per second (Mbps).
peak-rate	Define the peak rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the peak rate in Kbps. The range is from 0 to 40000000 for Kbps. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)
burst-KB	(OPTIONAL) Enter the peak burst size in KB. The range is from 0 to 10000. The default is 50 KB.
Packets	(OPTIONAL) Enter the peak burst size as a count of packets. The range is from 1 to 1073000. The default is 50 packets. The default peak rate is regarded as the same value as the configured peak rate.

Default Granularity for rate is Mbps unless you use the kbps option.

Command Modes CONFIGURATION

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Added support for committed rate and committed burst size, and for configuration of rate limits on the S6000 platform.

Usage Information

If you specify the pps keyword after the rate-shape command, the peak rate, peak burst, committed rate and committed burst are all considered to be values as a measure of packets. If you do not specify the `pps` or `kbps` keyword, the peak and committed rate settings are considered to be values in Mbps. Similarly, if you enter the `kbps` keyword, the peak and committed rate settings are treated as values in Kbps.

You cannot configure the committed rate settings to use a different metric or unit from the metric that is set for peak rate attributes because when you use the `rate-shape kbps` command, it denotes the metric for peak and committed rate attributes). Similarly, if you use the `rate-shape pps` option , it denotes the metric for peak rate and committed rate attributes.

If you attempt to define the committed rate to be less than the peak rate, an error message is displayed stating that the peak rate cannot be lower than the committed rate. You can configure all the rate shaping parameters to be either in bytes or packets measure for each queue. The rate and burst parameters for both minimum and maximum settings for a queue can be either in packets or bytes. You cannot configure some of rate shaping attributes to be in bytes measure and the remaining rate shaping attributes to be in packets measure; all the rate shaping attributes must contain the same metric or unit of measure.

Example

```
DellEMC(conf-qos-policy-out) #rate-shape pps 100 100 peak pps 1000 200

DellEMC(conf-qos-policy-out) #rate-shape kbps 1024 100 peak kbps 102400
75

DellEMC(conf-qos-policy-out) # rate-shape 100 100 peak 1000 750

DellEMC(conf-qos-policy-in)#rate-police 100 25 peak 80 500
% Error: Peak rate cannot be less than committed rate.
```

service-pool wred

A global buffer pool that is a shared buffer pool accessed by multiple queues when the minimum guaranteed buffers for the queue are consumed can be configured on the S6000 and Z9000 platforms.

Create a global buffer pool that is a shared buffer pool accessed by multiple queues when the minimum guaranteed buffers for the queue are consumed. S4810, S4820T, S6000, and Z9000 platforms support four global service-pools in the egress direction. Two service pools are used—one for lossy queues and the other for lossless (priority-based flow control (PFC)) queues. You can enable WRED and ECN configuration on the global service-pools. You can define WRED profiles and weight on each of the global service-pools for both lossy and lossless (PFC) service-pools.

Syntax

`[No] service-pool wred {green | weight | yellow} {pool0 number/string| pool1 number/string}pool0 number/string`

Parameters

service-pool	Define the mapping between the service class and policy-based QoS or routing.
wred	Specify WRED curve parameters for a queue.
green	Specify green (low) drop precedence to a queue.
weight	Specify a weight factor to a queue.
yellow	Specify yellow (medium) drop precedence to a queue.
pool0	Service-pool buffer 1 (default service-pool for PFC traffic) .
pool1	Service-pool buffer 0 (default service-pool for both lossy and lossless traffic. traffic).

number	Enter a weight for the queue as a number in the range of 1 to 15. This parameter applies only if you specify the green or yellow drop precedence.
string	Enter the WRED profile name. It is a string of up to 32 characters. Or use one of the five pre-defined WRED profile names. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_. This parameter applies only if you specify a weight factor.

Default All queues on backplane ports operate in tail-drop (best-effort traffic) mode by default. There is no default WRED green or yellow profile. The default weight is 0.

Command Modes CONFIGURATION mode

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3.0.0	Introduced on the S6000 and Z9000 platforms

Usage Information

You can configure only service pools 0 and 1 because the Dell EMC Networking OS uses only these two service pools. The pool, service0, is used for lossy queues and the pool, service1, is used for lossless (PFC) queues in all the platforms.

You can configure only service pool 0. The pool, service0, is used for lossy queues.

You can configure the weight for the WRED average queue size for service1, which is the only the platform in which PFC is supported for this service pool.

A WRED profile contains a set of attributes, such as the minimum and maximum threshold values, and the maximum drop rate for the received packets. You can add or remove WRED parameter configurations for one or more shared service pools using a single command. The `service-pool wred` command is similar in usage and working to the `service-class bandwidth-percentage` *`queue-id`* command.

Example

```
DellEMC(conf-wred) #wred thresh-1
DellEMC(conf-wred) #threshold min 100 max 200 max-drop-rate 40

DellEMC(conf-wred) #wred thresh-2
DellEMC(conf-wred) #threshold min 300 max 400 max-drop-rate 80

DellEMC(conf) #service-pool wred green pool0 thresh-1 pool1 thresh-2
DellEMC(conf) #service-pool wred yellow pool0 thresh-3 pool1 thresh-4
DellEMC(conf) #service-pool wred weight pool0 11 pool1 4
```

```
DellEMC(conf-wred) #wred thresh-1
DellEMC(conf-wred) #threshold min 100 max 200 max-drop-rate 40

DellEMC(conf-wred) #wred thresh-2
DellEMC(conf-wred) #threshold min 300 max 400 max-drop-rate 80

DellEMC(conf) #service-pool wred green pool0 thresh-1 pool1 thresh-2
DellEMC(conf) #service-pool wred yellow pool0 thresh-3 pool1 thresh-4
DellEMC(conf) #service-pool wred weight pool0 11 pool1 4
```

```
DellEMC(conf-wred) #wred thresh-1
DellEMC(conf-wred) #threshold min 100 max 200 max-drop-rate 40

DellEMC(conf-wred) #wred thresh-2
DellEMC(conf-wred) #threshold min 300 max 400 max-drop-rate 80
```

```
DellEMC(conf) #service-pool wred green pool0 thresh-1 pool1 thresh-2
```

DSCP Color Map Commands

The DSCP color map allows you to set the number of specific DSCP values to yellow or red. Traffic marked as yellow delivers traffic to the egress queue which will either transmit the packet if it has available bandwidth or drop the packet due to no ability to send. Traffic marked as red (high drop precedence) is dropped.

dscp

Sets the number of specific DSCP values for a color map profile to yellow or red.

Syntax `dscp {yellow | red} [list-dscp-values]`

To remove a color policy map profile, use the `no dscp {yellow | red} [dscp-list]` command.

Parameters

Yellow	Enter the `yellow` keyword. Traffic marked as yellow delivers traffic to the egress queue which either transmits the packet if it has available bandwidth or drops the packet due to no ability to send.
Red	Enter the `red` keyword. Traffic marked as red is dropped.
dscp-list	Enter a list of IP DSCP values. The *dscp-list* parameter specifies the full list of IP DSCP value(s) for the specified color. Each DSCP value in a list is separate values by commas – no spaces (1,2,3) or indicates a list of values separated by a hyphen (1-3). Range is `0` to `63`.

Defaults **None**

Command Modes CONFIG-COLOR-MAP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information If the specified color-map does not exist, the Diffserv Manager (DSM) creates a color map and sets all the DSCP values to green (low drop precedence).

The default setting for each DSCP value (0-63) is green (low drop precedence). This command allows setting the number of specific DSCP values to yellow or red.

Important Points to Remember

- All DSCP values that are not specified as yellow or red are colored green.

- A DSCP value cannot be in both the yellow and red lists. Setting the red or yellow list with any DSCP value that is already in the other list results in an error and no update to that list is made.
- Each color map can only have one list of DSCP values for each color; any DSCP values previously listed for that color that are not in the new DSCP list are colored green.

Example

```
DellEMC(conf-dscp-color-map)# dscp yellow 9,10,11,13,15,16
```

Related Commands

- qos dscp-color-map — configures the DSCP color map.
- qos dscp-color-policy— configures a DSCP color policy.

qos dscp-color-map

Configure the DSCP color map.

Syntax

`qos dscp-color-map` *map-name*

To remove a color map, use the no `qos dscp-color-map` *map-name* command.

Parameters

map-name	Enter the name of the DSCP color map. The map name can have a maximum of 32 characters.

Defaults **None**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.5(0.1)	Introduced on the Z9500.
9.7(0.0)	Introduced on the S6000-ON.
9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information A color map outlines the codepoint mappings to the appropriate color mapping (green, yellow, red) for the traffic. The system uses this information use to handle the traffic on the interface based on the traffic priority and places it into the appropriate shaping queue. You cannot delete a DSCP color map when it is configured on an interface. If you do, all the DSCP values are set to green (low drop precedence). To delete the DSCP color map that is being used by one or more interfaces, remove the DSCP map from each interface.

Example

```
DellEMC(conf)#qos dscp-color-map mymap
```

Related Commands

- qos dscp-color-map— associates the DSCP color map profile with an interface so that all IP packets received on it is given a color based on that color map.
- dscp— sets the number of specific DSCP values for color map profile to yellow or red.

qos dscp-color-policy

Associates the DSCP color map profile with an interface so that all IP packets received on it is given a color based on that color map.

Syntax

`dscp-color-policy color-map-profile-name`

To remove a color policy map profile, use the `no dscp-color-policy color-map-profile-name` command.

Parameters

color-map-profile-name	Enter the color map profile name. The name can have a maximum of 32 characters.

Defaults **None**

Command Modes CONFIG-INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
Version 9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information If the specified color-map does not exist, the Diffserv Manager (DSM) creates a color map and sets all the DSCP values to green (low drop precedence).

Example The following example assigns the color map, **bat-enclave-map**, to interface**tw 1/1**.

```
DellEMC(conf)# int tw 1/1
DellEMC(conf-if-tf-1/1)# qos dscp-color-policy bat-enclave-map
DellEMC(conf-if-tf-1/1)#
```

Related Commands

- dscp— sets the number of specific DSCP values for color map profile to yellow or red.
- qos dscp-color-map— configures the DSCP color map.

show qos dscp-color-policy

Display DSCP color policy configuration for one or all interfaces.

Syntax

`show qos dscp-color-policy {summary [interface] | detail {interface}}`

Parameters

summary	Enter the `summary` keyword to display summary information about a color policy on one or more interfaces.
Detail	Enter the `detail` keyword to display detailed information about a color policy on one or more interfaces.

	interface	Enter the name of the interface that has color policy configured.

Defaults **None**

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Example

```
Display summary information about a color policy on one or more
interfaces.

DellEMC# show qos dscp-color-policy summary

Interface     dscp-color-map
Tf 1/10       mapONE
Tf 1/11       mapTWO

Display summary information about a color policy on a specific interface.

DellEMC# show qos dscp-color-policy summary tw 1/10
Interface    dscp-color-map
Tf 1/10      mapONE

Displayed detailed color policy information on an interface.

DellEMC# show qos dscp-color-policy detail tw 1/10
Interface twentyFiveGigE 1/10

Dscp-color-map mapONE
  yellow 4,7
  red 20,30
```

Related Commands

- show qos dscp-color-map — displays DSCP color maps.

show qos dscp-color-map

Display the DSCP color map for one or all interfaces.

Syntax `show qos dscp-color-map` *map-name*

Parameters

map-name	Enter the name of the color map.

Defaults **None**

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Example

```
Display all DSCP color maps.

DellEMC# show qos dscp-color-map
Dscp-color-map mapONE
  yellow 4,7
  red 20,30
Dscp-color-map mapTWO
  yellow 16,55

Display a specific DSCP color map.

DellEMC# show qos dscp-color-map mapTWO
Dscp-color-map mapTWO
  yellow 16,55
DellEMC#
```

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Routing Information Protocol (RIP)

Routing information protocol (RIP) is a distance vector routing protocol. The Dell EMC Networking OS supports both RIP version 1 (RIPv1) and RIP version 2 (RIPv2).

The Dell EMC Networking OS implementation of RIP is based on IETF RFCs 2453 and RFC 1058. For more information about configuring RIP, see the *Dell EMC Networking OS Configuration Guide*.

Topics:

- auto-summary
- clear ip rip
- debug ip rip
- default-information originate
- default-metric
- description
- distance
- distribute-list in
- distribute-list out
- ip poison-reverse
- ip rip receive version
- ip rip send version
- ip split-horizon
- maximum-paths
- neighbor
- network
- offset-list
- output-delay
- passive-interface
- redistribute
- redistribute isis
- redistribute ospf
- router rip
- show config
- show ip rip database
- show running-config rip
- timers basic
- version

auto-summary

Restore the default behavior of automatic summarization of subnet routes into network routes. This command applies only to RIP version 2.

Syntax	`auto-summary` To send sub-prefix routing information, use the `no auto-summary` command.
Defaults	Enabled.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

clear ip rip

Update all the RIP routes in the Dell EMC Networking OS routing table.

Syntax `clear ip rip`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information This command triggers updates of the main RIP routing tables.

debug ip rip

Examine RIP routing information for troubleshooting.

Syntax `debug ip rip [interface | database | events [interface] | trigger]`

To turn off debugging output, use the `no debug ip rip` command.

Parameters

interface	(OPTIONAL) Enter the interface type and ID as one of the following: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
database	(OPTIONAL) Enter the keyword `database` to display messages when there is a change to the RIP database.
events	(OPTIONAL) Enter the keyword `events` to debug only RIP protocol changes.
trigger	(OPTIONAL) Enter the keyword `trigger` to debug only RIP trigger extensions.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

default-information originate

Generate a default route for the RIP traffic.

Syntax `default-information originate [always] [metric metric-value] [route-map map-name]`

To return to the default values, use the `no default-information originate` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to enable the switch software to always advertise the default route.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 1 to 16. The default is **1**.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route-map.

Defaults Disabled. Metric: **1**.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information The default route must be present in the switch routing table for the `default-information originate` command to take effect.

default-metric

Change the default metric for routes. To ensure that all redistributed routes use the same metric value, use this command with the `redistribute` command.

Syntax `default-metric number`

To return the default metric to the original values, use the `no default-metric` command.

Parameters

number	Specify a number. The range is from 1 to 16. The default is **1**.

Defaults **1**

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Version	Description
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information This command ensures that route information being redistributed is converted to the same metric value.

Related Commands
- redistribute — allows you to redistribute routes learned by other methods.

description

Enter a description of the RIP routing protocol.

Syntax `description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the RIP protocol (80 characters maximum).

Defaults none

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0)	Introduced on the S3048-ON and S4048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 7.7.1.0	Introduced on the E-Series.

Related Commands
- router rip — enters ROUTER mode on the switch.

distance

Assign a weight (for prioritization) to all routes in the RIP routing table or to a specific route. Lower weights ("administrative distance") are preferred.

Syntax

`distance weight [ip-address mask [prefix-name]]`

To return to the default values, use the `no distance weight [ip-address mask]` command.

Parameters

weight	Enter a number from 1 to 255 for the weight (for prioritization). The default is **120**.
ip-address	(OPTIONAL) Enter the IP address, in dotted decimal format (A.B.C.D), of the host or network to receive the new distance metric.
mask	If you enter an IP address, also enter a mask for that IP address, in either dotted decimal format or /prefix format (/x).
prefix-name	(OPTIONAL) Enter a configured prefix list name.

Defaults

weight = **120**

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- default-metric — assigns one distance metric to all routes learned using the `redistribute` command.

distribute-list in

Configure a filter for incoming routing updates.

Syntax

`distribute-list` *`prefix-list-name`* `in` [*`interface`*]

To delete the filter, use the `no distribute-list` *`prefix-list-name`* `in` command.

Parameters

prefix-list-name Enter the name of a configured prefix list.

interface (OPTIONAL) Identifies the interface type slot/port as one of the following:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.29.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- ip prefix-list — enters PREFIX-LIST mode and configures a prefix list.

distribute-list out

Configure a filter for outgoing routing updates.

Syntax

`distribute-list prefix-list-name out [interface | bgp | connected | isis | ospf | static]`

To delete the filter, use the `no distribute-list prefix-list-name out` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
connected	(OPTIONAL) Enter the keyword `connected` to filter only directly connected routes.
isis	(OPTIONAL) Enter the keyword `isis` to filter only IS-IS routes.
ospf	(OPTIONAL) Enter the keyword `ospf` to filter all OSPF routes.
static	(OPTIONAL) Enter the keyword `static` to filter manually configured routes.

Defaults

Not configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- ip prefix-list — enters PREFIX-LIST mode and configures a prefix list.

ip poison-reverse

Set the prefix of the RIP routing updates to the RIP infinity value.

Syntax

```
ip poison-reverse
```

To disable poison reverse, use the `no ip poison-reverse` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- ip split-horizon — sets the RIP routing updates to exclude routing prefixes.

ip rip receive version

To receive specific versions of RIP, set the interface. The RIP version you set on the interface overrides the version command in ROUTER RIP mode.

Syntax

```
ip rip receive version [1] [2]
```

To return to the default, use the `no ip rip receive version` command.

Parameters

1	(OPTIONAL) Enter the number `1` for RIP version 1.
2	(OPTIONAL) Enter the number `2` for RIP version 2.

Defaults **RIPv1** and **RIPv2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information If you want the interface to receive both versions of RIP, use the `ip rip receive version 1 2` command.

Related Commands

- ip rip send version — sets the RIP version for sending RIP traffic on an interface.
- version — sets the RIP version the switch software uses.

ip rip send version

To send a specific version of RIP, set the interface. The version you set on the interface overrides the version command in ROUTER RIP mode.

Syntax

```
ip rip send version [1] [2]
```

To return to the default value, use the `no ip rip send version` command.

Parameters

1	(OPTIONAL) Enter the number `1` for RIP version 1. The default is RIP version 1.
2	(OPTIONAL) Enter the number `2` for RIP version 2.

Defaults **RIPv1**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information To enable the interface to send both version of RIP packets, use the `ip rip send version 1 2` command.

Related Commands

- ip rip receive version — sets the RIP version for the interface to receive traffic.
- version — sets the RIP version for the switch software.

ip split-horizon

Enable split-horizon for RIP data on the interface. As described in RFC 2453, the split-horizon scheme prevents any routes learned over a specific interface to be sent back out that interface.

Syntax `ip split-horizon`

To disable split-horizon, use the `no ip split-horizon` command.

Defaults Enabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- ip poison-reverse — sets the prefix for RIP routing updates.

maximum-paths

Set RIP to forward packets over multiple paths.

Syntax `maximum-paths` *number*

To return to the default values, use the `no maximum-paths` commands.

Parameters

number Enter the number of paths. The range is from 1 to 16. The default is **4** paths.

Defaults **4**

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information RIP supports a maximum of 16 ECMP paths.

neighbor

Define a neighbor router with which to exchange RIP information.

Syntax `neighbor ip-address`

To delete a neighbor setting, use the `no neighbor ip-address` command.

Parameters

ip-address Enter the IP address, in dotted decimal format, of a router with which to exchange information.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information

When a neighbor router is identified, unicast data exchanges occur. Multiple neighbor routers are possible.

To ensure that only specific interfaces are receiving and sending data, use the `passive-interface` command with the `neighbor` command.

Related Commands

- passive-interface — sets the interface to only listen to RIP broadcasts.

network

Enable RIP for a specified network. To enable RIP on all networks connected to the switch, use this command.

Syntax

`network` *`ip-address`*

To disable RIP for a network, use the `no network` *`ip-address`* command.

Parameters

ip-address	Specify an IP network address in dotted decimal format. You cannot specify a subnet.

Defaults

No RIP network is configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information

You can enable an unlimited number of RIP networks.

RIP operates over interfaces configured with any address the `network` command specifies.

offset-list

Specify a number to add to the incoming or outgoing route metrics learned using RIP.

Syntax

`offset-list` *`prefix-list-name`* `{in | out}` *`offset`* `[`*`interface`*`]`

To delete an offset list, use the `no offset-list` *`prefix-list-name`* `{in | out}` *`offset`* `[`*`interface`*`]` command.

Parameters

prefix-list-name	Enter the name of an established Prefix list to determine which incoming routes are modified.
offset	Enter a number from zero (0) to 16 to be applied to the incoming route metric matching the access list specified. If you set an offset value to zero (0), no action is taken.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information When the offset metric is applied to an interface, that value takes precedence over an offset value that is not extended to an interface.

Related Commands

- ip prefix-list — enters PREFIX-LIST mode and configure a prefix list.

output-delay

Set the interpacket delay of successive packets to the same neighbor.

Syntax `output-delay` *delay*

To return to the switch software defaults for interpacket delay, use the `no output-delay` command.

Parameters

delay	Specify a number of milliseconds as the delay interval. The range is from 8 to 50.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information This command is intended for low-speed interfaces.

passive-interface

Suppress routing updates on a specified interface.

Syntax `passive-interface` *interface*

To delete a passive interface, use the `no passive-interface` *interface* command.

Parameters

interface Enter the following information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information Although the passive interface does not send or receive routing updates, the network on that interface still includes in RIP updates sent using other interfaces.

Related Commands
- neighbor — enables RIP for a specified network.
- network — defines a neighbor.

redistribute

Redistribute information from other routing instances.

Syntax `redistribute {connected | static}`

To disable redistribution, use the no redistribute {connected | static} command.

Parameters

connected	Enter the keyword `connected` to specify that information from active routes on interfaces is redistributed.
static	Enter the keyword `static` to specify that information from static routes is redistributed.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information To redistribute the default route (0.0.0.0/0), configure the `default-information originate` command.

Related Commands

- default-information originate — generates a default route for RIP traffic.

redistribute isis

Redistribute routing information from an IS-IS instance.

Syntax `redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric metric-value] [route-map map-name]`

To disable redistribution, use the `no redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric metric-value] [route-map map-name]` command.

Parameters

tag	(OPTIONAL) Enter the name of the IS-IS routing process.
level-1	(OPTIONAL) Enter the keywords `level-1` to redistribute only IS-IS Level-1 routes.
level-1-2	(OPTIONAL) Enter the keywords `level-1-2` to redistribute both IS-IS Level-1 and Level-2 routes.
level-2	(OPTIONAL) Enter the keywords `level-2` to redistribute only IS-IS Level-2 routes.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 0 to 16.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
pre- 6.2.1.1	Introduced on the E-Series.

redistribute ospf

Redistribute routing information from an OSPF process.

Syntax

```
redistribute ospf process-id [match external {1 | 2} | match internal | metric metric-value] [route-map map-name]
```

To disable redistribution, use the `no redistribute ospf process-id [match external {1 | 2} | match internal | metric metric-value] [route-map map-name]` command.

Parameters

process-id	Enter a number that corresponds to the OSPF process ID to redistribute. The range is from 1 to 65355.
match external {1 | 2}	(OPTIONAL) Enter the keywords `match external` then the numbers `1` or `2` to indicated that external 1 routes or external 2 routes should be redistributed.
match internal	(OPTIONAL) Enter the keywords `match internal` to indicate that internal routes should be redistributed.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 0 to 16.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

router rip

To configure and enable RIP, enter ROUTER RIP mode.

Syntax

```
router rip
```

To disable RIP, use the `no router rip` command.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.

Version	Description
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information To enable RIP, assign a network address using the `network` command.

Example

```
DellEMC(conf)# router rip
DellEMC(conf-router_rip)#
```

Related Commands

- network — enables RIP.
- exit — returns to CONFIGURATION mode.

show config

Display the changes you made to the RIP configuration. The default values are not shown.

Syntax `show config`

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(conf-router_rip)# show config
!
router rip
  network 172.31.0.0
  passive-interface twentyFiveGigE 1/1
DellEMC(conf-router_rip)#
```

show ip rip database

Display the routes that RIP learns. If the switch learned no RIP routes, no output is generated.

Syntax `show ip rip database [ip-address mask]`

Parameters

ip-address	(OPTIONAL) Specify an IP address in dotted decimal format to view RIP information on that network only. If you enter an IP address, also enter a mask for that IP address.
mask	(OPTIONAL) Specify a mask, in /network format, for the IP address.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information The following describes the `show ip rip database` command shown in the following example.

Field	Description
Total number of routes in RIP database	Displays the number of RIP routes stored in the RIP database.
100.10.10.0/24 directly connected	Lists the routes directly connected.
150.100.0.0 redistributed	Lists the routes learned through redistribution.
209.9.16.0/24...	Lists the routes and the sources advertising those routes.

Example

```
DellEMC# show ip rip database
Total number of routes in RIP database: 1624
204.250.54.0/24
      [50/1] via 192.14.1.3, 00:00:12, twentyFiveGigE 1/15
204.250.54.0/24     auto-summary
203.250.49.0/24
      [50/1] via 192.13.1.3, 00:00:12, twentyFiveGigE 1/14
203.250.49.0/24     auto-summary
210.250.40.0/24
      [50/2] via 1.1.18.2, 00:00:14, Vlan 18
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
210.250.40.0/24     auto-summary
207.250.53.0/24
      [50/2] via 1.1.120.2, 00:00:55, Port-channel 20
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
      [50/2] via 1.1.10.2, 00:00:18, Vlan 10
207.250.53.0/24     auto-summary
208.250.42.0/24
      [50/2] via 1.1.120.2, 00:00:55, Port-channel 20
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
      [50/2] via 1.1.10.2, 00:00:18, Vlan 10
208.250.42.0/24     auto-summary
DellEMC#
```

show running-config rip

Display the current RIP configuration.

Syntax `show running-config rip`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.

Version	Description
7.7.1.0	Introduced on the C-Series.
7.6.1.0	Introduced on the E-Series.

Example

```
DellEMC# show running-config rip
!
router rip
  distribute-list Test1 in
  distribute-list Test21 out
  network 10.0.0.0
  passive-interface twentyFiveGigE 1/2
  neighbor 20.20.20.20
  redistribute ospf 999
  version 2
DellEMC#
```

timers basic

Manipulate the RIP timers for routing updates, invalid, holddown times, and flush time.

Syntax `timers basic update` *`invalid holddown flush`*

To return to the default settings, use the `no timers basic` command.

Parameters

update	Enter the number of seconds to specify the rate at which RIP routing updates are sent. The range is from zero (0) to 4294967295. The default is **30 seconds**.
invalid	Enter the number of seconds to specify the time interval before routing updates are declared invalid or expired. The invalid value should be at least three times the update timer value. The range is from zero (0) to 4294967295. The default is **180 seconds**.
holddown	Enter the number of seconds to specify a time interval during which the route is marked as unreachable but still sending RIP packets. The holddown value should be at least three times the update timer value. The range is from zero (0) to 4294967295. The default is **180 seconds**.
flush	Enter the number of seconds to specify the time interval during which the route is advertised as unreachable. When this interval expires, the route is flushed from the routing table. The flush value should be greater than the update value. The range is from zero (0) to 4294967295. The default is **240 seconds**.

Defaults

- update = **30 seconds**
- invalid = **180 seconds**
- holddown = **180 seconds**
- flush = **240 seconds**

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Usage Information If you change the timers on one router, also synchronize the timers on all routers in the RIP domain.

version

Specify either RIP version 1 or RIP version 2.

Syntax `version {1 | 2}`

To return to the default version setting, use the `no version` command.

Parameters

1	Enter the keyword `1` to specify RIP version 1.
2	Enter the keyword `2` to specify RIP version 2.

Defaults The Dell EMC Networking OS sends RIPv1 and receives RIPv1 and RIPv2.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
pre- 6.2.1.1	Introduced on the E-Series.

Related Commands

- ip rip receive version — sets the RIP version the interface receives.
- ip rip send version — sets the RIP version the interface sends.

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Remote Monitoring (RMON)

Dell EMC Networking OS RMON is based on IEEE standards, providing both 32-bit and 64-bit monitoring and long-term statistics collection. Dell EMC Networking OS RMON supports the following RMON groups, as defined in RFC-2819, RFC-3273, RFC-3434, and RFC-4502:

- Ethernet Statistics Table; RFC-2819
- Ethernet Statistics High-Capacity Table; RFC-3273, 64bits
- Ethernet History Control Table; RFC-2819
- Ethernet History Table; RFC-2819
- Ethernet History High-Capacity Table; RFC-3273, 64bits
- Alarm Table; RFC-2819
- High-Capacity Alarm Table (64bits); RFC-3434, 64bits
- Event Table; RFC-2819
- Log Table; RFC-2819
- User History; RFC-4502
- Probe Configuration (Capabilities, SoftwareRev, HardwareRev, DateTime and ResetControl); RFC-4502

Dell EMC Networking OS RMON does not support the following statistics:

- etherStatsCollisions
- etherHistoryCollisions
- etherHistoryUtilization

NOTE: Only SNMP GET/GETNEXT access is supported. Configure RMON using the RMON commands. Collected data is lost during a chassis reboot.

Topics:

- rmon alarm
- rmon collection history
- rmon collection statistics
- rmon event
- rmon hc-alarm
- show rmon
- show rmon alarms
- show rmon events
- show rmon hc-alarm
- show rmon history
- show rmon log
- show rmon statistics

rmon alarm

Set an alarm on any MIB object.

Syntax

```
rmon alarm number variable interval {delta | absolute} rising-threshold
value event-number falling-threshold value event-number [owner string]
```

To disable the alarm, use the `no rmon alarm number` command.

Parameters

number	Enter the alarm integer number from 1 to 65535. The value must be unique in the RMON alarm table.
variable	Enter the MIB object to monitor. The variable must be in the SNMP OID format; for example, 1.3.6.1.2.1.1.3. The object type must be a 32-bit integer.

interval	Time, in seconds, the alarm monitors the MIB variables; this is the alarmSampleType in the RMON alarm table. The range is from 5 to 3600 seconds.
delta	Enter the keyword `delta` to test the change between MIB variables. This is the alarmSampleType in the RMON alarm table.
absolute	Enter the keyword `absolute` to test each MIB variable directly. This is the alarmSampleType in the RMON alarm table.
rising-threshold *value event-number*	Enter the keywords `rising-threshold` then the value (32 bit) the rising-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the rising threshold exceeds its limit. This value is the same as the alarmRisingEventIndex or alarmTable of the RMON MIB. If there is no corresponding rising-threshold event, the value is zero.
falling-threshold *value event-number*	Enter the keywords `falling-threshold` then the value (32 bit) the falling-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the falling threshold exceeds its limit. This value is the same as the alarmFallingEventIndex or the alarmTable of the RMON MIB. If there is no corresponding falling-threshold event, the value is zero.
owner *string*	(OPTIONAL) Enter the keyword `owner` then the owner name to specify an owner for the alarm. This is the alarmOwner object in the alarmTable of the RMON MIB.

Defaults **owner**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

rmon collection history

Enable the RMON MIB history group of statistics collection on an interface.

Syntax

`rmon collection history {controlEntry integer} [owner name] [buckets number] [interval seconds]`

To remove a specified RMON history group of statistics collection, use the `no rmon collection history {controlEntry integer}` command.

Parameters

controlEntry *integer*	Enter the keyword `controlEntry` to specify the RMON group of statistics using a value. Then enter an integer value from 1 to 65535 that identifies the RMON group of statistics. The integer value must be a unique index in the RMON history table.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the owner name to record the owner of the RMON group of statistics.
buckets *number*	(OPTIONAL) Enter the keyword `buckets` then the number of buckets for the RMON collection history group of statistics. The bucket range is from 1 to 1000. The default is **50**.
interval *seconds*	(OPTIONAL) Enter the keyword `interval` then the number of seconds in each polling cycle. The range is from 5 to 3600 seconds. The default is **1800 seconds**.

Defaults

none

Command Modes

CONFIGURATION INTERFACE (config-if)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

rmon collection statistics

Enable RMON MIB statistics collection on an interface.

Syntax

`rmon collection statistics {controlEntry integer} [owner name]`

To remove RMON MIB statistics collection on an interface, use the `no rmon collection statistics {controlEntry integer}` command.

Parameters

controlEntry *integer*	Enter the keyword `controlEntry` to specify the RMON group of statistics using a value. Then enter an integer value from 1 to 65535 that identifies the RMON Statistic Table. The integer value must be a unique in the RMON statistic table.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the owner name to record the owner of the RMON group of statistics.

Defaults

none

Command Modes

CONFIGURATION INTERFACE (config-if)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

rmon event

Add an event in the RMON event table.

Syntax

`rmon event number [log] [trap community] [description string]`

To disable RMON on an interface, use the `no rmon event number` command.

Parameters

number	Assign an event number in integer format. The range is from 1 to 65535. You must ensure that the value you enter is unique in the RMON event table.

log	(OPTIONAL) Enter the keyword `log` to generate an RMON event log. This option sets the eventType to either log or log-and-snmptrap in the RMON event table. The default is None.
trap *community*	(OPTIONAL) Enter the keyword `trap` followed by the SNMP community string to generate SNMP traps for an RMON event entry. This option sets the eventType to either snmptrap or log-and-snmptrap in the RMON event table. In addition to the SNMP traps, this option also generates a syslog.
description *string*	(OPTIONAL) Enter the keyword `description` then a string describing the event.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the name of the owner of this event.

Defaults As noted in the *Parameters* section.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

rmon hc-alarm

Set an alarm on any MIB object.

Syntax

```
rmon hc-alarm number variable interval {delta | absolute} rising-threshold
value event-number falling-threshold value event-number [owner string]
```

To disable the alarm, use the `no rmon hc-alarm number` command.

Parameters

number	Enter the alarm integer number from 1 to 65535. The value must be unique in the RMON alarm table.
variable	The MIB object to monitor. The variable must be in the SNMP OID format; for example, 1.3.6.1.2.1.1.3 The object type must be a 64-bit integer.

interval	Time, in seconds, the alarm monitors the MIB variables; this is the alarmSampleType in the RMON alarm table. The range is from 5 to 3600 seconds.
delta	Enter the keyword `delta` to test the change between MIB variables. This is the alarmSampleType in the RMON alarm table.
absolute	Enter the keyword `absolute` to test each MIB variable directly. This is the alarmSampleType in the RMON alarm table.
rising-threshold *value event-number*	Enter the keywords `rising-threshold` then the value (64 bit) the rising-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the rising threshold exceeds its limit. This value is the same as the alarmRisingEventIndex or alarmTable of the RMON MIB. If there is no corresponding rising-threshold event, the value is zero.
falling-threshold *value event-number*	Enter the keywords `falling-threshold` then the value (64 bit) the falling-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the falling threshold exceeds its limit. This value is the same as the alarmFallingEventIndex or the alarmTable of the RMON MIB. If there is no corresponding falling-threshold event, the value is zero.
owner *string*	(OPTIONAL) Enter the keyword `owner` then the owner name to specify an owner for the alarm. This is the alarmOwner object in the alarmTable of the RMON MIB.

Defaults **owner**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

show rmon

Display the RMON running status including the memory usage.

Syntax `show rmon`

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show rmon
RMON status
  total memory used 218840 bytes.
  ether statistics table: 8 entries, 4608 bytes
  ether history table: 8 entries, 6000 bytes
  alarm table: 390 entries, 102960 bytes
  high-capacity alarm table: 5 entries, 1680 bytes
  event table: 500 entries, 206000 bytes
  log table: 2 entries, 552 bytes
DellEMC#
```

show rmon alarms

Display the contents of the RMON alarm table.

Syntax `show rmon alarms [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON alarm table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example (Index)

```
DellEMC# show rmon alarm 1
RMON alarm entry 1
  sample Interval: 5
  object: 1.3.6.1.2.1.1.3
  sample type: absolute value.
  value: 255161
  alarm type: rising or falling alarm.
  rising threshold: 1, RMON event index: 1
  falling threshold: 501, RMON event index: 501
  alarm owner: 1
  alarm status: OK
DellEMC#
```

Example (Brief)

```
DellEMC# show rmon alarm br
index   SNMP OID
--------------------------
1       1.3.6.1.2.1.1.3
2       1.3.6.1.2.1.1.3
3       1.3.6.1.2.1.1.3
4       1.3.6.1.2.1.1.3
5       1.3.6.1.2.1.1.3
6       1.3.6.1.2.1.1.3
7       1.3.6.1.2.1.1.3
8       1.3.6.1.2.1.1.3
9       1.3.6.1.2.1.1.3
```

```
10      1.3.6.1.2.1.1.3
11      1.3.6.1.2.1.1.3
12      1.3.6.1.2.1.1.3
13      1.3.6.1.2.1.1.3
14      1.3.6.1.2.1.1.3
15      1.3.6.1.2.1.1.3
16      1.3.6.1.2.1.1.3
17      1.3.6.1.2.1.1.3
18      1.3.6.1.2.1.1.3
19      1.3.6.1.2.1.1.3
20      1.3.6.1.2.1.1.3
21      1.3.6.1.2.1.1.3
22      1.3.6.1.2.1.1.3
DellEMC#
```

show rmon events

Display the contents of the RMON event table.

Syntax `show rmon events [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON event table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example (Index)

```
DellEMC(conf)# rmon event 111                -> Default case
DellEMC(conf)# rmon event 112 log            -> Only “log” option
DellEMC(conf)# rmon event 113 trap private   -> Only “trap” option
DellEMC(conf)# rmon event 114 log trap public-> Both “log” and “trap”
options
DellEMC(conf)#do show rmon events
RMON event entry 111
    description:
    event type: none.
    event community:
    event last time sent: none
    event owner:
    event status: OK
RMON event entry 112
    description:
    event type: LOG.
    event community:
    event last time sent: none
    event owner:
    event status: OK
RMON event entry 113
    description:
    event type: SNMP TRAP.
    event community: private
    event last time sent: none
    event owner:
    event status: OK
RMON event entry 114
    description:
    event type: LOG and SNMP TRAP.
    event community: public
    event last time sent: none
    event owner:
    event status: OK
```

Example (Brief)

```
DellEMC# show rmon event brief
index    description
------------------------------
1        1
2        2
3        3
4        4
5        5
6        6
7        7
8        8
9        9
10       10
11       11
12       12
13       13
14       14
15       15
16       16
17       17
18       18
19       19
20       20
21       21
22       22
DellEMC#
```

show rmon hc-alarm

Display the contents of RMON High-Capacity alarm table.

Syntax `show rmon hc-alarm [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON High-Capacity alarm table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example (Index)

```
DellEMC# show rmon hc-alarm 1
RMON high-capacity alarm entry 2
    object: 1.3.6.1.2.1.2.2.1.4.2099844
    sample interval: 10
    sample type: delta value.
    value: 0, value status: positive
    alarm type: rising or falling alarm.
    alarm rising threshold value: positive.
    rising threshold: 500, RMON event index: 3
    alarm falling threshold value: positive.
    falling threshold: 300, RMON event index: 4
    alarm sampling failed 0 times.
    alarm owner:
    alarm storage type: non-volatile.
    alarm status: OK
DellEMC#
```

Example (Brief)

```
DellEMC# show rmon hc-alarm brief
index     SNMP OID
---------------------------------
1         1.3.6.1.2.1.1.3
2         1.3.6.1.2.1.1.3
3         1.3.6.1.2.1.1.3
4         1.3.6.1.2.1.1.3
5         1.3.6.1.2.1.1.3
DellEMC#
```

show rmon history

Display the contents of the RMON Ethernet history table.

Syntax `show rmon history [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON Ethernet history table in an easy-to-read format

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example (Index)

```
DellEMC# show rmon history 6001
RMON history control entry 6001
interface: ifIndex.100974631 twentyFiveGigE 1/1
```

```
bucket requested: 1
bucket granted: 1
sampling interval: 5 sec
owner: 1
status: OK
DellEMC#
```

Example (Brief)

```
DellEMC# show rmon history brief
index ifIndex interface
-------------------------------------------------------------------------
6001 100974631 twentyFiveGigE 1/2
6002 100974631 twentyFiveGigE 1/3
6003 101236775 twentyFiveGigE 1/1
6004 101236775 twentyFiveGigE 1/4
9001 134529054 twentyFiveGigE 1/5
9002 134529054 twentyFiveGigE 1/6
9003 134791198 twentyFiveGigE 1/7
9004 134791198 twentyFiveGigE 1/8
DellEMC#
```

show rmon log

Display the contents of the RMON log table.

Syntax `show rmon log [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON log table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information The log table has a maximum of 500 entries. If the log exceeds that maximum, the oldest log entry is purged to allow room for the new entry.

Example (Index)

```
DellEMC# show rmon log 2
RMON log entry, alarm table index 2, log index 1
  log time: 14638 (THU AUG 12 22:10:40 2004)
  description: 2
DellEMC#
```

Example (Brief)

```
DellEMC# show rmon log br
eventIndex     description
-------------------------------
2              2
4              4
DellEMC#
```

show rmon statistics

Display the contents of RMON Ethernet statistics table.

Syntax `show rmon statistics [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON Ethernet statistics table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example (Index)

```
DellEMC# show rmon statistics 6001
RMON statistics entry 6001
  interface: ifIndex.100974631 twentyFiveGigE 1/2
  packets dropped: 0
  bytes received: 0
  packets received: 0
  broadcast packets: 0
  multicast packets: 0
  CRC error: 0
  under-size packets: 0
  over-size packets: 0
  fragment errors: 0
  jabber errors: 0
  collision: 0
  64bytes packets: 0
  65-127 bytes packets: 0
  128-255 bytes packets: 0
  256-511 bytes packets: 0
  512-1023 bytes packets: 0
  1024-1518 bytes packets: 0
  owner: 1
  status: OK
  <high-capacity data>
  HC packets received overflow: 0
  HC packets received: 0
  HC bytes received overflow: 0
  HC bytes received: 0
  HC 64bytes packets overflow: 0
  HC 64bytes packets: 0
  HC 65-127 bytes packets overflow: 0
  HC 65-127 bytes packets: 0
  HC 128-255 bytes packets overflow: 0
  HC 128-255 bytes packets: 0
  HC 256-511 bytes packets overflow: 0
  HC 256-511 bytes packets: 0
  HC 512-1023 bytes packets overflow: 0
  HC 512-1023 bytes packets: 0
  HC 1024-1518 bytes packets overflow: 0
  HC 1024-1518 bytes packets: 0
DellEMC#
```

Example (Brief)

```
DellEMC# show rmon statistics br
index    ifIndex    interface
-----------------------------------------
6001    100974631    twentyFiveGigE 1/2
6002    100974631    twentyFiveGigE 1/2
6003    101236775    twentyFiveGigE 1/3
6004    101236775    twentyFiveGigE 1/3
9001    134529054    twentyFiveGigE 1/4
9002    134529054    twentyFiveGigE 1/4
9003    134791198    twentyFiveGigE 1/5
9004    134791198    twentyFiveGigE 1/5
DellEMC#
```

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Rapid Spanning Tree Protocol (RSTP)

The Dell EMC Networking OS implementation of rapid spanning tree protocol (RSTP) is based on the IEEE 802.1w standard spanning-tree protocol. The RSTP algorithm configures connectivity throughout a bridged local area network (LAN) that is comprised of LANs interconnected by bridges.

Dell EMC Networking OS supports RSTP.

Topics:

- bridge-priority
- debug spanning-tree rstp
- description
- disable
- forward-delay
- hello-time
- max-age
- protocol spanning-tree rstp
- show config
- show spanning-tree rstp
- spanning-tree rstp
- tc-flush-standard

bridge-priority

Set the bridge priority for RSTP.

Syntax `bridge-priority` *priority-value*

To return to the default value, use the `no bridge-priority` command.

Parameters

priority-value Enter a number as the bridge priority value in increments of 4096. The range is from 0 to 61440. The default is **32768**.

Defaults **32768**

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- protocol spanning-tree rstp — enters rapid spanning tree mode.

debug spanning-tree rstp

Enable debugging of RSTP and view information on the protocol.

Syntax

```
debug spanning-tree rstp [all | bpdu interface {in | out} | events]
```

To disable debugging, use the `no debug spanning-tree rstp` command.

Parameters

all	(OPTIONAL) Enter the keyword `all` to debug all spanning tree operations.
bpdu *interface* {in | out}	(OPTIONAL) Enter the keyword `bpdu` to debug the bridge protocol data units. (OPTIONAL) Enter the keyword `interface` along with the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port-channel interface, enter the keywords `port-channel` then the port-channel ID. Optionally, enter an in or out parameter with the optional interface: • For Receive, enter `in`. • For Transmit, enter `out`.
events	(OPTIONAL) Enter the keyword `events` to debug RSTP events.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC# debug spanning-tree rstp bpdu gigabitethernet 1/1 ?
in Receive (in)
out Transmit (out)
```

description

Enter a description of the rapid spanning tree.

Syntax `description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the rapid spanning tree (80 characters maximum).

Defaults none

Command Modes SPANNING TREE (The prompt is “config-rstp”.)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
pre-7.7.1.0	Introduced.

Related Commands

- protocol spanning-tree rstp — enters SPANNING TREE mode on the switch.

disable

Disable RSTP globally on the system.

Syntax `disable`

To enable Rapid Spanning Tree Protocol, use the `no disable` command.

Defaults RSTP is disabled.

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- protocol spanning-tree rstp — enters SPANNING TREE mode on the switch.

forward-delay

Configure the amount of time the interface waits in the Listening State and the Learning State before transitioning to the Forwarding State.

Syntax `forward-delay seconds`

To return to the default setting, use the `no forward-delay` command.

Parameters

seconds Enter the number of seconds that Dell EMC Networking OS waits before transitioning RSTP to the forwarding state. The range is from 4 to 30. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- hello-time — changes the time interval between BPDUs.
- max-age — changes the wait time before RSTP refreshes the protocol configuration information.

hello-time

Set the time interval between the generation of the RSTP bridge protocol data units (BPDUs).

Syntax `hello-time [milli-second] seconds`

To return to the default value, use the `no hello-time` command.

Parameters

seconds Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10 seconds. The default is **2 seconds**.

	milli-second	Enter the keywords `milli-second` to configure a hello time on the order of milliseconds. The range is from 50 to 950 milliseconds

Defaults **2 seconds**

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Added the `milli-second` option to the S-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information The hello time is encoded in BPDUs in increments of 1/256ths of a second. The standard minimum hello time in seconds is 1 second, which is encoded as 256. Millisecond hello times are encoded using values less than 256; the millisecond hello time equals (x/1000)*256.

When you configure millisecond hellos, the default hello interval of 2 seconds is still used for edge ports; the millisecond hello interval is not used.

Related Commands
- forward-delay — changes the wait time before RSTP transitions to the Forwarding state.
- max-age — changes the wait time before RSTP refreshes the protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the RSTP bridge.

Syntax `max-age seconds`

To return to the default values, use the `no max-age` command.

Parameters	***max-age***	Enter a number of seconds the Dell EMC Networking OS waits before refreshing configuration information. The range is from 6 to 40 seconds. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands
- forward-delay — changes the wait time before RSTP transitions to the Forwarding state.
- hello-time — changes the time interval between BPDUs.

protocol spanning-tree rstp

To configure RSTP, enter RSTP mode.

Syntax `protocol spanning-tree rstp`

To exit RSTP mode, use the `exit` command.

Defaults Not configured

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information RSTP is not enabled when you enter RSTP mode. To enable RSTP globally on the system, use the `no disable` command from RSTP mode.

Example

```
DellEMC(conf)# protocol spanning-tree rstp
DellEMC(config-rstp)# no disable
```

Related Commands

- disable — disables RSTP globally on the system.

show config

View the current configuration for the mode. Only non-default values are displayed.

Syntax `show config`

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(conf-rstp)# show config
!
protocol spanning-tree rstp
  no disable
  bridge-priority 16384
```

show spanning-tree rstp

Display the RSTP configuration.

Syntax `show spanning-tree rstp [brief] [guard]`

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to view a synopsis of the RSTP configuration information.
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on an RSTP interface and the current port state.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
6.4.1.0	Expanded to display the port error disable state (EDS) caused by loopback BPDU inconsistency.
6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show spanning-tree rstp guard` command shown in the following example.

Field	Description
Interface Name	RSTP interface.
Instance	RSTP instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), disabled (DIS), or shut down (EDS Shut).
Guard Type	Types of STP guard configured (Root, Loop, or BPDU guard)

Example (Brief)

```
DellEMC# show spanning-tree rstp brief
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 8192, Address 0001.e805.e306
Root Bridge hello time 4, max age 20, forward delay 15
Bridge ID Priority 16384, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15
Interface                              Designated
Name   PortID Prio Cost Sts Cost       Bridge ID       PortID
---------- ------- --- ------- -------------------- --------
Tf 1/2 128.418 128 20000 FWD 20000 16384 0001.e801.6aa8 128.418
Tf 1/1 128.419 128 20000 FWD 20000 16384 0001.e801.6aa8 128.419
Tf 1/8 128.426 128 20000 FWD 20000 8192 0001.e805.e306 128.130
Tf 1/9 128.427 128 20000 BLK 20000 8192 0001.e805.e306 128.131

Interface
Name   Role PortID Prio Cost Sts Cost  Link-type Edge
---------- ---- ------- --- ------- --------- ----
Tf 1/2 Desg 128.418 128 20000 FWD 20000 P2P     Yes
Tf 1/1 Desg 128.419 128 20000 FWD 20000 P2P     Yes
Tf 1/8 Root 128.426 128 20000 FWD 20000 P2P     No
Tf 1/9 Altr 128.427 128 20000 BLK 20000 P2P     No
DellEMC#
```

Example (EDS, LBK)

NOTE: “LBK_INC” (bold) means Loopback BPDU Inconsistency.

```
DellEMC# show spanning-tree rstp br
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 32768, Address 0001.e801.6aa8
We are the root
Configured hello time 2, max age 20, forward delay 15

Interface                              Designated
Name   PortID Prio Cost Sts Cost       Bridge ID PortID
- ---- ------- --- ------- -------------------- --------
Tf 1/1 128.257 128 20000 EDS 0 32768 0001.e801.6aa8 128.257
Interface
Name   Role PortID    Prio Cost Sts Cost Link-type Edge
--- ------ -------- ---- ------- --- ------- --------- ----
Tf 1/1 ErrDis 128.257 128 20000 EDS 0 P2P No

DellEMC# show spanning-tree rstp
Root Identifier has priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max hops 0
Bridge Identifier has priority 32768, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15, max hops 0
We are the root
```

```
Current root has priority 32768, Address 0001.e801.6aa8
Number of topology changes 1, last change occurred 00:00:31 ago on Tf 1/1
Port 257 (twentyFiveGigE 1/1) is LBK_INC Discarding
Port path cost 20000, Port priority 128, Port Identifier 128.257
Designated root has priority 32768, address 0001.e801.6aa8
Designated bridge has priority 32768, address 0001.e801.6aa8
Designated port id is 128.257, designated path cost 0
Number of transitions to forwarding state 1
BPDU : sent 27, received 9
The port is not in the Edge port mode
```

Example (Guard)

```
DellEMC# show spanning-tree rstp guard
Interface
Name   Instance Sts         Guard type
--------- -------- ------------------
Tf 1/1 0        INCON(Root) Rootguard
Tf 1/2 0        FWD         Loopguard
Tf 1/3 0        BLK         Bpduguard
```

spanning-tree rstp

Configure an RSTP interface with one of these settings: port cost, edge port with optional bridge port data unit (BPDU) guard, port priority, loop guard, or root guard.

Syntax

```
spanning-tree rstp {cost port-cost | edge-port [bpduguard [shutdown-on-violation]] | priority priority | {loopguard | rootguard}}
```

Parameters

cost *port-cost*
Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. The defaults are:
- 100 Mb/s Ethernet interface = **200000**
- 1-Gigabit Ethernet interface = **20000**
- 10-Gigabit Ethernet interface = **2000**
- Port Channel interface with one 100 Mb/s Ethernet = **200000**
- Port Channel interface with one 1 Gigabit Ethernet = **20000**
- Port Channel interface with one 10 Gigabit Ethernet = **2000**
- Port Channel with two 1 Gigabit Ethernet = **18000**
- Port Channel with two 10 Gigabit Ethernet = **1800**
- Port Channel with two 100 Mbps Ethernet = **180000**

edge-port
Enter the keywords `edge-port` to configure the interface as a rapid spanning tree edge port.

bpduguard
(OPTIONAL) Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails.

Enter the keyword `bpduguard` to disable the port when it receives a BPDU.

shutdown-on-violation
(OPTIONAL) Enter the keywords `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.

priority *priority*
Enter keyword `priority` then a value in increments of 16 as the priority. The range is from 0 to 240. The default is **128**.

loopguard
Enter the keyword `loopguard` to enable loop guard on an RSTP port or port-channel interface.

rootguard
Enter the keyword `rootguard` to enable root guard on an RSTP port or port-channel interface.

Defaults
Not configured.

Command Modes
INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced the `hardware shutdown-on-violation` options.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Added the optional bridge port data unit (BPDU) guard.
6.2.1.1	Introduced on the E-Series.

Usage Information

The `BPDU guard` option prevents the port from participating in an active STP topology in case a BPDU appears on a port unintentionally, or is misconfigured, or is subject to a DOS attack. This option places the port into an Error Disable state if a BPDU appears and a message is logged so that the administrator can take corrective action.

NOTE: A port configured as an edge port, on an RSTP switch, immediately transitions to the Forwarding state. Only configure ports connected to end-hosts as edge ports. Consider an edge port similar to a port with a `spanning-tree portfast` enabled.

If you do not enable `shutdown-on-violation`, BPDUs are still sent to the RPM CPU.

You cannot enable STP root guard and loop guard at the same time on a port. For example, if you configure loop guard on a port on which root guard is already configured, the following error message displays: `% Error: RootGuard is configured. Cannot configure LoopGuard.`

Enabling Portfast BPDU guard and loop guard at the same time on a port results in a port that remains in a Blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.
- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

Example

```
DellEMC(conf)# interface twentyFiveGigE 1/1
DellEMC(conf-if-tf-1/1)# spanning-tree rstp edge-port
DellEMC(conf-if-tf-1/1)# show config
!
```

```
interface twentyFiveGigE 1/1
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
DellEMC#
```

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

Syntax `tc-flush-standard`

To disable, use the `no tc-flush-standard` command.

Defaults Disabled

Command Modes CONFIGURATION (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

Usage Information By default, Dell EMC Networking OS implements an optimized flush mechanism for RSTP. This implementation helps in flushing MAC addresses only when necessary (and less often), allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, you can turn on this *knob* command to enable flushing MAC addresses after receiving every topology change notification.

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Security

The commands in this chapter are available on Dell EMC Networking OS.

For configuration details, see the *Security* section in the *Dell EMC Networking OS Configuration Guide*.

NOTE: Dell EMC Networking OS implements LEAP with MSCHAP v2 supplicant.

Topics:

- AAA Accounting Commands
- Authorization and Privilege Commands
- Obscure Password Commands
- Authentication and Password Commands
- RADIUS Commands
- TACACS+ Commands
- Port Authentication (802.1X) Commands
- SSH and SCP Commands
- Secure DHCP Commands
- Role-Based Access Control Commands
- ICMP Vulnerabilities
- System Security Commands

AAA Accounting Commands

AAA Accounting enables tracking of services that users are accessing and the amount of network resources being consumed by those services. When you enable AAA Accounting, the network server reports user activity to the TACACS+ security server in the form of accounting records. Each accounting record is comprised of accounting AV pairs and is stored on the access control server.

As with authentication and authorization, you must configure AAA Accounting by defining a named list of accounting methods, and then applying that list to various interfaces.

aaa accounting

Enable AAA Accounting and create a record for monitoring the accounting function.

Syntax

```
aaa accounting {commands {level | role role-name | dot1x | exec | rest |
suppress | system} {name | default} {start-stop | wait-start | stop-only}
{radius | tacacs+}
```

To disable AAA Accounting, use the `no aaa accounting {commands {level | role role-name | dot1x | exec | rest | suppress | system} {name | default} {start-stop | wait-start | stop-only} {radius | tacacs+}` command.

Parameters

system	Enter the keyword `system` to send accounting information of any other AAA configuration.
exec	Enter the keyword `exec` to send accounting information when a user has logged in to EXEC mode.
dot1x	Enter the keyword `dot1x` to send accounting information when a dot1x user has logged in.

commands {*level* | role *role-name*}	Enter the keyword `commands` then a privilege level for accounting of commands executed at that privilege level or enter the keyword `role` then the role name for accounting of commands executed by a user with that user role.
***name* | default**	Enter one of the following: ● For `name`, enter a user-defined name of a list of accounting methods. ● For `default`, the default accounting methods used.
start-stop	Enter the keywords `start-stop` to send a "start accounting" notice at the beginning of the requested event and a "stop accounting" notice at the end of the event.
wait-start	Enter the keywords `wait-start` to ensure that the TACACS+ security server acknowledges the start notice before granting the user's process request.
stop-only	Enter the keywords `stop-only` to instruct the TACACS+ security server to send a "stop record accounting" notice at the end of the requested user process.
radius	Enter the keyword `radius` to use RADIUS service for exec and dot1x accounting.
tacacs+	Enter the keyword `tacacs+` to use TACACS+ service for accounting.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.5)	Added support for RADIUS accounting.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, and MXL
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Usage Information In the example below, TACACS+ accounting is used to track all usage of EXEC command and commands on privilege level 15.

Privilege level 15 is the default. If you want to track usage at privilege level 1 for example, use the `aaa accounting command 1` command.

Example (TACACS+)

```
DellEMC(conf)# aaa accounting exec default start-stop tacacs+
DellEMC(conf)# aaa accounting command 15 default start-stop tacacs+
DellEMC(conf)# aaa accounting command role secaadmin default start-stop
tacacs+
```

Example (RADIUS)

```
DellEMC(conf)# aaa accounting dot1x default start-stop radius
DellEMC(conf)# aaa accounting dot1x default stop-only radius
```

Related Commands

- enable password — changes the password for the `enable` command.
- login authentication — enables AAA login authentication on the terminal lines.
- password — creates a password.
- tacacs-server host — specifies a TACACS+ server host.

aaa accounting suppress

Prevent the generation of accounting records of users with the user name value of NULL.

Syntax `aaa accounting suppress null-username`

To permit accounting records to users with user name value of NULL, use the `no aaa accounting suppress null-username` command.

Defaults Accounting records are recorded for all users.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4280T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Usage Information Dell EMC Networking OS issues accounting records for all users on the system, including users whose username string, due to protocol translation, is NULL. For example, a user who comes on line with the `aaa authentication login` *`method-list`* `none` command is applied. To prevent the accounting

records from being generated for sessions that do not have user names associated to them, use the `aaa accounting suppress` command.

accounting

Apply an accounting method list to terminal lines.

Syntax `accounting {exec | commands {level | role role-name} method-list`

Parameters

exec	Enter the keyword `exec` to apply an EXEC level accounting method list.
commands {*level* | role *role-name*}	Enter the keywords `commands level` to apply an EXEC and CONFIGURATION level accounting method list or enter the keyword `role` and then the role name for accounting of commands executed by a user with that user role.
method-list	Enter a method list that you defined using the `aaa accounting exec` or `aaa accounting` commands.

Defaults none

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Related Commands

- aaa accounting — enables AAA Accounting and creates a record for monitoring the accounting function.

aaa radius group

Configure the RADIUS server group that is used for Authentication, Authorization and Accounting.

Syntax

```
aaa radius group group-name
```

To remove the RADIUS group configuration, use the `no aaa radius group group-name` command.

Parameters

group-name Enter the name of the RADIUS server group.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can use this command to configure the group of Radius servers used for Authentication, Authorization, and Accounting purposes.

If the RADIUS group is not configured for Authentication, Authorization, and Accounting, then globally configured Radius servers are used for the purposes.

When the RADIUS group is removed, the AAA configuration is also removed.

Example

```
DellEMC(conf)# radius-server group group1
DellEMC(conf-radius-group)# radius-server host 1.1.1.1 key secret
DellEMC(conf-radius-group)# radius-server host 2.2.2.2 key secret
DellEMC(conf-radius-group)# radius-server vrf vrf1 source-interface
twentyFiveGigE 1/1
DellEMC(conf)# exit
DellEMC(conf)# aaa radius group group1
DellEMC(conf)#
```

show accounting

Display the active accounting sessions for each online user.

Syntax

```
show accounting
```

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Added support for roles on the Z9500.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Usage Information This command steps through all active sessions and then displays the accounting records for the active account functions.

Example

```
DellEMC# show accounting
Active accounted actions on tty2, User admin Priv 1 Role
   Task ID 2, EXEC Accounting record, 00:02:03 Elapsed, service=shell
Active accounted actions on tty3, User ad Priv 15 Role
   Task ID 7, EXEC Accounting record, 00:01:22 Elapsed, service=shell
Active accounted actions on tty4, User ad Priv 15 Role
   Task ID 11, EXEC Accounting record, 00:00:35 Elapsed, service=shell
Active accounted actions on tty5, User ad1 Priv 1 Role sysadmin
   Task ID 16, EXEC Accounting record, 00:00:04 Elapsed, service=shell
DellEMC#
```

Related Commands

- aaa accounting — enables AAA Accounting and creates a record for monitoring the accounting function.

Authorization and Privilege Commands

To set command line authorization and privilege levels, use the following commands.

authorization

Apply an authorization method list to terminal lines.

Syntax `authorization {exec | commands {level | role role-name}} method-list`

Parameters

exec	Enter the keyword `exec` to apply an EXEC level authorization method list.
commands {*level* | role *role-name*}	Enter the keyword commands followed by either a privilege level for accounting of commands executed at that privilege level, or enter the keyword `role` then the role name for authorization of commands executed by a user with that user role.
method-list	Enter a method list that you defined using the `aaa accounting exec` or `aaa accounting` commands.

Defaults none

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Related Commands

- aaa authorization commands — sets the parameters that restrict (or permit) a user's access to EXEC and CONFIGURATION level commands.
- aaa authorization exec — sets the parameters that restrict (or permit) a user's access to EXEC level commands.

aaa authorization commands

Set parameters that restrict (or permit) a user's access to EXEC and CONFIGURATION level commands.

Syntax `aaa authorization commands {level | role role-name}{name|default} {local | tacacs+| none}`

Undo a configuration with the `no aaa authorization commands {level | role role-name} {name|default} {local | tacacs+ | none}` command.

Parameters

commands *level*	Enter the keyword `commands` then the command privilege level for command level authorization.

role *role-name*	Enter the keyword `role` then the role name.
name	Define a name for the list of authorization methods.
default	Define the default list of authorization methods.
local	Use the authorization parameters on the system to perform authorization.
tacacs+	Use the TACACS+ protocol to perform authorization.
none	Enter the keyword `none` to apply no authorization.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Added support for RADIUS.

Usage Information Certain TACACS+ servers do not authenticate the device if you use the `aaa authorization commands level default local tacacs+` command. To resolve the issue, use the `aaa authorization commands level default tacacs+ local` command.

aaa authorization config-commands

Set parameters that restrict (or permit) a user's access to EXEC level commands.

Syntax `aaa authorization config-commands`

Disable authorization checking for CONFIGURATION level commands using the `no aaa authorization config-commands` command.

Defaults Enabled when you configure `aaa authorization commands` command.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the E-Series.

Usage Information

By default, the `aaa authorization commands` command configures the system to check both EXEC level and CONFIGURATION level commands. Use the command `no aaa authorization config-commands` to enable only EXEC-level command checking.

aaa authorization exec

Set parameters that restrict (or permit) a user's access to EXEC-level commands.

Syntax

`aaa authorization exec {`*`name`* `| default} {local || tacacs+ || if-authenticated || none}`

To disable authorization checking for EXEC level commands, use the `no aaa authorization exec` command.

Parameters

name	Define a name for the list of authorization methods.
default	Define the default list of authorization methods.
local	Use the authorization parameters on the system to perform authorization.
tacacs+	Use the TACACS+ protocol to perform authorization.
none	Enter the keyword `none` to apply no authorization.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Added support for RADIUS.

privilege level (CONFIGURATION mode)

Change the access or privilege level of one or more commands.

Syntax

`privilege` *mode* {`level` *level command* | `reset` *command*}

To delete access to a level and command, use the `no privilege mode level level command` command.

Parameters

mode	Enter one of the following keywords as the mode for which you are controlling access: • `configure` for CONFIGURATION mode • `exec` for EXEC mode • `interface` for INTERFACE modes • `line` for LINE mode • `route-map` for ROUTE-MAP mode • `router` for ROUTER OSPF, ROUTER RIP, ROUTER ISIS and ROUTER BGP modes
level *level*	Enter the keyword `level` then a number for the access level. The range is from 0 to 15. Level 1 is EXEC mode and Level 15 allows access to all CLI modes and commands.
reset	Enter the keyword `reset` to return the security level to the default setting.
command	Enter the command's keywords to assign the command to a certain access level. You can enter one or all of the keywords.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information To define a password for the level to which you are assigning privilege or access, use the `enable password` command.

privilege level (LINE mode)

Change the access level for users on the terminal lines.

Syntax `privilege level level`

To delete access to a terminal line, use the `no privilege level level` command.

Parameters

level *level* Enter the keyword `level` then a number for the access level. The range is from 0 to 15.

Level 1 is EXEC mode and Level 15 allows access to all CLI modes.

Defaults *level* = **15**

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Obscure Password Commands

To enable the obscure password, use the following commands.

service obscure-passwords

Enable the obscuring of passwords and keys.

Syntax

```
service obscure-passwords
```

Enable the obscuring of passwords and keys, including RADIUS, TACACS+ keys, router authentication strings, VRRP authentication, use the `service obscure-passwords` command.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Introduced on the S4810, S4820T, S5000, S6000, Z9000, Z9500, MXL

Usage Information By default, the `service password-encryption` command stores encrypted passwords. For greater security, you can also use the `service obscure-passwords` command to prevent a user from reading the passwords and keys, including RADIUS, TACACS+ keys, router authentication strings,

VRRP authentication by obscuring this information. Passwords and keys are stored encrypted in the configuration file and by default are displayed in the encrypted form when the configuration is displayed. Enabling the`service obscure-passwords` command displays asterisks instead of the encrypted passwords and keys. This command prevents a user from reading these passwords and keys by obscuring this information with asterisks.

Password obscuring masks the password and keys for display only but does not change the contents of the file. The string of asterisks is the same length as the encrypted string for that line of configuration. To verify that you have successfully obscured passwords and keys, use the `show running-config` command or`show startup-config` command.

If you are using role-based access control (RBAC), only the system administrator and security administrator roles can enable the `service obscure-password` command.

Related Commands

- show running-config— Display the current configuration and display changes from the default values.
- service password-encryption— Encrypts all passwords configured in the system.

Authentication and Password Commands

To manage access to the system, use the following the commands.

aaa authentication enable

Configure AAA Authentication method lists for user access to EXEC privilege mode (the “Enable” access).

Syntax

`aaa authentication enable {default | method-list-name} method [... method2]`

To return to the default setting, use the `no aaa authentication enable {default | method-list-name} method [... method2]` command.

Parameters

default	Enter the keyword `default` then the authentication methods to use as the default sequence of methods for the Enable login. The default is `default enable`.
method-list-name	Enter a text string (up to 16 characters long) to name the list of enabled authentication methods activated at login.
method	Enter one of the following methods: • `enable`: use the password the `enable password` command defines in CONFIGURATION mode. • `line`: use the password the `password` command defines in LINE mode. • `none`: no authentication. • `radius`: use the RADIUS servers configured with the `radius-server host` command. • `tacacs+`: use the TACACS+ server(s) configured with the `tacacs-server host` command.
... method2	(OPTIONAL) In the event of a “no response” from the first method, Dell EMC Networking OS applies the next configured method.

Defaults

Use the `enable` password.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.0	Introduced on the E-Series.

Usage Information

By default, the `Enable password` is used. If you configure `aaa authentication enable default`, Dell EMC Networking OS uses the methods defined for `Enable access` instead.

Methods configured with the `aaa authentication enable` command are evaluated in the order they are configured. If authentication fails using the primary method, Dell EMC Networking OS employs the second method (or third method, if necessary) automatically. The fallback to the second method would happen only if the authentication failure is due to a non-reachable server or invalid TACACS server key. The fallback would not occur if the authentication failure is due to invalid credentials. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell EMC Networking OS proceeds to the next authentication method.

Related Commands

- enable password — changes the password for the `enable` command.
- login authentication — enables AAA login authentication on the terminal lines.
- password — creates a password.
- radius-server host — specifies a RADIUS server host.
- tacacs-server host — specifies a TACACS+ server host.

aaa authentication login

Configure AAA Authentication method lists for user access to EXEC mode (`Enable log-in`).

Syntax

`aaa authentication login {`*`method-list-name`*` | default} `*`method`*` [... `*`method4`*`]`

To return to the default setting, use the `no aaa authentication login {`*`method-list-name`*` | default}` command.

Parameters

method-list-name	Enter a text string (up to 16 characters long) as the name of a user-configured method list that can be applied to different lines.
default	Enter the keyword `default` to specify that the method list specified is the default method for all terminal lines.
method	Enter one of the following methods: • `enable`: use the password the `enable password` command defines in CONFIGURATION mode. Not available if role-only is in use.

- `line`: use the password the `password` command defines in LINE mode. Not available if role-only is in use.
- `local`: use the password for the userid contained in the local password database.
- `none`: no authentication. Not available if role-only is in use.
- `radius`: use the RADIUS servers configured with the `radius-server host` command.
- `tacacs+`: use the TACACS+ servers configured with the `tacacs-server host` command.

... method4 (OPTIONAL) Enter up to four additional methods. In the event of a "no response" from the first method, the system applies the next configured method (up to four configured methods).

Defaults Not configured (that is, no authentication is performed).

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Included a prompt to force the users to re-authenticate, when re-authentication is enabled.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Added support for roles Z9500.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information By default, the locally configured username password is used. If you configure `aaa authentication login default`, Dell EMC Networking OS uses the methods this command defines for login instead.

Methods configured with the `aaa authentication login` command are evaluated in the order they are configured. If users encounter an error with the first method listed, Dell EMC Networking OS applies the next method configured. If users fail the first method listed, no other methods are applied. The only exception is the local method. If the user's name is not listed in the local database, the next method is

applied. If the correct user name/password combination is not entered, the user is not allowed access to the switch.

NOTE: If authentication fails using the primary method, Dell EMC Networking OS employs the second method (or third method, if necessary) automatically. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell EMC Networking OS proceeds to the next authentication method. The TACACS+ is incorrect, but the user is still authenticated by the secondary method.

After configuring the `aaa authentication login` command, configure the `login authentication` command to enable the authentication scheme on terminal lines.

Connections to the SSH server work with the following login mechanisms: local, radius, and tacacs.

Related Commands

- login authentication — enables AAA login authentication on the terminal lines.
- password — creates a password.
- radius-server host — specifies a RADIUS server host.
- tacacs-server host — specifies a TACACS+ server host.

aaa reauthenticate enable

Enable re-authentication of user whenever there is a change in the authenticators.

Syntax `aaa reauthenticate enable`

To disable the re-authentication option, use the `no aaa reauthenticate enable` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced this command.

Usage Information

When an operating system enables to change the user authenticators, the users might access resources and perform tasks that they do not have authorization.

Once re-authentication is enabled, Dell EMC Networking OS prompts the users to re-authenticate whenever there is a change in authenticators.

The change in authentication happens when:

- Add or remove an authentication server (RADIUS/TACACS+)
- Modify an AAA authentication/authorization list
- Change to role-only (RBAC) mode

The re-authentication is also applicable for authenticated 802.1x devices. When there is a change in the authentication servers, the supplicants connected to all the ports are forced to re-authenticate.

Example

```
DellEMC(config)#aaa reauthenticate enable
```

```
DellEMC(config)#aaa authentication login vty_auth_list radius
Force all logged-in users to re-authenticate (y/n)?
```

```
DellEMC(config)#radius-server host 192.100.0.12
Force all logged-in users to re-authenticate (y/n)?
```

access-class

Restrict incoming connections to a particular IP address in a defined IP access control list (ACL).

Syntax

`access-class` *access-list-name*

To delete a setting, use the `no access-class` command.

Parameters

access-list-name Enter the name of an established IP Standard ACL.

Defaults

Not configured.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Related Commands

- line — applies an authentication method list to the designated terminal lines.
- ip access-list standard — names (or selects) a standard access list to filter based on the IP address.
- ip access-list extended — names (or selects) an extended access list based on the IP addresses or protocols.

enable password

Change the password for the `enable` command.

Syntax

`enable password [level` *level*`] [`*encryption-type*`]` *password*

To delete a password, use the `no enable password [`*encryption-type*`]` *password* `[level` *level*`]` command.

Parameters

level *level* (OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.

encryption-type	(OPTIONAL) Enter the number `7` or `0` as the encryption type. Enter a `7` then a text string as the hidden password. The text string must be a password that was already encrypted by a Dell EMC Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell EMC Networking router.
password	Enter a text string, up to 96 characters long, as the clear text password.

Defaults No password is configured. *level* = **15**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Changed the maximum length of the password from 32 to 96.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information To control access to command modes, use this command to define a password for a level and use the `privilege level (CONFIGURATION mode)` command.

Passwords must meet the following criteria:

- Start with a letter, not a number.
- Passwords can have a regular expression as the password. To create a password with a regular expression in it, use CNTL + v prior to entering regular expression. For example, to create the password `abcd]e`, you type "`abcd CNTL v ]e`". When the password is created, you do not use the CNTL + v key combination and enter "`abcd]e`".

NOTE: The question mark (?) is not a supported character.

Related Commands

- show running-config — views the current configuration.
- privilege level (CONFIGURATION mode) — controls access to the command modes within the switch.

enable sha256-password

Configure SHA-256 based password for the `enable` command.

Syntax

`enable sha256-password [level level] [encryption-type] password`

To delete a password, use the `no enable sha256-password [encryption-type] password [level level]` command.

Parameters

sha256-password	Enter the keyword `sha256-password` then the `encryption-type` or the password.
level *level*	(OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.
encryption-type	(OPTIONAL) Enter the number `8` or `0` as the encryption type. Enter `8` to enter the sha256–based hashed password.
password	Enter a text string, up to 96 characters long, as the clear text password.

Defaults

No password is configured. *level* = **15**.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Changed the maximum length of the password from 32 to 96.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON, S6000, S6000–ON, S5000, S4810, S4820T, S3048–ON, S4048–ON, MXL, FN IOM, C9010, S3100, and Z9100-ON.

Related Commands

- show running-config — views the current configuration.
- privilege level (CONFIGURATION mode) — controls access to the command modes within the switch.

enable restricted

Allows Dell EMC Networking technical support to access restricted commands.

Syntax

`enable restricted [encryption-type] password`

To disallow access to restricted commands, use the `no enable restricted` command.

Parameters

encryption-type	(OPTIONAL) Enter the number `7` as the encryption type. Enter `7` followed a text string as the hidden password. The text string must be a password that was already encrypted by a Dell EMC Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell EMC Networking router.
password	Enter a text string, up to 32 characters long, as the clear text password.

Defaults

Not configured.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information Only Dell EMC Networking Technical Support staff use this command.

enable secret

Change the password for the `enable` command.

Syntax `enable secret [level level] [encryption-type] password`

To delete a password, use the `no enable secret [encryption-type] password [level level]` command.

Parameters

level *level*	(OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.
encryption-type	(OPTIONAL) Enter the number `5` or `0` as the encryption type. Enter a `5` then a text string as the hidden password. The text string must be a password that was already encrypted by a Dell EMC Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell EMC Networking router.
password	Enter a text string, up to 32 characters long, as the clear text password.

Defaults No password is configured. *level* = **15**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

To control access to command modes, use this command to define a password for a level and use the `privilege level (CONFIGURATION mode)` command.

Passwords must meet the following criteria:

- Start with a letter, not a number.
- Passwords can have a regular expression as the password. To create a password with a regular expression in it, use CNTL + v prior to entering regular expression. For example, to create the password `abcd]e`, you type "`abcd CNTL v ]e`". When the password is created, you do not use the CNTL + v key combination and enter "`abcd]e`".

NOTE: The question mark (?) is not a supported character.

Related Commands

- show running-config — views the current configuration.
- privilege level (CONFIGURATION mode) — controls access to the command modes within the switch.

login authentication

To configure authentication for console or remote access, apply an authentication method list.

Syntax

`login authentication {`*`method-list-name`*` | default}`

To use the local user/password database for login authentication, use the `no login authentication` command.

Parameters

method-list-name	Enter the keywords `method-list-name` to specify that method list, created in the `aaa authentication login` command, to be applied to the designated terminal line.
default	Enter the keyword `default` to specify that the default method list, created in the `aaa authentication login` command, is applied to the terminal line.

Defaults

No authentication is performed on the console lines. Local authentication is performed on the virtual terminal and auxiliary lines.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.6.0.0	Revised introductory and usage guidelines description.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information

If you configure the aaa authentication login default command, the login authentication default command automatically is applied to all terminal lines.

When configuring authentication, consider the following:

- If you configure the default authentication list using the `default` keyword, the list applies it to all the local and remote connections globally, unless you have specified some another authentication list for a specific connection.
- If you configure an authentication lists other than default, you must apply those authentication lists to each connection.
- If you configure the `aaa authentication login default` command, the `login authentication default` command automatically is applied to all terminal lines.

Related Commands

- aaa authentication login — selects the login authentication methods.

password

Specify a password for users on terminal lines.

Syntax

`password [encryption-type] password`

To delete a password, use the `no password password` command.

Parameters

encryption-type (OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the password entered. The options are

- `0` is the default and means the password is not encrypted and stored as clear text.

- 7 means that the password is encrypted and hidden.

password Enter a text string up to 96 characters long. The first character of the password must be a letter. You cannot use spaces in the password.

Defaults No password is configured.

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Changed the maximum length of the password from 32 to 96.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information Dell EMC Networking OS prompts users for these passwords when the method for authentication or authorization used is "line".

Related Commands

- enable password — sets the password for the `enable` command.
- login authentication — configures an authentication method to log in to the switch.
- service password-encryption — encrypts all passwords configured in Dell EMC Networking OS.
- radius-server key — configures a key for all RADIUS communications between the switch and the RADIUS host server.
- tacacs-server key — configures a key for communication between a TACACS+ server and client.
- username — establishes an authentication system based on user names.

password-attributes

Configure the password attributes (strong password).

Syntax

```
password-attributes [min-length number] [max-retry number] [lockout-period
minutes] [user-lockout-period minutes][character-restriction [upper number]
[lower number] [numeric number] [special-char number]]
```

To return to the default, use the `no password-attributes [min-length number] [max-retry number] [lockout-period minutes] [character-restriction [upper number] [lower number] [numeric number] [special-char number]]` command.

Parameters

min-length *number*	(OPTIONAL) Enter the keywords `min-length` then the number of characters. The range is from 0 to 32 characters.
max-retry *number*	(OPTIONAL) Enter the keywords `max-retry` then the number of maximum password retries. The range is from 0 to 16.
lockout-period *minutes*	(OPTIONAL) Enter the keyword `lockout-period` then the number of minutes. The range is from `1` to `1440` minutes. The default is `0` minutes and the lockout-period is not enabled. This parameter enhances the security of the switch by locking out sessions on the Telnet or SSH sessions for which there has been a consecutive failed login attempts. The console is not locked out.
user-lockout-period *minutes*	(OPTIONAL) Enter the keyword `user-lockout-period` then the number of minutes. The range is from `1` to `1440` minutes. The default is `0` minutes and the lockout-period is not enabled. This parameter enhances the security of the switch by locking out the local user account if there are more number of unsuccessful login attempts than what is configured using the *`max-retry`* parameter. The default value is 3 times.
character-restriction	(OPTIONAL) Enter the keywords `character-restriction` to indicate a character restriction for the password.
upper *number*	(OPTIONAL) Enter the keyword `upper` then the upper number. The range is from 0 to 31.
lower *number*	(OPTIONAL) Enter the keyword `lower` then the lower number. The range is from 0 to 31.
numeric *number*	(OPTIONAL) Enter the keyword `numeric` then the numeric number. The range is from 0 to 31.
special-char *number*	(OPTIONAL) Enter the keywords `special-char` then the number of special characters permitted. The range is from 0 to 31. The following special characters are supported: ! " # % & ' ( ) ; < = > ? [\ ] * + , - . / : ^ _ { | } ~ @ $

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced lockout-period option on the Z9500.

Version	Description
9.5(0.0)	Introduced `lockout-period` option on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.3.1.0	Introduced on the E-Series.

Example

In the following example, after 5 un-successful login attempts, the session (SSH/TELNET) goes into a locked state for 5 minutes. If all the 10 sessions are locked out with 5 un-successful attempts in each session, no users can login during the lockout-period.

```
DellEMC(conf)# password-attributes max-retry 5 lockout-period 5
```

Related Commands

- password — specifies a password for users on terminal lines.

secure-cli enable

Enable the secured CLI mode.

Syntax `secure-cli enable`

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced this command.

Usage Information

The secured CLI mode prevents the users from enhancing the permissions or promoting the privilege levels. After entering the command, save the running-configuration.

Once you save the running-configuration, the secured CLI mode is enabled. If you do not want to enter the secured mode, do not save the running-configuration.

Once saved, to disable the secured CLI mode, you need to manually edit the startup-configuration file and reboot the system.

service password-encryption

Encrypt all passwords configured in Dell EMC Networking OS.

Syntax `service password-encryption`

To store new passwords as clear text, use the `no service password-encryption` command.

Defaults Enabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

CAUTION: Encrypting passwords with this command does not provide a high level of security. When the passwords are encrypted, you cannot return them to plain text unless you re-configure them. To remove an encrypted password, use the `no password password` command.

To keep unauthorized people from viewing passwords in the switch configuration file, use the `service password-encryption` command. This command encrypts the clear-text passwords created for user name passwords, authentication key passwords, the privileged command password, and console and virtual terminal line access passwords.

To view passwords, use the `show running-config` command.

show privilege

View your access level.

Syntax `show privilege`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show privilege
Current privilege level is 15.
DellEMC#

DellEMC# show privilege
Current privilege level is 14.
DellEMC#
DellEMC# show privilege
Current privilege level is 10.
DellEMC#
```

Related Commands

- privilege level (CONFIGURATION mode) — assign access control to different command modes.

show users

Allows you to view information on all users logged in to the switch.

Syntax `show users [all]`

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all terminal lines in the switch.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Added support for roles on the Z9500.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show user` command shown in the following example.

Field	Description
(untitled)	Indicates with an asterisk (*) which terminal line you are using.
Line	Displays the terminal lines currently in use.
User	Displays the user name of all users logged in.
Host(s)	Displays the terminal line status.
Location	Displays the IP address of the user.

Example

```
DellEMC# show users
Authorization Mode:  role or privilege
    Line              User                        Role             Priv
Host(s)    Location
*   0  console 0                                  unassigned         1
idle
    2  vty 0          admin                       unassigned         1
idle       10.16.127.35
    3  vty 1          ad                             unassigned        15
idle       10.16.127.145
    4  vty 2          ad1                          sysadmin           1
 idle       10.16.127.141
    5  vty 3          ad1                          sysadmin           1
 idle       10.16.127.145
    6  vty 4          admin                       unassigned         1
idle       10.16.127.141
    7  vty 5          ad                             unassigned        15
idle       10.16.127.141
DellEMC#
```

Related Commands

- username — enables a user.

timeout login response

Specify how long the software waits for the login input (for example, the user name and password) before timing out.

Syntax `timeout login response` *seconds*

To return to the default values, use the `no timeout login response` command.

Parameters

seconds Enter a number of seconds the software waits before logging you out. The range is:
- VTY — range is from 1 to 30 seconds, the default is **30 seconds**.
- Console — range is from 1 to 300 seconds, the default is **0 seconds** (no timeout).
- AUX — range is from 1 to 300 seconds, the default is **0 seconds** (no timeout).

Defaults See *Parameters*.

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information The software measures the period of inactivity defined in this command as the period between consecutive keystrokes. For example, if your password is “password” you can enter “p” and wait 29 seconds to enter the next letter.

username

Establish an authentication system based on user names.

Syntax

```
username name [access-class access-list-name] [nopassword | {password
| secret | sha256-password} [encryption-type] password [dynamic-salt]]
[privilege level] [role role-name]
```

If you do not want a specific user to enter a password, use the `nopassword` option.

To delete authentication for a user, use the `no username name` command.

Parameters

name Enter a text string for the name of the user up to 63 characters.

access-class *access-list-name* Enter the keywords `access-class` then the name of a configured access control list (either an IP access control list or MAC access control list).

nopassword	Enter the keyword `nopassword` to specify that the user should not enter a password.
password	Enter the keyword `password` then the `encryption-type` or the password.
encryption-type	Enter an encryption type for the `password` that you enter. ● `0` directs the system to store the password as clear text. It is the default encryption type when using the `password` option. ● `8` to indicate that a password encrypted using a sha256 hashing algorithm follows. This encryption type is available with the `sha256-password` option only, and is the default encryption type for this option. ● `7` to indicate that a password encrypted using a DES hashing algorithm follows. This encryption type is available with the `password` option only. ● `5` to indicate that a password encrypted using an MD5 hashing algorithm follows. This encryption type is available with the `secret` option only, and is the default encryption type for this option.
password	Enter a string up to 32 characters long.
dynamic-salt	Enter the keyword `dynamic-salt` to have an additional random input in the password encryption process.
privilege *level*	Enter the keyword `privilege` then a number from zero (0) to 15.
role *role-name*	Enter the keyword `role` followed by the role name to associate with that user ID.
secret	Enter the keyword `secret` then the encryption type.
sha256-password	Enter the keyword `sha256-password` then the `encryption-type` or the password.

Defaults The default encryption type for `password` option is **0**. The default encryption type for `secret` option is **5**. The default encryption type for `sha256-password` option is **8**. The default value of `privilege level` is **1**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced `dynamic-salt` option on the S4810 and S4820T.
9.13.0.0	Enhanced to display a warning message when a weak password is used. Introduced the `dynamic-salt` option on the MXL, S5000, S4048-ON, S6000, S6000-ON, S3048-ON, S3100 Series, C9010, S4048T-ON, Z9500, Z9100-ON, S6100-ON, S6010-ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Added support for the `sha256-password` option for S3100, S3048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, Z9100–ON, MXL, and Z9500.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Added support for the `secret` option and the MD5 password encryption. Extended the name from 25 to 63 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

To view the defined user names, use the `show running-config user` command. You can use the `dynamic-salt` option only under the `secret` and the `password` options.

When you configure the password, the system alerts if your password does not match the following criteria. The system accepts your password even if these conditions are not met. Dell EMC Networking recommends selecting a strong password for enhanced security.

- A minimum of eight characters in length
- A minimum of one lower case letter (a to z)
- A minimum of one upper case letter (A to Z)
- A minimum of one numeric character (0 to 9)
- A minimum of one special character including a space (" !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~")

Related Commands

- password — specifies a password for users on terminal lines.
- show running-config — views the current configuration.

RADIUS Commands

The following RADIUS commands are supported by Dell EMC Networking OS.

aaa radius auth-method

Configure the authentication method to use with RADIUS for user access.

Syntax

```
aaa radius auth-method {pap | mschapv2}
```

To undo the RADIUS authentication method configuration, use the `no aaa radius auth-method` command.

Parameters

pap	Enter the keyword `pap` to use the Password Authentication Protocol (PAP) for RADIUS authentication. This protocol uses the username and password attributes in the access-request message sent to the RADIUS server.
mschapv2	Enter the keyword `mschapv2` to use the Microsoft Challenge-Handshake Authentication Protocol (MS-CHAPv2) for RADIUS authentication. This protocol is considered to be more secure than PAP and uses mutual authentication based on a random challenge and challenge response.

Defaults PAP

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(2.0P1)	Introduced the command on all Dell EMC Networking OS platforms.

Usage Information

If an authentication method is not configured using this command, then PAP is used for authentication with the RADIUS server.

You can configure the RADIUS authentication method to access the switch using the following applications: Console, Telnet, SSH, REST, and OMI.

debug radius

View RADIUS transactions to assist with troubleshooting.

Syntax

```
debug radius
```

To disable debugging of RADIUS, use the `no debug radius` command.

Defaults Disabled.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

ip radius source-interface

Specify an interface's IP address as the source IP address for RADIUS connections.

Syntax

```
ip radius source-interface interface
```

To delete a source interface, use the `no ip radius source-interface` command.

Parameters

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

radius-server deadtime

Configure a time interval during which non-responsive RADIUS servers to authentication requests are skipped.

Syntax `radius-server deadtime` *seconds*

To disable this function or return to the default value, use the `no radius-server deadtime` command.

Parameters

seconds Enter a number of seconds during which non-responsive RADIUS servers are skipped. The range is from 0 to 2147483647 seconds. The default is **0 seconds**.

Defaults **0 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

radius-server group

Creates or deletes a group of radius servers.

Syntax `radius-server group group-name`

Parameters

group-name Enter the group name that denotes the group of RADIUS servers.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Example

```
DellEMC(conf)# radius-server group group1
DellEMC(conf-radius-group)# radius-server host 1.1.1.1 key secret
DellEMC(conf-radius-group)# radius-server host 2.2.2.2 key secret
DellEMC(conf-radius-group)# radius-server vrf vrf1 source-interface
twentyFiveGigE 1/45
DellEMC(conf-radius-group)# show config
!
radius-server group group1
radius-server vrf vrf1 source-interface twentyFiveGigE 1/45
radius-server host 1.1.1.1 key 7 9a2f3ec0c65c6f41
radius-server host 2.2.2.2 key 7 9a2f3ec0c65c6f41
DellEMC(conf-radius-group)#
```

Related Commands

- login authentication — sets the database to be checked when a user logs in.
- radius-server key — sets an authentication key for RADIUS communications.
- radius-server retransmit — sets the number of times the RADIUS server attempts to send information.
- radius-server timeout — sets the time interval before the RADIUS server times out.

radius-server host

Configure a RADIUS server host.

Syntax

```
radius-server host {hostname | ipv4-address | ipv6-address} [auth-port
port-number] [acct-port port-number] [retransmit retries] [timeout seconds]
[key [encryption-type] key]
```

Parameters

hostname	Enter the name of the RADIUS server host.
ipv4-address* | *ipv6-address	Enter the IPv4 address (A.B.C.D) or IPv6 address (X:X:X:X::X) of the RADIUS server host.
auth-port *port-number*	(OPTIONAL) Enter the keywords `auth-port` then a number as the port number. The range is from zero (0) to 65535. The default port-number is **1812**.
acct-port *port-number*	(OPTIONAL) Enter the keywords `acct-port` then a number as the port number. The range is from 1 to 65535. The default port-number is **1813**.
retransmit *retries*	(OPTIONAL) Enter the keyword `retransmit` then a number as the number of attempts. This parameter overwrites the `radius-server retransmit` command. The range is from zero (0) to 100. The default is **3 attempts**.
timeout *seconds*	(OPTIONAL) Enter the keyword `timeout` then the seconds the time interval the switch waits for a reply from the RADIUS server. This parameter overwrites the `radius-server timeout` command. The range is from 0 to 1000. The default is **5 seconds**.
key [*encryption-type*] *key*	(OPTIONAL) Enter the keyword `key` then an optional encryption-type and a string up to 42 characters long as the authentication key. The RADIUS host server uses this authentication key and the RADIUS daemon operating on this switch.

For the encryption-type, enter either zero (`0`) or `7` as the encryption type for the key entered. The options are:

- `0` is the default and means the password is not encrypted and stored as clear text.
- `7` means that the password is encrypted and hidden.

Configure this parameter last because leading spaces are ignored.

Defaults Not configured.

Command Modes
- RADIUS SERVER GROUP
- CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.5)	Added support for RADIUS accounting.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Included a prompt to force the users to re-authenticate when there is a change in the RADIUS server list.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Added support for IPv6.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Authentication key length increased to 42 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information To configure any number of RADIUS server hosts for each server host that is configured, use this command. Dell EMC Networking OS searches for the RADIUS hosts in the order they are configured in the software.

The global default values for the `timeout`, `retransmit`, and `key` optional parameters are applied, unless those values are specified in the `radius-server host` or other commands. To return to the global default values, if you configure the `timeout`, `retransmit`, or `key` values, include those keywords when using the `no radius-server host` command syntax.

You can use duplicate host names or IP addresses among RADIUS groups. However, you cannot use duplicate host names or IP addresses within the same RADIUS group. If a VRF is not configured on the RADIUS group, then servers configured in the group are considered to be on the default VRF. RADIUS servers that are configured in the CONFIGURATION mode are also considered to be on the default VRF.

You must configure the RADIUS group explicitly with the `aaa radius group` command in order for the AAA servers to use the group of RADIUS servers. The 802.1x servers use the group of RADIUS servers based on the VRF where the 802.1x request is received. As a result, it is possible that both globally configured RADIUS servers as well as the group-configured RADIUS servers (without VRF or default VRF) are used for processing the 802.1x requests that are received at the default VRF. The order in which the RADIUS servers are tried depends on the order in which the RADIUS servers are configured.

The RADIUS accounting port `acct-port` *`port-number`* is configurable.

Example

```
DellEMC(config)#radius-server host 192.100.0.12
Force all logged-in users to re-authenticate (y/n)?
```

```
DellEMC(config)#no radius-server host 192.100.0.12
Force all logged-in users to re-authenticate (y/n)?
```

Related Commands

- login authentication — sets the database to be checked when a user logs in.
- radius-server key — sets an authentication key for RADIUS communications.
- radius-server retransmit — sets the number of times the RADIUS server attempts to send information.
- radius-server timeout — sets the time interval before the RADIUS server times out.

radius-server vrf

Create an association between a RADIUS server group and a VRF and source interface.

ud

Syntax

`radius-server vrf vrf-name [source-interface` *`interface`*`]`

To delete the association between a RADIUS server group and a VRF and source interface, use the `no radius-server vrf vrf-name [source-interface` *`interface`*`]` command.

Parameters

vrf *vrf-name* Enter the keyword `vrf` and then the name of the VRF to associate a RADIUS server group with that VRF.

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes RADIUS SERVER GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information

You can use this command to associate a group of RADIUS servers with a VRF and source interface. You can configure the source interface only with the VRF attribute and source interface is optional with the VRF attributes.

If VRF is not configured on the RADIUS group, then the group is considered to be on the default VRF. It is possible to use the default VRF name; however, you cannot configure the source interface with the default VRF as such a configuration results in conflicts between the source interfaces corresponding to the 802.1x supplicants on that default VRF.

RADIUS groups and VRFs have one-to-one mapping. If a VRF is configured with one RADIUS group, then you cannot use the same VRF with another RADIUS group. When the VRF is removed, then the corresponding RADIUS group is also removed automatically.

Example

```
DellEMC(conf)#radius-server group group1
DellEMC(conf-radius-group)#radius-server vrf vrf1 source-interface
twentyFiveGigE 1/45

DellEMC(conf)#radius-server group group2
DellEMC(conf-radius-group)#radius-server vrf default
```

radius-server key

Configure a key for all RADIUS communications between the switch and the RADIUS host server.

Syntax

```
radius-server key [encryption-type] key
```

To delete a password, use the `no radius-server key` command.

Parameters

encryption-type (OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the key entered. The options are:

- `0` is the default and means the key is not encrypted and stored as clear text.
- `7` means that the key is encrypted and hidden.

key Enter a string that is the key to be exchanged between the switch and RADIUS servers. It can be up to 96 characters long.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Changed the maximum length of the password from 32 to 96.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Authentication key length increased to 42 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Usage Information

The key configured on the switch must match the key configured on the RADIUS server daemon.

If you configure the `key` parameter in the `radius-server host` command, the key configured with the `radius-server key` command is the default key for all RADIUS communications.

Related Commands

- radius-server host — configures a RADIUS host.

radius-server retransmit

Configure the number of times the switch attempts to connect with the configured RADIUS host server before declaring the RADIUS host server unreachable.

Syntax

`radius-server retransmit` *`retries`*

To configure zero retransmit attempts, use the `no radius-server retransmit` command.

To return to the default setting, use the `radius-server retransmit 3` command.

Parameters

retries	Enter a number of attempts that the Dell OS tries to locate a RADIUS server. The range is from zero (0) to 100. The default is **3 retries**.

Defaults

3 retries

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Related Commands

- radius-server host — configures a RADIUS host.

radius-server timeout

To reply to a request, configure the amount of time the RADIUS client (the switch) waits for a RADIUS host server .

Syntax `radius-server timeout` *seconds*

To return to the default value, use the `no radius-server timeout` command.

Parameters

seconds	Enter the number of seconds between an unsuccessful attempt and the Dell EMC Networking OS times out. The range is from zero (0) to 1000 seconds. The default is **5 seconds**.

Defaults **5 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

Related Commands

- radius-server host — configure a RADIUS host.

TACACS+ Commands

Dell EMC Networking OS supports TACACS+ as an alternate method for login authentication.

tacacs-server group

Creates a group of TACACS servers to be used for Authentication, Authorization, and Accounting..

Syntax

`aaa tacacsgroup group-name`

To delete a group of TACACS servers, use the `no tacacs-server group group-name` command

.

Parameters

group-name	Enter the name of the TACACS server group.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

If the TACACS group is not configured for Authentication, Authorization, and Accounting, then globally configured TACACS servers are used for the purposes. When the TACACS group is removed, the AAA configuration is also removed.

Example

```
DellEMC(conf)# tacacs-server group group1
DellEMC(conf-tacacs-group)# tacacs-server host 1.1.1.1 key secret
DellEMC(conf-tacacs-group)# tacacs-server host 2.2.2.2 key secret
DellEMC(conf-tacacs-group)# tacacs-server vrf vrf1 source-interface
twentyFiveGigE 1/1
DellEMC(conf)# exit
DellEMC(conf)# aaa tacacsgroup group1
DellEMC(conf)#
```

Related Commands

- aaa authentication login — specifies the login authentication method.
- tacacs-server key — configures a TACACS+ key for the TACACS server.

debug tacacs+

To assist with troubleshooting, view TACACS+ transactions.

Syntax

`debug tacacs+`

To disable debugging of TACACS+, use the `no debug tacacs+` command.

Defaults

Disabled.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.0	Introduced on the E-Series.

ip tacacs source-interface

Specify an interface's IP address as the source IP address for TACACS+ connections.

Syntax

```
ip tacacs source-interface interface
```

To delete a source interface, use the `no ip tacacs source-interface` command.

Parameters

interface

Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

tacacs-server group

Creates a group of TACACS servers.

Syntax `tacacs-server group group-name`To delete a group of TACACS servers, use the `no tacacs-server group group-name` command.

Parameters

group-name	Enter the name of the TACACS server group.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information You can associate a TACACS server group with a VRF.

Example

```
DellEMC(conf)# tacacs-server group group1
DellEMC(conf-tacacs-group)# tacacs-server host 1.1.1.1 key secret
DellEMC(conf-tacacs-group)# tacacs-server host 2.2.2.2 key secret
DellEMC(conf-tacacs-group)# tacacs-server vrf vrf1 source-interface
twentyFiveGigE 1/30
DellEMC(conf-tacacs-group)# show config
!
tacacs-server group group1
tacacs-server vrf vrf1 source-interface twentyFiveGigE 1/30
tacacs-server host 1.1.1.1 key 7 9a2f3ec0c65c6f41
tacacs-server host 2.2.2.2 key 7 9a2f3ec0c65c6f41
DellEMC(conf-tacacs-group)#
```

Related Commands

- aaa authentication login — specifies the login authentication method.
- tacacs-server key — configures a TACACS+ key for the TACACS server.

tacacs-server host

Specify a TACACS+ host.

Syntax `tacacs-server host {hostname | ipv4-address | ipv6-address} [port number] [timeout seconds] [key key]`

Parameters

hostname	Enter the name of the TACACS+ server host.

ipv4-address* | *ipv6-address	Enter the IPv4 address (A.B.C.D) or IPv6 address (X:X:X:X::X) of the TACACS+ server host.
port *number*	(OPTIONAL) Enter the keyword `port` then a number as the port to be used by the TACACS+ server. The range is from zero (0) to 65535. The default is **49**.
timeout *seconds*	(OPTIONAL) Enter the keyword `timeout` then the number of seconds the switch waits for a reply from the TACACS+ server. The range is from 0 to 1000. The default is **10 seconds**.
key *key*	(OPTIONAL) Enter the keyword `key` then a string up to 42 characters long as the authentication key. This authentication key must match the key specified in the `tacacs-server key` for the TACACS+ daemon.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Added support for IPv6.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Authentication key length increased to 42 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.2.1.1	Introduced on the E-Series.

Usage Information To list multiple TACACS+ servers to be used by the `aaa authentication login` command, configure this command multiple times.

If you are not configuring the switch as a TACACS+ server, you do not need to configure the `port`, `timeout` and `key` optional parameters. If you do not configure a key, the key assigned in the `tacacs-server key` command is used.

You can use duplicate host names or IP addresses among TACACS groups. However, you cannot use duplicate host names or IP addresses within the same TACACS group.

If a VRF is not configured on the TACACS group, then servers configured in the group are considered to be on the default VRF. TACACS servers that are configured in the CONFIGURATION mode are also considered to be on the default VRF.

For AAA servers to use a group of TACACS servers, you must explicitly configure the group using the `aaa tacacs group group-name` command. The order in which the TACACS servers are tried depends on the order in which they are configured.

Example

```
DellEMC(conf)# tacacs-server group group1
DellEMC(conf-tacacs-group)# tacacs-server host 1.1.1.1 key secr-et
DellEMC(conf-tacacs-group)# no tacacs-server host 1.1.1.1
DellEMC(conf-tacacs-group)#
```

Related Commands

- aaa authentication login — specifies the login authentication method.
- tacacs-server key — configures a TACACS+ key for the TACACS server.

tacacs-server key

Configure a key for communication between a TACACS+ server and a client.

Syntax

`tacacs-server key [encryption-type] key`

To delete a key, use the `no tacacs-server key key` command.

Parameters

encryption-type	(OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the key entered. The options are: • `0` is the default and means the key is not encrypted and stored as clear text. • `7` means that the key is encrypted and hidden.
key	Enter a text string, up to 42 characters long, as the clear text password. Leading spaces are ignored.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Authentication key length increased to 42 characters.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
pre-6.2.1.1	Introduced on the E-Series.

Usage Information The key configured with this command must match the key configured on the TACACS+ daemon.

tacacs-server vrf

Create an association between a TACACS server group and a VRF and source interface.

Syntax `tacacs-server vrf vrf-name [source-interface interface]`

To delete the association between a TACACS server group and a VRF and source interface, use the `no tacacs-server vrf vrf-name [source-interface interface]` command.

Parameters

vrf *vrf-name* Enter the keyword `vrf` and then the name of the VRF to associate a TACACS server group with that VRF.

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes TACACS SERVER GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can use this command to associate a group of TACACS servers with a VRF and source interface. You can configure the source interface only with the VRF attribute and source interface is optional with the VRF attributes.

If VRF is not configured on the TACACS group, then the group is considered to be on the default VRF.

RADIUS groups and VRFs have one-to-one mapping. If a VRF is configured with one RADIUS group, then you cannot use the same VRF with another RADIUS group. When the VRF is removed, then the corresponding RADIUS group is also removed automatically.

Example

```
DellEMC(conf)# tacacs-server group group1
DellEMC(conf-tacacs-group)# tacacs-server vrf vrf1 source-interface
twentyFiveGigE 1/3

DellEMC(conf)# tacacs-server group group2
DellEMC(conf-tacacs-group)# tacacs-server vrf default
DellEMC(conf-tacacs-group)#
```

Port Authentication (802.1X) Commands

An authentication server must authenticate a client connected to an 802.1X switch port. Until the authentication, only Extensible Authentication Protocol over LAN (EAPOL) traffic is allowed through the port to which a client is connected. After authentication is successful, normal traffic passes through the port.

Dell EMC Networking OS supports RADIUS and Active Directory environments using 802.1X Port Authentication.

Important Points to Remember

Dell EMC Networking OS limits network access for certain users by using VLAN assignments. 802.1X with VLAN assignment has these characteristics when configured on the switch and the RADIUS server.

- 802.1X is supported on Dell EMC Networking OS.
- 802.1X is not supported on the LAG or the channel members of a LAG.
- If no VLAN is supplied by the RADIUS server or if 802.1X authorization is disabled, the port is configured in its access VLAN after successful authentication.
- If 802.1X authorization is enabled but the VLAN information from the RADIUS server is not valid, the port returns to the Unauthorized state and remains in the configured access VLAN. This prevents ports from appearing unexpectedly in an inappropriate VLAN due to a configuration error. Configuration errors create an entry in Syslog.
- If 802.1X authorization is enabled and all information from the RADIUS server is valid, the port is placed in the specified VLAN after authentication.
- If port security is enabled on an 802.1X port with VLAN assignment, the port is placed in the RADIUS server assigned VLAN.
- If 802.1X is disabled on the port, it is returned to the configured access VLAN.
- When the port is in the Force Authorized, Force Unauthorized, or Shutdown state, it is placed in the configured access VLAN.
- If an 802.1X port is authenticated and put in the RADIUS server assigned VLAN, any change to the port access VLAN configuration does not take effect.
- The 802.1X with VLAN assignment feature is not supported on trunk ports, dynamic ports, or with dynamic-access port assignment through a VLAN membership.

dot1x authentication (Configuration)

Enable dot1x globally; dot1x must be enabled both globally and at the interface level.

Syntax `dot1x authentication`

To disable dot1x on globally, use the `no dot1x authentication` command.

Defaults Disabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- dot1x authentication (Interface) — enable dot1x on an interface.

dot1x authentication (Interface)

Enable dot1x on an interface; dot1x must be enabled both globally and at the interface level.

Syntax

```
dot1x authentication
```

To disable dot1x on an interface, use the `no dot1x authentication` command.

Defaults

Disabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- dot1x authentication (Configuration) — enable dot1x globally.

dot1x auth-fail-vlan

Configure an authentication failure VLAN for users and devices that fail 802.1X authentication.

Syntax

`dot1x auth-fail-vlan` *`vlan-id`* `[max-attempts` *`number`*`]`

To delete the authentication failure VLAN, use the `no dot1x auth-fail-vlan` *`vlan-id`* `[max-attempts` *`number`*`]` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.
max-attempts *number*	(OPTIONAL) Enter the keywords `max-attempts` then number of attempts desired before authentication fails. The range is from 1 to 5. The default is **3**.

Defaults

3 attempts

Command Modes

CONFIGURATION (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Usage Information

If the host responds to 802.1X with an incorrect login/password, the login fails. The switch attempts to authenticate again until the maximum attempts configured is reached. If the authentication fails after all allowed attempts, the interface is moved to the authentication failed VLAN.

After the authentication VLAN is assigned, the port-state must be toggled to restart authentication. Authentication occurs at the next re-authentication interval (`dot1x reauthentication`).

Related Commands

- dot1x port-control — enables port-control on an interface.
- dot1x guest-vlan — configures a guest VLAN for non-dot1x devices.
- show dot1x interface — displays the 802.1X information on an interface.

dot1x auth-server

Configure the authentication server to RADIUS.

Syntax `dot1x auth-server radius`

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x guest-vlan

Configure a guest VLAN for limited access users or for devices that are not 802.1X capable.

Syntax `dot1x guest-vlan vlan-id`

To disable the guest VLAN, use the `no dot1x guest-vlan vlan-id` command.

Parameters

vlan-id Enter the VLAN Identifier. The range is from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Usage Information

802.1X authentication is enabled when an interface is connected to the switch. If the host fails to respond within a designated amount of time, the authenticator places the port in the guest VLAN.

If a device does not respond within 30 seconds, it is assumed that the device is not 802.1X capable. Therefore, a guest VLAN is allocated to the interface and authentication for the device occurs at the next re-authentication interval (`dot1x reauthentication`).

If the host fails authentication for the designated number of times, the authenticator places the port in authentication failed VLAN (`dot1x auth-fail-vlan`).

NOTE: The layer 3 portion of guest VLAN and authentication fail VLANs can be created regardless if the VLAN is assigned to an interface or not. After an interface is assigned a guest VLAN (which has an IP address), routing through the guest VLAN is the same as any other traffic. However, the interface may join/leave a VLAN dynamically.

Related Commands

- dot1x auth-fail-vlan — configures a VLAN for authentication failures.
- dot1x reauthentication — enables periodic re-authentication.
- show dot1x interface — displays the 802.1X information on an interface.

dot1x mac-auth-bypass

Enable MAC authentication bypass. If 802.1X times out because the host did not respond to the Identity Request frame, Dell EMC Networking OS attempts to authenticate the host based on its MAC address.

Syntax `[no] dot1x mac-auth-bypass`

Defaults Disabled

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.4	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information To disable MAC authentication bypass on a port, enter the `no dot1x mac-auth-bypass` command.

dot1x max-eap-req

Configure the maximum number of times an extensive authentication protocol (EAP) request is transmitted before the session times out.

Syntax `dot1x max-eap-req` *number*

To return to the default, use the `no dot1x max-eap-req` command.

Parameters

number	Enter the number of times an EAP request is transmitted before a session time-out. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- interface range — configure a range of interfaces.

dot1x port-control

Enable port control on an interface.

Syntax `dot1x port-control {force-authorized | auto | force-unauthorized}`

Parameters

force-authorized	Enter the keywords `force-authorized` to forcibly authorize a port.
auto	Enter the keyword `auto` to authorize a port based on the 802.1X operation result.
force-unauthorized	Enter the keywords `force-unauthorized` to forcibly de-authorize a port.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information The authenticator performs authentication only when `port-control` is set to `auto`.

dot1x quiet-period

Set the number of seconds that the authenticator remains quiet after a failed authentication with a client.

Syntax `dot1x quiet-period seconds`

To disable quiet time, use the `no dot1x quiet-time` command.

Parameters

seconds Enter the number of seconds. The range is from 1 to 65535. The default is **30**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x reauthentication

Enable periodic re-authentication of the client.

Syntax `dot1x reauthentication [interval seconds]`

To disable periodic re-authentication, use `the no dot1x reauthentication` command.

Parameters

interval *seconds* (Optional) Enter the keyword `interval` then the interval time, in seconds, after which re-authentication is initiated. The range is from 1 to 31536000 (1 year). The default is**3600 (1 hour)**.

Defaults **3600 seconds (1 hour)**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

Related Commands

- interface range — configures a range of interfaces.

dot1x reauth-max

Configure the maximum number of times a port can re-authenticate before the port becomes unauthorized.

Syntax

```
dot1x reauth-max number
```

To return to the default, use the `no dot1x reauth-max` command.

Parameters

number	Enter the permitted number of re-authentications. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x server-timeout

Configure the amount of time after which exchanges with the server time-out.

Syntax `dot1x server-timeout` *seconds*

To return to the default, use the `no dot1x server-timeout` command.

Parameters

seconds	Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x supplicant-timeout

Configure the amount of time after which exchanges with the supplicant time-out.

Syntax `dot1x supplicant-timeout seconds`

To return to the default, use the`no dot1x supplicant-timeout` command.

Parameters

seconds Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

dot1x tx-period

Configure the intervals at which EAPOL PDUs are transmitted by the Authenticator PAE.

Syntax `dot1x tx-period seconds`

To return to the default, use the `no dot1x tx-period` command.

Parameters

seconds Enter the interval time, in seconds, that EAPOL PDUs are transmitted. The range is from 1 to 65535 (1 year). The default is **30**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.
7.4.1.0	Introduced on the E-Series.

show dot1x interface

Display the 802.1X information on an interface.

Syntax `show dot1x interface` *interface*

Parameters

interface Enter one of the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.

Defaults none

Command Modes

- EXEC
- EXEC privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Example

```
DellEMC#show dot1x interface fortyGigE 1/49/1

802.1x information on Fo 1/49/1:
-----------------------------
Dot1x Status:              Enable
Port Control:              AUTO
Port Auth Status:          UNAUTHORIZED
Re-Authentication:         Disable
Untagged VLAN id:          None
Guest VLAN:                Disable
Guest VLAN id:             NONE
Auth-Fail VLAN:            Disable
Auth-Fail VLAN id:         NONE
Auth-Fail Max-Attempts:    NONE
Mac-Auth-Bypass:           Disable
Mac-Auth-Bypass Only:      Disable
Tx Period:                 30 seconds
Quiet Period:              60 seconds
ReAuth Max:                2
Supplicant Timeout:        30 seconds
Server Timeout:            30 seconds
Re-Auth Interval:          3600 seconds
Max-EAP-Req:               2
Host Mode:                 SINGLE_HOST
Auth PAE State:            Initialize
Backend State:             Initialize
DellEMC#

DellEMC# show dot1x interface fortyGigE 1/49/1

802.1x information on Fo 1/49/1:
-----------------------------
Dot1x Status:              Enable
Port Control:              FORCE_AUTHORIZED
Port Auth Status:          UNAUTHORIZED
Re-Authentication:         Disable
Untagged VLAN id:          None
Guest VLAN:                Disable
Guest VLAN id:             NONE
Auth-Fail VLAN:            Disable
Auth-Fail VLAN id:         NONE
Auth-Fail Max-Attempts:    NONE
Mac-Auth-Bypass:           Disable
Mac-Auth-Bypass Only:      Disable
Tx Period:                 30 seconds
```

```
Quiet Period:               60 seconds
ReAuth Max:                 2
Supplicant Timeout:         30 seconds
Server Timeout:             30 seconds
Re-Auth Interval:           3600 seconds
Max-EAP-Req:                2
Host Mode:                  SINGLE_HOST
Auth PAE State:             Initialize
Backend State:              Initialize
DellEMC#
```

SSH and SCP Commands

Dell EMC Networking OS supports secure shell (SSH) protocol version 2.0. SSH is a protocol for secure remote login over an insecure network. SSH sessions are encrypted and use authentication.

crypto key generate

Generate keys for the SSH server.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

```
crypto key generate {rsa}
```

Parameters

rsa Enter the keyword `rsa` then the key size to generate a SSHv2 RSA host keys. The range is from 1024 to 2048 if you did not enable FIPS mode; if you enabled FIPS mode, you can only generate a 2048-bit key. The default is **1024**.

NOTE: You must have a license to access the FIPS mode. For more information, contact your Dell EMC Networking representative.

Defaults Key size **1024**; if you enable FIPS mode, the key size is **2048**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Removed support for rsa1 keys from all platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.12.0	Added support for FIPS mode on the S4810.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

The host keys are required for key-exchange by the SSH server. If the keys are not found when you enable the server (`ip ssh server enable`), the keys are automatically generated.

This command requires user interaction and generates a prompt prior to overwriting any existing host keys.

NOTE: Only a user with superuser permissions should generate host-keys.

Example

```
DellEMC(conf)# crypto key generate rsa
Enter key size <1024-2048>. Default<1024>  :
Host key already exists. Overwrite (y/n)?y
Generating 1024-bit SSHv2 RSA key.
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
DellEMC(conf)#
```

Related Commands

- ip ssh server — enables the SSH server.
- show crypto — displays the SSH host public keys.

crypto key zeroize rsa

Removes the generated RSA host keys and zeroize the key storage location.

Syntax `crypto key zeroize rsa`

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide.*

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

debug ip ssh

Enables collecting SSH debug information.

Syntax

`debug ip ssh {client | server}`

To disable debugging, use the `no debug ip ssh {client | server}` command.

Parameters

client	Enter the keyword `client` to enable collecting debug information on the client.
server	Enter the keyword `server` to enable collecting debug information on the server.

Defaults

Disabled on both client and server.

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

Debug information includes details for key-exchange, authentication, and established session for each connection.

ip scp topdir

Identify a location for files used in secure copy transfer.

Syntax

`ip scp topdir` *`directory`*

To return to the default setting, use the `no ip scp topdir` command.

Parameters

directory	Enter a directory name.

Defaults

The internal flash (`flash:`) is the default directory.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

To configure the switch as an SCP server, use the `ip ssh server` command.

Related Commands

- ip ssh server — enables the SSH and SCP server on the switch.

ip ssh authentication-retries

Configure the maximum number of attempts that should be used to authenticate a user.

Syntax

```
ip ssh authentication-retries 1-10
```

Parameters

1-10	Enter the number of maximum retries to authenticate a user. The range is from 1 to 10. The default is **3**.

Defaults

3

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information This command specifies the maximum number of attempts to authenticate a user on an SSH connection with the remote host for password authentication. SSH disconnects when the number of password failures exceeds authentication-retries.

ip ssh challenge–response–authentication

Enable challenge response authentication for SSHv2.

Syntax `ip ssh challenge-response-authentication enable`

To disable the challenge response authentication, use the `no ip ssh challenge-response-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable the challenge response authentication for SSHv2.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4810, S4820T, S3048–ON, S3100 Series, S4048–ON, S5000, S6000, S6000–ON, Z9500, Z9100–ON, S6100–ON, S6010–ON, S4048T–ON, C9000, and MXL.

Usage Information If both the challenge response authentication and password authentication methods are configured, the challenge response authentication takes priority.

ip ssh cipher

Configure the list of ciphers supported on both SSH client and SCP.

Syntax `ip ssh cipher` *`cipher-list`*

Parameters

cipher *cipher-list* Enter the keyword `cipher` and then a space-delimited list of ciphers that the SSH client supports. The following ciphers are available.

- `aes256-ctr`
- `aes256-cbc`
- `aes192-ctr`
- `aes192-cbc`
- `aes128-ctr`
- `aes128-cbc`
- `3des-cbc`

Defaults The default list of ciphers is in the order as shown below:

- `aes256-ctr`
- `aes256-cbc`
- `aes192-ctr`
- `aes192-cbc`
- `aes128-ctr`
- `aes128-cbc`
- `3des-cbc`

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON, S6000, S6000–ON, S5000, S4810, S4820T, S3048–ON, S4048–ON, MXL, C9010, S3100 series, and Z9100-ON.

Usage Information

- You can select one or more ciphers from the list.
- The default list of supported ciphers is same irrespective of whether FIPS mode is enabled or disabled.
- Client-supported cipher list gets preference over the server-supported cipher list in selecting the cipher for the SSH session.
- When the `cipher (-c)` option is used with the SSH CLI, it overrides the configured or default cipher list.
- When FIPS is enabled or disabled, the client ciphers get default configuration.

ip ssh connection-rate-limit

Configure the maximum number of incoming SSH connections per minute.

Syntax `ip ssh connection-rate-limit 1-60`

Parameters

1-60 Enter the number of maximum numbers of incoming SSH connections allowed per minute. The range is from 1 to 60 per minute. The default is **10 per minute**.

Defaults **10 per minute**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.11(0.0)	Increased the SSH rate–limit range.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

ip ssh connection-rate-interval

Configure the rate interval in which the maximum number of SSH connections can be attempted.

Syntax `ip ssh connection-rate-interval 1-5`

Parameters

1-5	Enter the rate interval in which the maximum number of SSH connections can be attempted. The range is from 1 to 5 minutes.

Defaults **1 minute**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on the S6000–ON, S6100–ON and Z9100–ON.

ip ssh connection-rate-lockout

Configure a lockout period until which the SSH connections are blocked, after the SSH connection attempts reach the rate limit.

Syntax `ip ssh connection-rate-lockout 0–300`

Parameters

0-300	Enter a lockout period in seconds. The range is from 0 to 300 seconds.

Defaults **0**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced on the S6000–ON, S6100–ON and Z9100–ON.

ip ssh hostbased-authentication

Enable hostbased-authentication for the SSHv2 server.

Syntax

```
ip ssh hostbased-authentication enable
```

To disable hostbased-authentication for SSHv2 server, use the `no ip ssh hostbased-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable hostbased-authentication for SSHv2 server.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

If you enable this command, clients can log in without a password prompt. This command provides two levels of authentication:

- rhost-authentication is done with the file specified in the `ip ssh rhostfile` command.
- checking client host-keys is done with the file specified in the `ip ssh pub-key-file` command.

NOTE: Administrators must specify the two files (`rhosts` and `pub-key-file`) to configure host-based authentication.

Related Commands

- ip ssh pub-key-file — public keys of trusted hosts from a file.
- ip ssh rhostsfile — trusted hosts and users for rhost authentication.

ip ssh mac

Configure the list of MAC algorithms supported on both SSH client and SCP.

Syntax `ip ssh mac mac-list`

Parameters

mac *mac-list*

Enter the keyword `mac` then a space-delimited list of message authentication code (MAC) algorithms supported by the SSH client. The following MAC algorithms are available.

When FIPS mode is enabled:

- `hmac-sha2-256`
- `hmac-sha1`
- `hmac-sha1-96`

When FIPS mode is disabled:

- `hmac-sha2-256`
- `hmac-sha1`
- `hmac-sha1-96`
- `hmac-md5`
- `hmac-md5-96`

Defaults

The default list of MAC algorithm is in the order as shown below:

When FIPS mode is enabled:

- `hmac-sha2-256`
- `hmac-sha1`
- `hmac-sha1-96`

When FIPS mode is disabled:

- `hmac-sha2-256`
- `hmac-sha1`
- `hmac-sha1-96`
- `hmac-md5`
- `hmac-md5-96`

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON, S6000, S6000–ON, S5000, S4810, S4820T, S3048–ON, S4048–ON, MXL, C9010, S3100 series, and Z9100-ON.

Usage Information

- You can select one or more MAC algorithms from the list.
- Client-supported MAC list gets preference over the server-supported MAC list in selecting the MAC algorithm for the SSH session.
- When the `MAC (-m)` option is used with the SSH CLI, it overrides the configured or default MAC list.
- When FIPS is enabled or disabled, the client MACs get default configuration.

ip ssh password-authentication

Enable password authentication for the SSH server.

Syntax

```
ip ssh password-authentication enable
```

To disable password-authentication, use the `no ip ssh password-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable password-authentication for the SSH server.

Defaults Enabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information With password authentication enabled, you can authenticate using the local, RADIUS, or TACACS+ password fallback order as configured.

ip ssh rekey

Configures the time rekey-interval or volume rekey-limit threshold at which to re-generate the SSH key during an SSH session.

Syntax

```
ip ssh rekey [time rekey-interval] [volume rekey-limit]
```

To reset to the default, use `no ip ssh rekey [time rekey-interval] [volume rekey-limit]` command.

Parameters

time *minutes*	Enter the keywords `time` then the amount of time in minutes. The range is from 10 to 1440 minutes. The default is **60** minutes

	volume *rekey-limit*	Enter the keywords **volume** then the amount of volume in megabytes. The range is from 1 to 4096 to megabytes. The default is **1024 megabytes**

Defaults The default time is **60** minutes. The default volume is **1024** megabytes.

Command Modes CONFIGURATION mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

ip ssh pub-key-file

Specify the file used for host-based authentication.

Syntax `ip ssh pub-key-file {WORD}`

Parameters

WORD	Enter the file name for the host-based authentication.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

This command specifies the file used for the host-based authentication. The `creates/` file overwrites the `flash://ADMIN_DIR/ssh/knownhosts` file and deletes the user-specified file. Even though this command is a global configuration command, it does not appear in the running configuration because you only need to run this command once.

The file contains the OpenSSH-compatible public keys of the host for which host-based authentication is allowed. An example known host file format:

```
poclab4,123.12.1.123 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEAox/
QQp8xYhzOxn07yh4VGPAoUfgKoieTHO9G4sNV+ui+DWEc3cgYAcU5Lai1MU2ODrzhCwyDNp05tK
BU3t
ReG1o8AxLi6+S4hyEMqHzkzBFNVqHzpQc+Rs4p2urzV0F4pRKnaXdHf3Lk4D460HZRhhVrxqeNx
PDpEn WIMPJi0ds= ashwani@poclab4
```

NOTE: For `rhostfile` and `pub-key-file`, the administrator must FTP the file to the chassis.

Example

```
DellEMC# conf
DellEMC(conf)# ip ssh pub-key-file flash://knownhosts
DellEMC(conf)#
```

Related Commands

- show ip ssh client-pub-keys — displays the client-public keys used for the host-based authentication.

ip ssh rhostsfile

Specify the rhost file used for host-based authorization.

Syntax `ip ssh rhostsfile {WORD}`

Parameters

WORD	Enter the rhost file name for the host-based authentication.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC#conf
DellEMC(conf)# ip ssh rhostsfile flash://shosts
DellEMC(conf)#
```

Usage Information

This command specifies the rhost file used for host-based authentication. This `creates/` file overwrites the `flash:/ADMIN_DIR/ssh/shosts` file and deletes the user-specified file. Even though this command is a global configuration command, it does not appear in the running configuration because you only need to run this command once.

This file contains hostnames and usernames, for which hosts and users, rhost-authentication can be allowed.

NOTE: For `rhostfile` and `pub-key-file`, the administrator must FTP the file to the switch.

ip ssh rsa-authentication (Config)

Enable RSA authentication for the SSHv2 server.

Syntax

```
ip ssh rsa-authentication enable
```

To disable RSA authentication, use the `no ip ssh rsa-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable RSA authentication for the SSHv2 server.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

Enabling RSA authentication allows the user to log in without being prompted for a password. In addition, the OpenSSH compatible SSHv2 RSA public key must be added to the list of authorized keys (`ip ssh rsa-authentication my-authorized-keys device://filename` command).

ip ssh server

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

`ip ssh server {ciphers` *`cipher-list`*`} {enable | port` *`port-number`*`} [kex` *`key-exchange-algorithm`*`] [mac` *`hmac-algorithm`*`][version 2]`

To disable SSH server functions, use the `no ip ssh server {ciphers` *`cipher-list`*`} {enable | port` *`port-number`*`} [kex` *`key-exchange-algorithm`*`] [mac` *`hmac-algorithm`*`]` command.

Parameters

enable — Enter the key word `enable` to start the SSH server.

ciphers *cipher-list* — Enter the keyword `ciphers` and then a space-delimited list of ciphers that the SSH server supports. The following ciphers are available.

- `3des-cbc`
- `aes128-cbc`
- `aes192-cbc`
- `aes256-cbc`
- `aes128-ctr`
- `aes192-ctr`
- `aes256-ctr`

The default cipher list is used.

- `3des-cbc`
- `aes128-cbc`
- `aes192-cbc`
- `aes256-cbc`
- `aes128-ctr`
- `aes192-ctr`

- `aes256-ctr`

mac *hmac-algorithm*

Enter the keyword `mac` then a space-delimited list of hash message authentication code (HMAC) algorithms supported by the SSH server for keying hashing for the message authentication.

The following HMAC algorithms are available:

- `hmac-sha1`
- `hmac-sha1-96`
- `hmac-sha2-256`

When FIPS is enabled, the default HMAC algorithm is `hmac-sha1-96`.

When FIPS is not enabled, the default HMAC algorithms are the following:

- `hmac-md5`
- `hmac-md5-96`
- `hmac-sha1`
- `hmac-sha1-96`
- `hmac-sha2-256`

kex *key-exchange-algorithm*

Enter the keyword `kex` and then a space-delimited list of key exchange algorithms supported by the SSH server.

The following key exchange algorithms are available:

- `diffie-hellman-group-exchange-sha1`
- `diffie-hellman-group1-sha1`
- `diffie-hellman-group14-sha1`

When FIPS is enabled, the default key-exchange-algorithm is `diffie-hellman-group14-sha1`.

When FIPS is not enabled, the default key-exchange-algorithms are the following:

- `diffie-hellman-group-exchange-sha1`
- `diffie-hellman-group1-sha1,`
- `diffie-hellman-group14-sha1`

port *port-number* (OPTIONAL) Enter the keyword `port` then the port number of the listening port of the SSH server. The range is from 1 to 65535. The default is **22**.

[version 2] (OPTIONAL) Enter the keyword `version` then the SSH version 2, to specify SSHv2.

Defaults

- Default listening port is **22**.
- Default cipher list is 3des-cbc,aes128-cbc,aes192-cbc,aes256-cbc,aes128-ctr,aes192-ctr,aes256-ctr.
- When FIPS is enabled, the default is hmac-sha1-96.
- When FIPS is not enabled, the default is hmac-md5,hmac-md5-96,hmac-sha1,hmac-sha1-96,hmac-sha2-256.
- *When FIPS is enabled, the default is* diffie-hellman-group14-sha1.
- When FIPS is not enabled, the default is diffie-hellman-group-exchange-sha1,diffie-hellman-group1-sha1,diffie-hellman-group14-sha1.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Removed support for SSHv1 from all platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Removed the support for hmac-sha2-256-96 algorithm.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Introduced the cipher , kex and mac options on the Z9500.
9.5(0.0)	Introduced the `cipher`, `kex` and `mac` options on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

This command enables the SSH server and begins listening on a port. If a port is not specified, listening is on SSH default port 22.

NOTE: Starting with Dell EMC Networking OS Release 9.2(0.0), SSH server is enabled by default.

Example

```
DellEMC# conf
DellEMC(conf)# ip ssh server port 45
DellEMC(conf)# ip ssh server enable
DellEMC#
```

ip ssh server vrf

Configure an SSH server on either a specific VRF or a management VRF.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

```
ip ssh server vrf {any | management | vrf-name}
```

To disable the SSH server configuration, use the `no ip ssh server vrf {management | vrf-name}` command.

Parameters

any	Enter the keyword `any` to enable access to the server from any VRF.

vrf management	Enter the keyword `vrf` followed by the keyword `management` to configure an SSH server on a management VRF.
vrf *vrf-name*	Enter the keyword `vrf` followed by the VRF name to configure an SSH server on that VRF.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information You can enable the SSH server on either a management VRF or a user defined VRF but not both. If no VRF is specified, then the SSH server is enabled on the default VRF.

If the SSH server is enabled on a VRF with name vrf1, then use the following command to restart the SSH server on a VRF with name vrf2: `ip ssh server vrf vrf2`. If the SSH server is enabled on a VRF with name vrf1, then use the following command to restart the SSH server on the default VRF: `ip ssh server vrf`.

Example

```
DellEMC(conf)# ip ssh server vrf any
DellEMC(conf)# no ip ssh server vrf
DellEMC(conf)# ip ssh server vrf vrf1
DellEMC(conf)# no ip ssh server vrf
DellEMC(conf)# ip ssh server vrf management
DellEMC(conf)# no ip ssh server vrf
```

Related Commands

- show ip ssh — displays the ssh information.

ip ssh source-interface

Specifies an interface's IP address as the source IP address for an outgoing SSH connections.

Syntax `ip ssh source-interface interface`

To delete a source interface, use the `no ip ssh source-interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information The `source-interface` *`interface`* attribute is applicable for both the `SSH client` as well as the `COPY` (SCP) commands. Using these attributes the client session tags an error to the user during run time, in case there is a mismatch between this command and the `ip ssh vrf` command.

Example

```
DellEMC(conf)#ip ssh source-interface twentyFiveGigE 1/30
DellEMC(conf)#do ssh 10.10.10.2 -l admin
DellEMC(conf)#no ip ssh source-interface
```

ip ssh vrf

Specify a VRF for an outgoing SSH connections.

Syntax `ip ssh vrf` *`vrf-name`*

To delete a VRF for an outgoing SSH connection, use the `no ip ssh vrf` *`vrf-name`* command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to configure that VRF for an outgoing SSH session.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information If you configure a VRF for an SSH session, then you need not explicitly mention the same VRF for the SSH client sessions intended for that VRF. The `vrf` attribute in the `ip ssh vrf` command is applicable for both the SSH client as well as the COPY (SCP) commands.

Example

```
DellEMC(conf)#ip ssh vrf vrf1
DellEMC(conf)#do ssh 10.10.10.2 -l admin
DellEMC(conf)#no ip ssh vrf vrf1
```

show crypto

Display the public part of the SSH host-keys.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

```
show crypto key mypubkey {rsa}
```

Parameters

Key	Enter the keyword `key` to display the host public key.
mypubkey	Enter the keyword `mypubkey` to display the host public key.
rsa	Enter the keyword `rsa` to display the host SSHv2 RSA public key.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.12(0.0)	Removed support for rsa1 keys from all platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

This command is useful if the remote SSH client implements Strict Host Key Checking. You can copy the host key to your list of known hosts.

Example

```
DellEMC# show crypto key mypubkey rsa
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAAAgQC9IYgcUcc8wQm+5KUQgW/
zAs8V5STalGq4/+S+6H9axpQnA+A0xweeo5iR5hvPP6Vc+HS+uWoQH+
VOJ8H5Jxsm347XnYv/gpSqhgjZ/C5UwFiucVkVfYu8RDcJVIuQhLv
PEebIF5Q+sD8K89MXU90MAS/UdoiJZSOIlbaCuSTW1Q==

DellEMC#
```

Related Commands

- crypto key generate — generates the SSH keys.

show ip ssh

Display information about established SSH sessions.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

```
show ip ssh
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Updated the output to include `challenge-response-authentication` option.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Removed the support for hmac-sha2-256-96 algorithm.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC# show ip ssh
SSH server                : enabled.
SSH server version        : v2.
SSH server vrf            : default.
SSH server ciphers        : aes256-ctr,aes256-cbc,aes192-ctr,aes192-
cbc,aes128-ctr,aes128-cbc,3des-cbc.
SSH server macs           : hmac-sha2-256,hmac-sha1,hmac-sha1-96,hmac-
md5,hmac-md5-96.
SSH server kex algorithms : diffie-hellman-group-exchange-sha1,diffie-
hellman-group1-sha1,diffie-hellman-group14-sha1.
Password Authentication   : enabled.
Hostbased Authentication  : disabled.
RSA       Authentication  : disabled.
Challenge Response Auth   : enabled.
   Vty          Encryption      HMAC            Remote IP
   2            aes128-cbc      hmac-md5        10.16.127.141
   4            aes128-cbc      hmac-md5        10.16.127.141
*  5            aes128-cbc      hmac-md5        10.16.127.141
DellEMC#
```

Related Commands

- ip ssh server — configures an SSH server.
- show ip ssh client-pub-keys — displays the client-public keys.

show ip ssh client-pub-keys

Display the client public keys used in host-based authentication.

Syntax `show ip ssh client-pub-keys`

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Network OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information This command displays the contents of the `flash://ADMIN_DIRssh/knownhosts` file.

Example

```
DellEMC# show ip ssh client-pub-keys
4.8.1.2 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhYeFPaHiygd8
FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac= root@dt-maa-linux-1.force10networks.c
om
2200:2200:2200:2200:2200::2202 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhYeFPaHiygd8
FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac= root@dt-maa-li
nux-1.force10networks.com
10.16.151.48 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhYeFPaHiygd8
FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac=
DellEMC#
```

Related Commands

- ip ssh pub-key-file — configures the filename for the host-based authentication.

show ip ssh rsa-authentication

Display the authorized-keys for the RSA authentication.

Syntax `show ip ssh rsa-authentication {my-authorized-keys}`

Parameters

my-authorized-keys	Display the RSA authorized keys.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

This command displays the contents of the `flash:/ADMIN_DIR/ssh/authorized-keys.username` file.

Example

```
DellEMC# show ip ssh rsa-authentication my-authorized-keys
ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAyB17l4gFp4r2DRHIvMc1VZ
d0Sg5GQxRV1y1X1JOMeO6Nd0WuYyzrQMM
4qJAoBwtneOXfLBcHF3V2hcMIqaZN+CRCnw/
zCMlnCf0+qVTd1oofsea5r09kS0xTp0CNfHXZ3NuGCq9Ov33m9+
U9tMwhS8vy8AVxdH4x4km3c3t5Jvc=
freedom@poclab4

DellEMC#
```

Related Commands

- ip ssh rsa-authentication (Config) — configures the RSA authorized keys.

ssh

Open an SSH connection specifying the hostname, username, encryption cipher, HMAC algorithm, port number, and version of the SSH client.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell EMC Networking representative.

```
ssh [vrf vrf-name] {hostname | ipv4 address | ipv6 address} [-c encryption
cipher | -l username | -m HMAC algorithm | -p port-number | -v 2]
```

Parameters

vrf *vrf-name* (OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to specify the VRF used with the SSH session.

NOTE: The VRF configured using this command has a higher precedence than the VRF configured using the `ip ssh vrf vrf-name` command. If you do not configure a VRF using this command, then the SSH client uses the configured VRF (if any). If there is a mismatch between VRFs that are

configured using the `ip ssh source-interface` command and the `ssh vrf vrf-name` command, then an error is reported.

hostname	(OPTIONAL) Enter the IP address or the host name of the remote device.
vrf instance	(OPTIONAL) E-Series Only: Enter the keyword `vrf` then the VRF Instance name to open an SSH connection to that instance.
ipv4 address	(OPTIONAL) Enter the IP address in dotted decimal format A.B.C.D.
ipv6-address prefix-length	(OPTIONAL) Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
-c *encryption cipher*	Enable the “FIPS mode enable", this mode will support the v2 client. "no fips mode enable"(disable) will support v1 & v2 client. This comment is applicable for both ciphers & HMAC algorithms: • `3des-cbc`: Force ssh to use 3des-cbc encryption cipher. • `aes128-cbc` : Force ssh to use aes128-cbc encryption cipher • `aes192-cbc` : Force ssh to use aes192-cbc encryption cipher • `aes256-cbc` : Force ssh to use aes256-cbc encryption cipher • `aes128-ctr` : Force ssh to use aes128-ctr encryption cipher • `aes192-ctr` : Force ssh to use aes192-ctr encryption cipher • `aes256-ctr` : Force ssh to use aes256-ctr encryption cipher
-l *username*	(OPTIONAL) Enter the keyword `-l` then the user name used in this SSH session. The default is the user name of the user associated with the terminal.
-m *HMAC algorithm*	Enter one of the following HMAC algorithms to use: "no fips mode enable"(disable) will support v1 & v2 client. • `hmac-md5`: Force ssh to use hmac-md5 HMAC algorithm. • `hmac-md5-96`: Force ssh to use hmac-md5-96 HMAC algorithm. • `hmac-sha1`: Force ssh to use hmac-sha1 HMAC algorithm. • `hmac-sha1-96` : Force ssh to use hmac-sha1-96 HMAC algorithm. • `hmac-sha2-256` : Force ssh to use hmac-sha2-256 HMAC algorithm.
-p *port-number*	(OPTIONAL) Enter the keyword `-p` then the port number. The range is from 1 to 65535. The default is **22**.
-v 2	(OPTIONAL) Enter the keyword `-v` then the SSH version 2. The default is the version from the protocol negotiation.

Defaults As shown in the *Parameters* section.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Version 1 is deprecated.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Removed the support for hmac-sha2-256-96 algorithm.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.5(0.1)	Added support for the following ciphers and HMAC alogorithms on the Z9000, S6000, S4820T, S4820T. S6000–ON. ● aes128-cbc ● aes192-cbc ● aes256-cbc ● aes128-ctr ● aes192-ctr ● aes256-ctr ● hmac-sha2-256 ● hmac-sha2-256-96
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.12.0	Added support for the `-c` and `-m` parameters on the S4810.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Added IPv6 support. Introduced on the C-Series.
pre-6.1.1.0	Introduced on the E-Series.

Usage Information

Dell EMC Networking OS supports both inbound and outbound SSH sessions using IPv4 or IPv6 addressing. Inbound SSH supports accessing the system through the management interface as well as through a physical Layer 3 interface.

Example

```
DellEMC#ssh 10.16.151.48 -l anvltest

Trying 10.16.151.48...
01:18:16: %STKUNIT0-M:CP %SEC-5-SSH_USAGE: Initiated SSH Client v2 (FIPS
Disabled) to anvltest@10.16.151.48 by default from console
anvltest@10.16.151.48's password:
Last login: Thu Jan  5 00:17:47 2012 from login-maa-101
[anvltest@dt-maa-linux-1 ~]# exit
logout
DellEMC#
```

Secure DHCP Commands

DHCP as defined by RFC 2131 provides no authentication or security mechanisms. Secure DHCP is a suite of features that protects networks that use dynamic address allocation from spoofing and attacks.

clear ip dhcp snooping

Clear the DHCP binding table.

Syntax `clear ip dhcp snooping binding`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

- show ip dhcp snooping — display the contents of the DHCP binding table.

ip dhcp relay

Enable Option 82.

Syntax `ip dhcp relay information-option [trust-downstream | vrf]`

Parameters

trust-downstream	Configure the system to trust Option 82 when it is received from the previous-hop router.
vrf	Enter the keyword `vrf` to include VRF related information in the Option 82. This configuration enables the relay agent to include VRF related information when it forwards the broadcasts from client to DHCP server.

Defaults Disabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping

Enable DHCP Snooping globally.

Syntax `[no] ip dhcp snooping`

Defaults Disabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

When enabled, no learning takes place until you enable snooping on a VLAN. After disabling DHCP Snooping, the binding table is deleted and Option 82, IP Source Guard, and Dynamic ARP Inspection are disabled.

Related Commands

- ip dhcp snooping vlan — enable DHCP Snooping on one or more VLANs.

ip dhcp snooping binding

Create a static entry in the DHCP binding table.

Syntax

```
[no] ip dhcp snooping binding mac address vlan-id vlan-id ip ip-address
interface type slot/port lease number
```

Parameters

mac *address*	Enter the keyword `mac` then the MAC address of the host to which the server is leasing the IP address.
vlan-id *vlan-id*	Enter the keywords `vlan-id` then the VLAN to which the host belongs. The range is from 2 to 4094.
ip *ip-address*	Enter the keyword `ip` then the IP address that the server is leasing.
interface *type*	Enter the keyword `interface` then the type of interface to which the host is connected. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
slot/port	Enter the slot and port number of the interface.
lease *time*	Enter the keyword `lease` then the amount of time the IP address is leased. The range is from 1 to 4294967295.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

- show ip dhcp snooping — displays the contents of the DHCP binding table.

ip dhcp snooping database renew

Renew the binding table.

Syntax

```
ip dhcp snooping database renew
```

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.

Version	Description
7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping trust

Configure an interface as trusted.

Syntax `[no] ip dhcp snooping trust`

Defaults Untrusted

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp source-address-validation

Enable IP source guard.

Syntax `[no] ip dhcp source-address-validation`

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping vlan

Enable DHCP Snooping on one or more VLANs.

Syntax `[no] ip dhcp snooping vlan name`

Parameters

name	Enter the name of a VLAN on which to enable DHCP Snooping.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information	When enabled, the system begins creating entries in the binding table for the specified VLANs. **NOTE:** Learning only happens if there is a trusted port in the VLAN.
Related Commands	• ip dhcp snooping trust — configure an interface as trusted.

show ip dhcp snooping

Display the contents of the DHCP binding table.

Syntax	`show ip dhcp snooping binding`
Defaults	none
Command Modes	• EXEC • EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000–ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands	• clear ip dhcp snooping — clear the contents of the DHCP binding table.

Role-Based Access Control Commands

With Role-Based Access Control (RBAC), access and authorization is controlled based on a user's role. Users are granted permissions based on their user roles, not on their individual user ID. User roles are created for job functions and through those roles they acquire the permissions to perform their associated job function.

This section describes the syntax and usage of RBAC-specific commands. You can find information on other related security commands in this chapter:

- aaa accounting
- aaa authentication login
- aaa authorization commands
- authorization
- show accounting

- show users
- username

aaa authorization role-only

Configure authentication to use the user's role only when determining if access to commands is permitted.

Syntax

```
aaa authorization role-only
```

To return to the default setting, use the `no aaa authentication role-only` command.

Parameters

name	Enter a text string for the name of the user up to 63 characters. It cannot be one of the system defined roles (sysadmin, secadmin, netadmin, netoperator).
inherit *existing-role-name*	Enter the `inherit` keyword then specify the system defined role to inherit permissions from (sysadmin, secadmin, netadmin, netoperator).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information By default, access to commands are determined by the user's role (if defined) or by the user's privilege level. If the `aaa authorization role-only` command is enabled, then only the user's role is used.

Before you enable role-based only AAA authorization:

1. Locally define a system administrator user role.This will give you access to login with full permissions even if network connectivity to remote authentication servers is not available.
2. Configure login authentication on the console. This ensures that all users are properly identified through authentication no matter the access point
3. Specify an authentication method (RADIUS, TACACS+, or Local).
4. Specify authorization method (RADIUS, TACACS+ or Local).
5. Verify the configuration has been applied to the console or VTY line.

Related Commands login authentication, password, radius-server host, tacacs-server host

role

Changes command permissions for roles.

Syntax

```
role mode { { { addrole | deleterole } role-name } | reset } command
```

To delete access to a command, use the `no role` *mode role-name*

Parameters

mode	Enter one of the following keywords as the mode for which you are controlling access:

configure for CONFIGURATION mode

exec for EXEC mode

interface for INTERFACE modes

line for LINE mode

route-map for Route-map mode

router for Router mode

addrole	Enter the keyword `addrole` to add permission to the command. You cannot add or delete rights for the sysadmin role.
deleterole	Enter the keyword deleterole to remove access to the command. You cannot add or delete rights for the sysadmin role.
role-name	Enter a text string for the name of the user role up to 63 characters. These are 3 system defined roles you can modify: secadmin, netadmin, and netoperator.
reset	Enter the keyword `reset` to reset all roles back to default for that command.
command	Enter the command's keywords to assign the command to a certain access level. You can enter one or more keywords.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Related Commands

- userrole — creates user roles.

show role

Display information on permissions assigned to a command, including user role and/or permission level.

Syntax `show role mode {mode} {command}`

Parameters

command	Enter the command's keywords to assign the command to a certain access level. You can enter one or all of the keywords.
mode *mode*	Enter keyword then one of the following modes. • configure • exec

- interface
- line
- route-map
- router

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

Examples

```
DellEMC# show role mode configure username
Role access: sysadmin

DellEMC# show role mode configure management route
Role access: netadmin, sysadmin

DellEMC# show role mode configure management crypto-policy
Role access: secadmin, sysadmin
```

Related Commands

- userrole — create user roles.

show userroles

Display information on all defined user roles.

Syntax `show userroles`

Example

```
DellEMC# show userroles
Role          Inheritance  Modes
netoperator                Exec
netadmin                   Exec Config Interface Line Router IP
                           Route-map Protocol MAC
secadmin                   Exec Config
sysadmin                   Exec Config Interface Line Router IP
                           Route-map Protocol MAC
netoperator
testadmin     netadmin     Exec Config Interface Line Router IP
                           Route-map Protocol MAC
```

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL.

Example

```
DellEMC# show userroles
Role           Inheritance  Modes
netoperator                 Exec
netadmin                    Exec Config Interface Line Router IP
                            Route-map Protocol MAC
secadmin                    Exec Config
sysadmin                    Exec Config Interface Line Router IP
                            Route-map Protocol MAC
netoperator
testadmin      netadmin     Exec Config Interface Line Router IP
                            Route-map Protocol MAC
```

Related Commands

- userrole — create user roles.

userrole

Create user roles for the role-based security model.

Syntax `userrole` *`name`* `inherit` *`existing-role-name`*

To delete a role name, use the no userrole *name* command. Note that the reserved role names may not be deleted.

Parameters

name	Enter a text string for the name of the user up to 63 characters. It cannot be one of the system defined roles (sysadmin, secadmin, netadmin, netoperator).
inherit *existing-role-name*	Enter the `inherit` keyword then specify the system defined role to inherit permissions from (sysadmin, secadmin, netadmin, netoperator).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL.

Usage Information

Instead of using the system defined user roles, you can create a new user role that best matches your organization. When you create a new user role, you first inherit permissions from one of the system defined roles. Otherwise you would have to create a user role from scratch. You then restrict commands or add commands to that role. For information about this topic, See *Modifying Command Permissions for Roles*.

NOTE: You can change user role permissions on system pre-defined user roles or user-defined user roles.

Important Points to Remember

Consider the following when creating a user role:

- Only the system administrator and user-defined roles inherited from the system administrator can create roles and usernames. Only the system administrator, security administrator, and roles inherited from these can use the `role` command to modify command permissions. The security administrator and roles inherited by security administrator can only modify permissions for commands they already have access to.
- Make sure you select the correct role you want to inherit.

NOTE: If you inherit a user role, you cannot modify or delete the inheritance. If you want to change or remove the inheritance, delete the user role and create it again. If the user role is in use, you cannot delete the user role.

`role mode { { { addrole | deleterole } role-name } | reset }` command – Modifies (adds or deletes) command permissions for newly created user roles and system defined roles.

Related Commands

- **role** mode { { { **addrole | deleterole** } *role-name* } | **reset** } *command* — modifies (adds or deletes) command permissions for newly created user roles and system defined roles.

ICMP Vulnerabilities

The internet control message protocol (ICMP) is a network-layer internet protocol that provides message packets to report errors and other information regarding IP packet processing back to the source. Dell EMC Networking OS mainly addresses the following ICMP vulnerabilities:

- ICMP Mask Reply
- ICMP Timestamp Request
- ICMP Replies
- IP ID Values Randomness

You can configure the Dell EMC Networking OS to drop ICMP reply messages. When you configure the `drop icmp` command, the system drops the ICMP reply messages from the front end and management interfaces. By default, the Dell EMC

Networking OS responds to all the ICMP messages. You can configure the Dell EMC Networking OS to suppress the following ICMPv4 and ICMPv6 message types:

Table 7. Suppressed ICMPv4 message types

ICMPv4 Message Types
Echo reply (0)
All sub types of destination unreachable (3)
Source quench (4)
Redirect (5)
Router advertisement (9)
Router solicitation (10)
Time exceeded (11)
IP header bad (12)
Timestamp request (13)
Timestamp reply (14)
Information request (15)
Information reply (16)
Address mask request (17)
Address mask reply (18)

NOTE: The Dell EMC Networking OS does not suppress the ICMPv4 message type `Echo request (8)`.

Table 8. Suppressed ICMPv6 message types

ICMPv6 Message Types
Destination unreachable (1)
Time exceeded (3)
IPv6 header bad (4)
Echo reply (129)
Who are you request (139)
Who are you reply (140)
Mtrace response (200)
Mtrace messages (201)

NOTE:

The Dell EMC Networking OS does not suppress the following ICMPv6 message types:

- Packet too big (2)
- Echo request (128)
- Multicast listener query (130)
- Multicast listener report (131)
- Multicast listener done (132)
- Router solicitation (133)
- Router advertisement (134)
- Neighbor solicitation (135)
- Neighbor advertisement (136)

- Redirect (137)
- Router renumbering (138)
- MLD v2 listener report (143)
- Duplicate Address Request (157)
- Duplicate Address Confirmation (158)

drop icmp

Drops the ICMPv4 and ICMPv6 packets.

Syntax `drop {icmp | icmp6}`

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other Platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced on the S4810, S4820T, S3048–ON, S3100 Series, S4048–ON, S5000, S6000, S6000–ON, Z9500, Z9100–ON, S6100–ON, S6010–ON, S4048T–ON, C9000, and MXL.

Usage Information When the `drop icmp` feature is configured, the system drops the ICMP reply messages on the front end and management interfaces. By default, the Dell EMC Networking OS responds to all the ICMP messages.

NOTE: There is no separate CLI to enable IP ID randomness. By default, the IP ID in the kernel is randomized.

For more information on the ICMP message types, see the ICMP Commands section.

System Security Commands

The following section lists the system security commands.

boot-access password

Set a password for the boot loader.

Syntax `boot-access password [encryption-type] boot-password`

To remove the GRUB access password, use the `no boot-access password` command.

Parameters

encryption-type (OPTIONAL) Enter an encryption type for the boot password.
- `0` directs the system to store the password as clear text.
- `7` directs the system to store the password with a dynamic salt.

boot-password Enter the boot access password.

Defaults None

Command Modes CONFIGURATION.

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.

Version	Description
9.13(0.0)	Introduced on the S3048–ON, S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

If you enable the boot access password, the system prompts for a password when you access any option on the boot screen.

When you configure the boot access password, ensure that your password meets the following criteria:

- A minimum of eight characters in length
- A minimum of one lower case letter (a to z)
- A minimum of one upper case letter (A to Z)
- A minimum of one numeric character (0 to 9)
- A minimum of one special character including a space (" !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~")

If your password does not meet the criteria, the system does not accept your password.

When you upgrade the Dell EMC Networking OS image, ensure that you upgrade the boot loader.

CAUTION: After configuring the boot access password, save it to a secure location. If you forget it, you will not be able to access the options in the startup menu. If you forget both the boot access password and the enable password, the system may become inaccessible.

Example

```
DellEMC(conf)#boot-access password 7 Hg$7^5HMoiY%

**********************************************************************
    *  Warning - boot-access password will enable password protection in
 *
    *  GRUB. Keep it safe. Forgetting this password and the CLI password
 *
    *  may result in switch becoming inaccessible.
 *

**********************************************************************

Do you want to configure boot-access password? Proceed [yes/no]:yes
DellEMC(conf)#
```

generate hash

Generate a hash checksum for the given file or the startup configuration using the MD5, SHA1, or SHA256 algorithm.

Syntax

```
generate hash {md5 | sha1 | sha256} {flash://filename | startup-config}
```

Parameters

md5 | sha1 | sha256	Enter the keyword `md5`, `sha1`, or `sha256` to generate .
flash://*filename*	Enter the keyword `flash:` and enter the filename to generate the hash checksum for any file in the flash drive using the MD5, SHA1, or SHA256 algorithm.
startup-config	Enter the keyword `shartup-config` to generate the hash checksum for the startup configuration using the MD5, SHA1, or SHA256 algorithm.

Defaults None

Command Modes EXEC Privilege

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.

Version	Description
9.13(0.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, Z9500, C9010, MXL, and FN-IOM.

Usage Information

Use the `generate hash` command to generate a hash checksum for your startup configuration, and use the hash to verify using the `verified boot hash` command.

Example

```
DellEMC#generate hash md5 startup-config
MD5SUM(/f10/flash/startup-config) : f81812a64eea202c5b2ef782639bafc3
```

root-access password

Configure the root access password.

Syntax

`root-access password [encryption-type] root-password`

To reset to the default password, use the `no root-access password` command.

Parameters

encryption-type (OPTIONAL) Enter an encryption type for the root password that you enter.

- `0` directs the system to store the password as clear text.
- `7` directs the system to store the password with a dynamic salt.
- `9` directs the system to encrypt the clear text password and store the encrypted password in an inaccessible location.

root-password Enter the root password.

Defaults

Not configured

Command Modes

CONFIGURATION

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.
9.13(0.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, Z9500, C9010, MXL, and FN-IOM.

Usage Information

If you configure the `secure-cli` command on the system, the Dell EMC Networking OS resets any previously-configured root access password to the default root password without displaying any warning message. With the `secure-cli` command enabled on the system, the CONFIGURATION mode does not display the `root access password` option.

When you configure the root access password, ensure that your password meets the following criteria:

- A minimum of eight characters in length
- A minimum of one lower case letter (a to z)
- A minimum of one upper case letter (A to Z)
- A minimum of one numeric character (0 to 9)
- A minimum of one special character including a space (" !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~")

If your password does not meet the criteria, the system does not accept your password.

If you use encryption type 9, the system stores the clear text password in an inaccessible location on the system. The `show running-configuration` command does not display the password. This configuration is not portable between different systems.

Example

```
DellEMC)# show running-config  | g root
root-access password 7
f4dc0cb9787722dd1084d17f417f164cc7f730d4f03d4f0215294cbd899614e3
```

verified boot

Enable OS image hash validation during system startup.

Syntax `verified boot`

To disable OS image hash validation, use the `no verified boot` command.

Defaults Not configured

Command Modes CONFIGURATION

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.
9.13(0.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, MXL, and FN-IOM.

Usage Information When you reboot the system using the `reload` command, the system performs OS image verification on the primary boot image. You can enable boot image hash validation only for images on local flash partitions such as A: or B:.

Example

```
DellEMC(config)# verified boot
```

verified boot hash

Verify and store the hash value of the startup configuration.

Syntax `verified boot hash {system-image {A: | B:} | startup-config}` *`hash value`*

Parameters

system-image {A: | B:}	Enter the keyword `system-image` and `A:` or `B:`, depending on where the image is stored and then the hash value that is present on the iSupport page for your image.
startup-config	Enter the keyword `startup-config` and then the hash value for the startup configuration. You can get the hash value for the startup configuration using the `generate hash` command.
hash value	Enter the MD5, SHA1, or SHA256 hash.

Defaults None

Command Modes EXEC Privilege

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.
9.13(0.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, Z9500, C9010, MXL, and FN-IOM.

Usage Information Dell EMC Networking OS supports MD5, SHA1, and SHA256.

Example

```
DellEMC# verified boot hash system-image A:
619A8C1B7A2BC9692A221E2151B9DA9E
```

verified startup-config

Enable hash validation for the startup configuration during system startup.

Syntax `verified startup-config`

To disable hash validation for the startup configuration, use the `no verified startup-config` command.

Defaults Not configured

Command Modes CONFIGURATION

Command History

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the S5048F–ON.
9.13(0.0)	Introduced on the S3100 series, S3048–ON, S4048–ON, S4048T-ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, Z9500, C9010, MXL, and FN-IOM.

Example

```
DellEMC(config)# verified startup-config
```

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Service Provider Bridging

Service provider bridging is composed of virtual local area network (VLAN) Stacking, Layer 2 Protocol Tunneling, and Provider Backbone Bridging as described in the *Dell EMC Networking OS Configuration Guide Service Provider Bridging* section.

This section includes command line information (CLI) for the Dell EMC Networking OS Layer 2 Protocol Tunneling (L2PT). L2PT enables protocols to tunnel through an 802.1q tunnel.

Dell EMC Networking OS supports L2PT on Dell EMC Networking OS.

For more information, see VLAN Stacking, Spanning Tree Protocol (STP), and GARP VLAN Registration (GVRP).

Important Points to Remember

- L2PT is enabled at the interface VLAN-Stack VLAN level. For more information about Stackable VLAN (VLAN-Stacking) commands, see VLAN Stacking.
- The default behavior is to disable protocol packet tunneling through the 802.1q tunnel.
- Rate-limiting is required to protect against bridge protocol data units (BPDU) attacks.
- A port channel (including through link aggregation control protocol [LACP]) can be configured as a VLAN-Stack access or trunk port.
- Address resolution protocol (ARP) packets work as expected across the tunnel.
- Far-end failure detection (FEFD) works the same as with Layer 2 links.
- Protocols that use Multicast MAC addresses (for example, open shortest path first [OSPF]) work as expected and carry over to the other end of the VLAN-Stack VLAN.

Topics:

- debug protocol-tunnel
- protocol-tunnel
- protocol-tunnel destination-mac
- protocol-tunnel enable
- protocol-tunnel rate-limit
- show protocol-tunnel

debug protocol-tunnel

Enable debugging to ensure incoming packets are received and rewritten to a new MAC address.

Syntax

```
debug protocol-tunnel interface {in | out | both} [vlan vlan-id] [count value]
```

To disable debugging, use the `no debug protocol-tunnel interface {in | out | both} [vlan vlan-id] [count value]` command.

Parameters

interface Enter one of the following interfaces and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.

in | out | both Enter the keyword `in`, `out`, or `both` to debug incoming interfaces, outgoing interfaces, or both incoming and outgoing interfaces.

vlan *vlan-id* Enter the keyword `vlan` then the VLAN ID. The range is from 1 to 4094.

count *value* Enter the keyword `count` then the number of debug outputs. The range is from 1 to 100.

Defaults Debug disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series, and E-Series.
7.4.1.0	Introduced

protocol-tunnel

Enable protocol tunneling on a stacked (Q-in-Q) VLAN for specified protocol packets.

Syntax `protocol-tunnel {rate-limit` *rate*`| stp}`

To disable protocol tunneling for a Layer 2 protocol, use the `no protocol-tunnel` command.

Parameters

rate-limit *rate* Enter the keyword `rate-limit` followed by a number for the rate-limit for tunneled packets on the VMAN. The range is from 64 to 320.

	stp	Enter the keyword `stp` to enable protocol tunneling on a spanning tree, including STP, MSTP, RSTP, and PVST.

Defaults none

Command Modes CONF-IF-VLAN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.5.1.1	Added support for `802.1X`, `E-LMI`, `GMRP`, `GVRP`, `LLDP`, `LACP`, `MMRP`, `MVRP`, and `OAM 802.3ah` protocol traffic to the E-Series.
8.2.1.0	Introduced on the C-Series, E-Series, and E-Series.
7.4.1.0	Introduced

Example

```
DellEMC# conf
DellEMC(conf)#interface vlan 2
DellEMC(conf-if-vl-2)#vlan-stack compatible
DellEMC(conf-if-vl-2)#member Tw 1/45
DellEMC(conf-if-vl-2)#protocol-tunnel stp
DellEMC(conf-if-vl-2)#protocol-tunnel enable
```

Related Command

- show protocol-tunnel — displays tunneling information for all VLANs.

protocol-tunnel destination-mac

Overwrite the BPDU destination MAC address with a specific value.

Syntax `protocol-tunnel destination-mac` *`xstp address`*

Parameters	**stp**	Change the default destination MAC address used for L2PT to another value.

Defaults The default destination MAC is 01:01:e8:00:00:00.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series, and S-Series.
7.4.1.0	Introduced

Usage Information When you enable VLAN-Stacking, no protocol packets are tunneled.

Related Command

- show protocol-tunnel — displays tunneling information for all VLANs.

protocol-tunnel enable

Enable protocol tunneling globally on the system.

Syntax `protocol-tunnel enable`

To disable protocol tunneling, use the `no protocol-tunnel enable` command.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.4.1.0	Introduced

Usage Information Dell EMC Networking OS must have the default CAM profile with the default microcode before you enable L2PT.

protocol-tunnel rate-limit

Enable traffic rate limiting per box.

Syntax `protocol-tunnel rate-limit rate`

To reset the rate limit to the default, use the `no protocol-tunnel rate-limit rate` command.

Parameters

rate	Enter the rate in frames per second. The range is from 75 to 3000. The default is **75**.

Defaults **75** frames per second.

Command Modes CONF-IF-VLAN-STACK

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and E-Series. Maximum rate limit on E-Series reduced from 4000 to 3000.
7.4.1.0	Introduced

Example

```
DellEMC(conf-if-vl-2)# vlan-stack compatible
DellEMC(conf-if-vl-2-stack)#protocol-tunnle rate-limit 100 <<<<<<<< VLAN
stack mode
DellEMC(conf-if-vl-2-stack)#show config
!
interface Vlan 2
 no ip address
 mtu 1000
 vlan-stack compatible
 protocol-tunnel rate-limit 100
 shutdown
```

Related Commands

- show protocol-tunnel — displays tunneling information for all VLANs.
- show running-config — displays the current configuration.

show protocol-tunnel

Display protocol tunnel information for all or a specified VLAN-Stack VLAN.

Syntax `show protocol-tunnel [vlan vlan-id]`

Parameters

vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display information for the one VLAN. The range is from 1 to 4094.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series, and E-Series.
7.4.1.0	Introduced

Example

```
DellEMC# show protocol-tunnel
System Rate-Limit: 75 frames/second
VLAN  Protocols   Interface
1000  STP,PVST    Tf 1/7,Tf 1/6
```

```
1001  LLDP,GVRP    Tf 1/7,Tf 1/6
1002  MMRP,MVRP    Tf 1/7,Tf 1/6
1003  LACP,DOT1X   Tf 1/7,Tf 1/6
1004  OAM,PAUSE    Tf 1/7,Tf 1/6
1005  E-LMI        Tf 1/7,Tf 1/6
```

Example (Specific VLAN)

```
DellEMC# show protocol-tunnel vlan 2
System Rate-Limit: 1000 Frames/second
Interface  Vlan  Protocol(s)
Tw1/2       2     STP, PVST
DellEMC#
```

Related Commands

- show running-config — displays the current configuration.

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sFlow

The Dell EMC Networking OS supports sFlow commands.

The Dell EMC Networking OS sFlow monitoring system includes an sFlow Agent and an sFlow Collector.

- The sFlow Agent combines the flow samples and interface counters into sFlow datagrams and forwards them to the sFlow Collector.
- The sFlow Collector analyses the sFlow Datagrams received from the different devices and produces a network-wide view of traffic flows.

Important Points to Remember

- Dell EMC Networking recommends that the sFlow Collector be connected to the Dell EMC Networking chassis through a line card port rather than the route processor module (RPM) Management Ethernet port.
- Dell EMC Networking OS exports all sFlow packets to the sFlow Collector. A small sampling rate can equate to many exported packets. A backoff mechanism is automatically applied to reduce this amount. Some sampled packets may be dropped when the exported packet rate is high and the backoff mechanism is about to or is starting to take effect. The dropEvent counter, in the sFlow packet, is always zero.
- sFlow sampling is done on a per-port basis.
- Community list and local preference fields are not filled up in the extended gateway element in the sFlow datagram.
- The 802.1P source priority field is not filled up in the extended switch element in the sFlow datagram.
- Only Destination and Destination Peer AS numbers are packed in the dst-as-path field in the extended gateway element.
- If the packet being sampled is redirected using policy-based routing (PBR), the sFlow datagram may contain incorrect extended gateway/router information.
- sFlow does not support packing extended information for IPv6 packets. Only the first 128 bytes of the IPv6 packet is shipped in the datagram.
- The source virtual local area network (VLAN) field in the extended switch element is not packed if there is a routed packet.
- The destination VLAN field in the extended switch element is not packed if there is a multicast packet.
- The sFlow sampling functionality is supported only for egress traffic and not for ingress traffic.
- The maximum number of packets that can be sampled and processed per second is:
  - 7500 packets when no extended information packing is enabled.
  - 7500 packets when only extended-switch information packing is enabled (see sflow extended-switch enable).

Topics:

- sflow collector
- sflow enable (Global)
- sflow ingress-enable
- sflow extended-switch enable
- sflow max-header-size extended
- sflow polling-interval (Global)
- sflow polling-interval (Interface)
- sflow sample-rate (Global)
- sflow sample-rate (Interface)
- show sflow

sflow collector

Configure a collector device to which sFlow datagrams are forwarded.

Syntax

`sflow collector {ip-address | ipv6-address} agent-addr {ip-address | ipv6-address} [number [max-datagram-size number]] | [max-datagram-size number] [vrf management]`

To delete a configured collector, use the `no sflow collector {ip-address | ipv6-address} agent-addr {ipv4-address | ipv6-address} [number [max-datagram-size number]] | [max-datagram-size number] [vrf management]` command.

Parameters

sflow collector *ip-address* | *ipv6-address*	Enter the IP address of the collector in dotted decimal format for IPv4 or x:x:x:x::x format for IPv6. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
agent-addr *ip-address* | *ipv6-address*	Enter the keyword `agent-addr` followed by the sFlow agent IP address in dotted decimal format for IPv4 or x:x:x:x::x format for IPv6. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
number	(OPTIONAL) Enter the user datagram protocol (UDP) port number. The range is from 0 to 65535. The default is 6343.
max-datagram-size *number*	(OPTIONAL) Enter the keyword max-datagram-size then the size number in bytes. The range is from 400 to 1500. The default is **1400**.
vrf management	(OPTIONAL) Enter the keyword `vrf` followed by the keyword `management` to configure the collector device corresponding to the default VRF and the management VRF respectively.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.4.2.3	Added support for IPv6 sFlow collectors and agents on the E-series, C-Series, and S-Series.
8.4.1.1	Added support for IPv6 sFlow collectors and agents on the E-series.

Version	Description
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
6.5.1.0	Expanded the `no` form of the command to mirror the syntax used to configure.
6.2.1.1	Introduced on the E-Series.

Usage Information

You can configure up to two sFlow collectors (IPv4 or IPv6). If two collectors are configured, traffic samples are sent to both.

The sFlow agent address is carried in a field in SFlow packets and is used by the collector to identify the sFlow agent.

In sFlow, the agent address is a single invariant IPv4 or IPv6 address used to identify the agent to the collector. It is usually assigned the address of a loopback interface on the agent, which provides invariance. The agent address is carried as a field in the payload of the sFlow packets.

As part of the sFlow-MIB, if the SNMP request originates from a configured collector, Dell EMC Networking OS returns the corresponding configured agent IP in the MIB requests. Dell EMC Networking OS checks to ensure that two entries are not configured for the same collector IP with a different agent IP. Should that happen, Dell EMC Networking OS generates the following error: `%Error: Different agent-addr attempted for an existing collector.`

Example

```
DellEMC(conf)# sflow collector 10.1.1.25 agent-addr 10.1.1.10 vrf
management
```

sflow enable (Global)

Enable sFlow globally.

Syntax `sflow enable`

To disable sFlow, use the `no sflow enable` command.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information sFlow is disabled by default. In addition to this command, sFlow needs to be enable on individual interfaces where sFlow sampling is desired.

Related Commands
- sflow enable (Interface) — enable sFlow on interfaces.

sflow ingress-enable

Enable sFlow ingress on interfaces.

Syntax
```
sflow ingress-enable
```
To disable sFlow, use the `no sflow ingress enable` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced on the S-Series, Z-Series, and MXL switch.
9.2(1.0)	Introduced on the Z9500.

Usage Information When you enable ingress sFlow on an interface, flow sampling is done on any incoming traffic.

NOTE: After a physical port is a member of a LAG, it inherits the sFlow configuration from the LAG port.

Related Commands

- sflow enable (Global) — turn sFlow globally.

sflow extended-switch enable

Enable packing information on a switch only.

Syntax

```
sflow extended-switch enable
```

To disable packing information, use the `no sflow extended-switch [enable]` command.

Parameters

enable	Enter the keyword `enable` to enable global extended information.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information

Dell EMC Networking OS enhances the sflow implementation for real time traffic analysis on the E-Series to provide extended gateway information in cases where the destination IP addresses are learned by different routing protocols and for cases where the destination is reachable over ECMP.

Related Commands

- show sflow — displays the sFlow configuration.

sflow max-header-size extended

Set the maximum header size of a packet to 256 bytes.

Syntax

```
sflow max-header-size extended
```

To reset the maximum header size of a packet, use the `[no] sflow max-header-size extended` command.

Parameters

extended	Enter the keyword `extended` to copy 256 bytes from the sample packets to sFlow datagram.

Defaults **128** bytes

Command Modes CONFIGURATION

INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Introduced on the S Series and Z Series switches.

Example

```
DellEMC(conf)# sflow max-header-size extended
```

sflow polling-interval (Global)

Set the sFlow polling interval at a global level.

Syntax

```
sflow polling-interval interval value
```

To return to the default, use the `no sflow polling-interval interval` command.

Parameters

interval value	Enter the interval value in seconds. The range is from 15 to 86400 seconds. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information The polling interval for an interface is the maximum number of seconds between successive samples of counters sent to the collector. This command changes the global default counter polling (20 seconds) interval. You can configure an interface to use a different polling interval.

Related Commands

- sflow polling-interval (Interface) — sets the polling interval for an interface.

sflow polling-interval (Interface)

Set the sFlow polling interval at an interface (overrides the global-level setting.)

Syntax `sflow polling-interval` *`interval value`*

To return to the default, use the `no sflow polling-interval` *`interval`* command.

Parameters

interval value Enter the interval value in seconds. The range is from 15 to 86400 seconds. The default is **the global counter polling interval**.

Defaults The same value as the current global default counter polling interval.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information This command sets the counter polling interval for an interface.

Related Commands
- sflow polling-interval (Global) — globally sets the polling interval.

sflow sample-rate (Global)

Change the global default sampling rate.

Syntax `sflow sample-rate value`

To return to the default sampling rate, use the `no sflow sample-rate` command.

Parameters

value	Enter the sampling rate value. For the C-Series and S-Series, the range is from 256 to 8388608 packets Enter values in powers of 2 only; for example, 4096, 8192, 16384, and so on. The default is **32768 packets**.

Defaults **32768 packets**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
7.4.1.0	Introduced on the E-Series.

Usage Information Sample-rate is the average number of packets skipped before the sample is taken. This command changes the global default sampling rate. You can configure an interface to use a different sampling rate than the global sampling rate. If the value entered is not a correct power of 2, the command generates an error message with the previous and next power of 2 value. Select one of these two packet numbers and re-enter the command.

Related Commands

- sflow sample-rate (Interface) — changes the interface sampling rate.

sflow sample-rate (Interface)

Change the interface default sampling rate.

Syntax `sflow sample-rate value`

To return to the default sampling rate, use the `no sflow sample-rate` command.

Parameters

value	Enter the sampling rate value. For the C-Series and S-Series, the range is from 256 to 8388608 packets. Enter values in powers of 2 only; for example, 4096, 8192, 16384, etc. The default is **32768** packets.

Defaults The Global default sampling.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

This command changes the sampling rate for an interface. By default, the sampling rate of an interface is set to the same value as the current global default sampling rate. If the value entered is not a correct power of 2, the command generates an error message with the previous and next power-of-2 value. Select one of these two number and re-enter the command.

Related Commands

- sflow sample-rate (Global) — changes the sampling rate globally.

show sflow

Display the current sFlow configuration.

Syntax

```
show sflow [interface]
```

Parameters

interface (OPTIONAL) Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For the Management interface on the, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100-ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100-ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on S-Series Stacking.
8.1.1.0	Introduced on the E-Series.
7.7.1.0	Introduced on the S-Series.
7.6.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

The dropEvent counter (sFlow samples dropped due to sub-sampling) shown in the following example always displays a value of zero.

Example

```
DellEMC#show sflow
sFlow services are enabled
Egress Management Interface sFlow services are disabled
Global default sampling rate: 32768
Global default counter polling interval: 20
Global default extended maximum header size: 128 bytes
Global extended information enabled: none
1 collectors configured
Collector IP addr: 100.1.1.1, Agent IP addr: 1.1.1.2, UDP port: 6343
VRF: Default
0 UDP packets exported
0 UDP packets dropped
0 sFlow samples collected

stack-unit 1 Port set 1
  Tf 1/1: configured rate 16384, actual rate 16384   <<< sampling rate
based on line speed if global sampling rate is default
DellEMC#
```

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Simple Network Management Protocol (SNMP) and Syslog

This section contains commands to configure and monitor the simple network management protocol (SNMP) v1/v2/v3 and Syslog. Both features are supported on Dell EMC Networking OS.

Topics:

- SNMP Commands
- Syslog Commands

SNMP Commands

The following SNMP commands are available in the Dell EMC Networking OS.

The simple network management protocol (SNMP) is used to communicate management information between the network management stations and the agents in the network elements. Dell EMC Networking OS supports SNMP versions 1, 2c, and 3, supporting both read-only and read-write modes. Dell EMC Networking OS sends SNMP traps, which are messages informing an SNMP management system about the network. Dell EMC Networking OS supports up to 16 SNMP trap receivers.

Important Points to Remember

- Typically, 5-second timeout and 3-second retry values on an SNMP server are sufficient for both LAN and WAN applications. If you experience a timeout with these values, the recommended best practice on Dell EMC Networking switches (to accommodate their high port density) is to increase the timeout and retry values on your SNMP server to the following:
  - SNMP Timeout — greater than 3 seconds.
  - SNMP Retry count — greater than 2 seconds.
- If you want to query an E-Series switch using SNMP v1/v2/v3 with an IPv6 address, configure the IPv6 address on a non-management port on the switch.
- If you want to send SNMP v1/v2/v3 traps from an E-Series using an IPv6 address, use a non-management port.
- SNMP v3 informs are not currently supported with IPv6 addresses.
- If you are using access control lists (ACLs) in an SNMP v3 configuration, group ACL overrides user ACL if the user is part of that group.
- SNMP operations are not supported on a virtual local area network (VLAN).

show snmp

Display the status of SNMP network elements.

Syntax `show snmp`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example

```
DellEMC# show snmp
  32685 SNMP packets input
      0 Bad SNMP version errors
      0 Unknown community name
      0 Illegal operation for community name supplied
      0 Encoding errors
  96988 Number of requested variables
      0 Number of altered variables
  31681 Get-request PDUs
    968 Get-next PDUs
      0 Set-request PDUs
  61727 SNMP packets output
      0 Too big errors (Maximum packet size 1500)
      9 No such name errors
      0 Bad values errors
      0 General errors
  32649 Response PDUs
  29078 Trap PDUs
DellEMC#
```

Related Commands

- snmp-server community — enables the SNMP and set community string.

show snmp engineID

Display the identification of the local SNMP engine and all remote engines that are configured on the router.

Syntax `show snmp engineID`

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Example

```
DellEMC# show snmp engineID
Local SNMP engineID: 0000178B02000001E80214A8
Remote Engine ID        IP-addr      Port
80001F88043132333435    172.31.1.3   5009
80001F88043938373635    172.31.1.3   5008
DellEMC#
```

Related Commands

- snmp-server engineID — configures local and remote SNMP engines on the router.

show snmp group

Display the group name, security model, status, and storage type of each group.

Syntax

```
show snmp group
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following Example displays a group named *ngroup*. The *ngroup* has a security model of version 3 (v3) with authentication (`auth`), the read and notify name is *nview* with no write view name specified, and finally the row status is active.

Example

```
DellEMC# show snmp group
groupname: v1v2creadg     security model: v1
readview : v1v2cdefault   writeview: no write view specified
notifyview: v1v2cdefault  context: no context specified
row status: active
DellEMC#
```

Related Commands

- snmp-server group — configures an SNMP server group.

show snmp supported-mibs

Display the list of SNMP MIBs supported by the platform.

Syntax

```
show snmp supported-mibs
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the C9010, FN-IOM, MIOA, MXL, S3048–ON, S3100, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010–ON, S6100–ON and Z9100–ON.

Example

```
DellEMC#show snmp supported-mibs
MIB                                          OID
-------------------------------------------------------------
RFC1155-SMI                                  -
RFC-1212                                     -
SNMPv2-SMI                                   -
SNMPv2-TC                                    -
SNMPv2-CONF                                  -
INET-ADDRESS-MIB                             -
IANAifType-MIB                               -
IANA-ADDRESS-FAMILY-NUMBERS-MIB              -
IANA-RTPROTO-MIB                             -
```

```
IPV6-FLOW-LABEL-MIB                     -
SNMPv2-MIB                              1.3.6.1.2.1
IF-MIB                                  1.3.6.1.2.1.31
IP-MIB                                  1.3.6.1.2.1.48
TCP-MIB                                 1.3.6.1.2.1.49
UDP-MIB                                 1.3.6.1.2.1.50
RFC1213-MIB                             -
EtherLike-MIB                           1.3.6.1.2.1.35
SNMP-FRAMEWORK-MIB                      1.3.6.1.6.3.10
RADIUS-AUTH-CLIENT-MIB                  1.3.6.1.2.1.67.1.2
SNMP-MPD-MIB                            1.3.6.1.6.3.11
RMON-MIB                                1.3.6.1.2.1.16
--More--
```

show snmp supported-traps

Display the list of SNMP traps supported by the platform.

Syntax `show snmp supported-traps`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the C9010, FN-IOM, MIOA, MXL, S3048–ON, S3100, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010–ON, S6100–ON and Z9100–ON.

Example

```
DellEMC#show snmp supported-traps
TRAP                                        OID
-------------------------------------------------------------------------
COLDSTART                                   1.3.6.1.6.3.1.1.5.1
WARMSTART                                   1.3.6.1.6.3.1.1.5.2
LINKDOWN                                    1.3.6.1.6.3.1.1.5.3
LINKUP                                      1.3.6.1.6.3.1.1.5.4
Authenticationfailure                       1.3.6.1.6.3.1.1.5.5
dellNetIfAlarmHighBer                       1.3.6.1.4.1.6027.3.11.1.4.1.1
dellNetIfAlarmHighBerClr                    1.3.6.1.4.1.6027.3.11.1.4.1.2
dellNetSysAlarmCardDown                     1.3.6.1.4.1.6027.3.26.1.5.1.1
dellNetSysAlarmCardUp                       1.3.6.1.4.1.6027.3.26.1.5.1.2
dellNetSysAlarmCardOffline                  1.3.6.1.4.1.6027.3.26.1.5.1.3
dellNetSysAlarmCardMismatch                 1.3.6.1.4.1.6027.3.26.1.5.1.4
dellNetSysAlarmRpmUp                        1.3.6.1.4.1.6027.3.26.1.5.1.5
dellNetSysAlarmRpmDown                      1.3.6.1.4.1.6027.3.26.1.5.1.6
dellNetSysAlarmPowersupplyDown              1.3.6.1.4.1.6027.3.26.1.5.1.7
dellNetSysAlarmMinorTemperatureHigh         1.3.6.1.4.1.6027.3.26.1.5.1.8
dellNetSysAlarmMajorTemperatureHigh         1.3.6.1.4.1.6027.3.26.1.5.1.9
dellNetSysAlarmFanTrayDown                  1.3.6.1.4.1.6027.3.26.1.5.1.10
dellNetSysAlarmPowersupplyClear             1.3.6.1.4.1.6027.3.26.1.5.1.11
dellNetSysAlarmMinorTemperatureClear        1.3.6.1.4.1.6027.3.26.1.5.1.12
dellNetSysAlarmMajorTemperatureClear        1.3.6.1.4.1.6027.3.26.1.5.1.13
dellNetSysAlarmFanTrayClear                 1.3.6.1.4.1.6027.3.26.1.5.1.14
--More--
```

show snmp user

Display the information configured on each SNMP user name.

Syntax `show snmp user`

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example

```
DellEMC#show snmp user
  User name: v1v2creadu
  Engine ID: 0000178B02000001E80214A8
  storage-type: nonvolatile     active
  Authentication Protocol: None
  Privacy Protocol: None

DellEMC#
```

snmp ifmib ifalias long

Display the entire description string through the Interface MIB, which would be truncated otherwise to 63 characters.

Syntax `snmp ifmib ifalias long`

Defaults Interface description truncated beyond 63 characters.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
unknown	Introduced on the E-Series.

Example

```
DellEMC#config!------command run on host connected to switch:
--------------!
> snmpwalk -c public 10.10.10.130 .1.3.6.1.2.1.31 | grep -i alias | more
IF-MIB::ifAlias.134530304 = STRING: This is a port connected to Router2.
This
is a port connected to
IF-MIB::ifAlias.134792448 = STRING:

!------command run on Dell EMC Networkingswitch: --------------!
DellEMC#snmp ifmib ifalias long

!------command run on server connected to switch: --------------!
> snmpwalk -c public 10.10.10.130 .1.3.6.1.2.1.31 | grep -i alias | more
IF-MIB::ifAlias.134530304 = STRING: This is a port connected to Router2.
This
is a port connected to Router2. This is a port connected to Router2.
This is a
port connected to Router2. This is a port connected to Router2.
IF-MIB::ifAlias.134792448 = STRING:
DellEMC#config
```

snmp-server community

Configure a new community string access for SNMPv1 v2 and v3.

Syntax

`snmp-server community` *community-name* `{ro | rw} [ipv6` *ipv6-access-list-name* `[ipv6` *ipv6-access-list-name* `|` *access-list-name* `| security-name` *name*`] | security-name` *name* `[ipv6` *ipv6-access-list-name* `|` *access-list-name* `| security-name` *name*`] |` *access-list-name* `[ipv6` *ipv6-access-list-name* `|` *access-list-name* `| security-name` *name*`]]]`

To remove access to a community, use the `no snmp-server community` *community-string* `{ro | rw} [security-name` *name* `[`*access-list-name* `| ipv6` *access-list-name* `|` *access-list-name* `ipv6` *access-list-name*`]]` command.

Parameters

community-name	Enter a text string (up to 20 characters long) to act as a password for SNMP.
ro	Enter the keyword `ro` to specify read-only permission.
rw	Enter the keyword `rw` to specify read-write permission.

ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then an IPv6 ACL name (a string up to 16 characters long).
security-name *name*	(Optional) Enter the keywords `security-name` then the security name as defined by the community MIB.
access-list-name	(Optional) Enter a standard IPv4 access list name (a string up to 16 characters long).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information The following example configures a community named *public* that is mapped to the security named *guestuser* with Read Only (`ro`) permissions.

The `security-name` parameter maps the community string to an SNMPv3 user/security name as defined by the community MIB.

If a community string is configured without a `security-name` (for example, `snmp-server community public ro`), the community is mapped to a default security-name/group:

- `v1v2creadu / v1v2creadg` — maps to a community with `ro` (read-only) permissions.
- `v1v2cwriteu/ v1v2cwriteg` — maps to a community with `rw` (read-write) permissions.

The `community-name` parameter indexes this command.

If you do not configure the `snmp-server community` command, you cannot query SNMP data. Only Standard IPv4 ACL and IPv6 ACL is supported in the optional `access-list-name`.

The command options `ipv6`, `security-name`, and `access-list-name` are recursive. In other words, each option can, in turn, accept any of the three options as a sub-option, and each of those sub-options can accept any of the three sub-options as a sub-option, and so forth. The second Example shows the creation of a standard IPv4 ACL called *snmp-ro-acl* and then assigning it to the SNMP community *guest*.

NOTE: For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP; TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs, port rules are not valid for SNMP.

Example

```
DellEMC# config
DellEMC(conf)# snmp-server community public ro
DellEMC(conf)# snmp-server community guest ro security-name guestuser
DellEMC(conf)#
```

Example

```
DellEMC(conf)# ip access-list standard snmp-ro-acl
DellEMC(config-std-nacl)#seq 5 permit host 10.10.10.224
DellEMC(config-std-nacl)#seq 10 deny any count
!
DellEMC(conf)# snmp-server community guest ro snmp-ro-acl
DellEMC(conf)#
```

Related Commands

- ip access-list standard — names (or selects) a standard access list to filter based on IP address.
- ipv6 access-list — configures an access list based on IPv6 addresses or protocols.
- show running-config — displays the current SNMP configuration and defaults.

snmp-server contact

Configure contact information for troubleshooting this SNMP node.

Syntax `snmp-server contact text`

To delete the SNMP server contact information, use the `no snmp-server contact` command.

Parameters

text	Enter an alphanumeric text string, up to 55 characters long.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
E-Series legacy command	

snmp-server enable traps

Enable SNMP traps.

Syntax

`snmp-server enable traps [notification-type] [notification-option]`

To disable traps, use the `no snmp-server enable traps [notification-type] [notification-option]` command.

Parameters

notification-type Enter the type of notification from the following list:

- `bgp` — Enable BGP state change traps.
- `config` — Enable `copy-config` trap.
- `ecmp` — Enable ECMP traps.
- `entity` — Enable entity change traps.
- `envmon` — Enable SNMP environmental monitor traps.
- `ets` — Enable ETS traps.
- `fips` — Enable FIP Snooping state change traps.
- `isis` — Enable ISIS adjacency change traps.
- `lacp` — Enable LACP state change traps.
- `mac` — Enable MAC address notification traps.
- `pfc` — Enable PFC traps.
- `snmp` — Enable SNMP traps.
- `stp` — Enable 802.1d state change traps.
- `vlt` — Enable VLT traps.
- `vrrp` — Enable VRRP state change traps.
- `xstp` — Enable 802.1s, 802.1w, and PVST+ state change traps.

notification-option For the `envmon` notification-type, enter one of the following optional parameters:

- `cam-utilization`
- `fan`
- `supply`
- `temperature`

For the `snmp` notification-type, enter one of the following optional parameters:

- `authentication`
- `coldstart`
- `linkdown`
- `linkup`
- `syslog-reachable`
- `syslog-unreachable`

Defaults Not enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced MAC address notification traps on all the Dell EMC Networking OS platforms.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Added the following two SNMP notification options: `syslog-reachable` and `syslog-unreachable`.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Added support for copy-config and ECMP traps.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.1.0	Added support for VRRP traps.
7.6.1.0	Added support for STP and xSTP traps. Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

Dell EMC Networking OS supports up to 16 SNMP trap receivers.

If you do not configure this command, traps that controlled by this command are not sent. If you do not specify a `notification-type` and `notification-option`, all traps are enabled.

Related Commands

- snmp-server community — enables SNMP and sets the community string.

snmp-server engineID

Configure the name for both the local and remote SNMP engines on the router.

Syntax

`snmp-server engineID [local` *`engineID`*`] [remote` *`ip-address`* `vrf` *`vrf-name`* `udp-port` *`port-number engineID`*`]`

To return to the default, use the `no snmp-server engineID [local` *`engineID`*`] [remote` *`ip-address`* `vrf` *`vrf-name`* `udp-port` *`port-number engineID`*`]` command.

Parameters

local *engineID*

Enter the keyword `local` followed by the engine ID number that identifies the copy of the SNMP on the local device.

Format (as specified in RFC 3411): 12 octets.

- The first four octets are set to the private enterprise number.
- The remaining eight octets are the MAC address of the chassis.

remote *ip-address*	Enter the keyword `remote` followed by the IP address that identifies the copy of the SNMP on the remote device.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF that is used to reach the device. **NOTE:** Use this attribute to specify the VRF that is used by the SNMP engine to reach the device. If no VRF is specified, then the default VRF is used.
udp-port *port-number engineID*	Enter the keywords `udp-port` followed by the user datagram protocol (UDP) port number on the remote device. The range is from 0 to 65535. The default is **162**.

Defaults As above.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information Changing the value of the SNMP Engine ID has important side effects. A user's password (entered on the command line) is converted to a message digest algorithm (MD5) or secure hash algorithm (SHA) security digest. This digest is based on both the password and the local Engine ID. The command line password is then destroyed, as required by RFC 2274. Because of this deletion, if the local value of the Engine ID changes, the security digests of SNMPv3 users is invalid and the users will have to be reconfigured.

For the remote Engine ID, the host IP and UDP port are the indexes to the command that are matched to either overwrite or remove the configuration.

Related Commands

- show snmp engineID — displays the SNMP engine and all the remote engines that are configured on the router.
- show running-config snmp — displays the SNMP running configuration.

snmp-server group

Configure a new SNMP group or a table that maps SNMP users to SNMP views.

Syntax

`snmp-server group [group_name {1 | 2c | 3 {auth | noauth | priv}}] [read name] [write name] [notify name] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]]`

To remove a specified group, use the `no snmp-server group [group_name {v1 | v2c | v3 {auth | noauth | priv}}] [read name] [write name] [notify name] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]]` command.

Parameters

group_name	Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults): • `v1v2creadg` — maps to a community/security-name with `ro` permissions. • `1v2cwriteg` — maps to a community/security-name `rw` permissions.
1 | 2c | 3	(OPTIONAL) Enter the security model version number (`1`, `2c`, or `3`): • `1` is the least secure version. • `3` is the most secure of the security modes. • `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed. The default is **1**.
auth	(OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.
noauth	(OPTIONAL) Enter the keyword `noauth` to specify no authentication of a packet.
priv	(OPTIONAL) Enter the keyword `priv` to specify both authentication and then scrambling of the packet.
read *name*	(OPTIONAL) Enter the keyword `read` then a name (a string of up to 20 characters long) as the read view name. The default is **GlobalView** and is assumed to be every object belonging to the internet (1.3.6.1) OID space.
write *name*	(OPTIONAL) Enter the keyword `write` then a name (a string of up to 20 characters long) as the write view name.
notify *name*	(OPTIONAL) Enter the keyword `notify` then a name (a string of up to 20 characters long) as the notify view name.
access *access-list-name*	(Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).
ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then the IPv6 access list name (a string up to 16 characters long).
access-list-name* ipv6 *access-list-name	(Optional) Enter both an IPv4 and IPv6 access list name.

Defaults

As above.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.2	Added support for the `access` parameter.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following example specifies the group named *harig* as a version 3 user requiring both authentication and encryption and read access limited to the read named *rview*.

NOTE: The number of configurable groups is limited to 16 groups.

Example

```
DellEMC# conf
DellEMC(conf)# snmp-server group harig 3 priv read rview
DellEMC#
```

Related Commands

- show snmp group — displays the group name, security model, view status, and storage type of each group.
- show running-config — displays the SNMP running configuration.

snmp-server host

Configure the recipient of an SNMP trap operation.

Syntax

`snmp-server host` *`ip-address | ipv6-address`* `[vrf` *`vrf-name`*`] traps | informs [version 1 | 2c | 3] [auth | no auth | priv]` [*`community-string`*] `[udp-port` *`port-number`*] [*`notification-type`*]

To remove the SNMP host, use the `no snmp-server host` *`ip-address`* `[vrf` *`vrf-name`*`] traps | informs [version 1 | 2c | 3] [auth | noauth | priv]` [*`community-string`*] `[udp-port` *`number`*] [*`notification-type`*] command.

Parameters

ip-address — Enter the keyword `host` then the IP address of the host (configurable hosts is limited to 16).

ipv6-address — Enter the keyword host then the IPv6 address of the host in the x:x:x:x::x format.

NOTE: The :: notation specifies successive hexadecimal fields of zero.

vrf *vrf-name* — Enter the keyword `vrf` and then the name of the VRF that the SNMP server uses to connect to the host.

NOTE: You can use this attribute to inform the SNMP engine about the vrf instance to be used to reach the corresponding remote host to send Trap or Inform message. If no VRF is specified, then the default VRF is used.

traps (OPTIONAL) Enter the keyword `traps` to send trap notifications to the specified host. The default is **traps**.

informs (OPTIONAL) Enter the keyword `informs` to send inform notifications to the specified host. The default is **traps**.

version 1 | 2c | 3 (OPTIONAL) Enter the keyword version to specify the security model then the security model version number `1`, `2c`, or `3`:

- Version `1` is the least secure version.
- Version `3` is the most secure of the security modes.
- Version `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed.

The default is version **1**.

auth (OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.

noauth (OPTIONAL) Enter the keyword `noauth` to specify no authentication of a packet.

priv (OPTIONAL) Enter the keyword `priv` to specify both authentication and then scrambling of the packet.

community-string Enter a text string (up to 20 characters long) as the name of the SNMP community.

NOTE: For version 1 and version 2c security models, this string represents the name of the SNMP community. The string can be set using this command; however, Dell EMC Networking OS recommends setting the community string using the `snmp-server community` command before executing this command. For version 3 security model, this string is the USM user security name.

udp-port *port-number* (OPTIONAL) Enter the keywords `udp-port` followed by the port number of the remote host to use. The range is from 0 to 65535. The default is **162**.

notification-type (OPTIONAL) Enter one of the following keywords for the type of trap to be sent to the host:

- `bgp` — Enable BGP state change traps.
- `ecfm` — Enable ECFM state change traps.
- `entity` — Enable entity change traps.
- `envmon` — Enable SNMP environmental monitor traps.
- `eoam` — Enable EOAM state change traps
- `ets` — Enable ets traps
- `fips` — Enable FIP Snooping state change traps
- `lacp` — Enable LACP state change traps.
- `mac` — Enable MAC address notification traps.
- `isis` — Enable ISIS adjacency change traps.
- `pfc` — Enable pfc traps.
- `snmp` — Enable SNMP trap.
- `stp` — Enable 802.1d state change traps.
- `vlt` — Enable VLT traps.
- `vrrp` — Enable VRRP state change traps.
- `xstp` — Enable 802.1s, 802.1w, and PVST+ state change traps.

The default is all trap types are sent to host.

Defaults As above.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.12(0.0)	Introduced MAC address notification traps on all the Dell EMC Networking OS platforms.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148 and S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.1(0.0)	Added support for config and ecmp traps.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.1.0	Added support for VRRP traps.
7.6.1.0	Added support for STP and xSTP notification types. Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information To configure the router to send SNMP notifications, enter at least `one snmp-server host` command. If you enter the command with no keywords, all trap types are enabled for the host. If you do not enter an `snmp-server host` command, no notifications are sent.

In order to enable multiple hosts, issue a separate `snmp-server host` command for each host. You can specify multiple notification types in the command for each host.

When multiple `snmp-server host` commands are given for the same host and type of notification (trap or inform), each succeeding command overwrites the previous command. Only the last `snmp-server host` command will be in effect. For example, if you enter an `snmp-server host inform` command for a host and then enter another `snmp-server host inform` command for the same host, the second command replaces the first command.

The `snmp-server host` command is used with the `snmp-server enable` command. Use the `snmp-server enable` command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one `snmp-server enable` command and the `snmp-server host` command for that host must be enabled.

NOTE: For v1 / v2c trap configuration, if the community-string is not defined using the `snmp-server community` command prior to using this command, the default form of the `snmp-server community` command automatically is configured with the community-name the same as specified in the `snmp-server host` command.

NOTE: You must configure notify option for the SNMPv3 traps to work.

Configuring Informs

To send an inform, use the following steps:

1. Configure a remote engine ID.
2. Configure a remote user.
3. Configure a group for this user with access rights.
4. Enable traps.
5. Configure a host to receive informs.

Related Commands

- snmp-server enable traps — enables SNMP traps.
- snmp-server community — configures a new community SNMPv1 or SNMPv2c.

snmp-server location

Configure the location of the SNMP server.

Syntax `snmp-server location text`

To delete the SNMP location, use the `no snmp-server location` command.

Parameters

text	Enter an alpha-numeric text string, up to 55 characters long.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

snmp-server packetsize

Set the largest SNMP packet size permitted. Wen the SNMP server is receiving a request or generating a reply, use the `snmp-server packetsize global configuration` command.

Syntax `snmp-server packetsize` *byte-count*

Parameters

byte-count	Enter one of the following values 8, 16, 24 or 32. Packet sizes are 8000 bytes, 16000 bytes, 32000 bytes, and 64000 bytes.

Defaults **8**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

snmp-server trap-source

Configure a specific interface as the source for SNMP traffic.

Syntax `snmp-server trap-source` *interface*

To disable sending traps out a specific interface, use the `no snmp trap-source` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.

- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For a port channel interface, enter the keywords `port-channel` then a number.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults The IP address assigned to the management interface is the default.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810
8.5.1.0	Added support for 4-port 40G line cards.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information To enable this `snmp-server trap-source` command, configure an IP address on the interface and enable the interface configured as an SNMP trap source.

Related Commands
- snmp-server community — sets the community string.

snmp-server user

Configure a new user to an SNMP group.

Syntax
```
snmp-server user name {group_name remote ip-address vrf vrf-name udp-port
port-number} [1 | 2c | 3] [encrypted] [auth {md5 | sha} auth-password]
```

`[priv {des56 | aes128} priv password] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]`

To remove a user from the SNMP group, use the `no snmp-server user name {group_name remote ip-address udp-port port-number} [1 | 2c | 3] [encrypted] [auth {md5 | sha} auth-password] [priv {des56 | aes128} priv password] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]` command.

Parameters

name	Enter the name of the user (not to exceed 20 characters), on the host that connects to the agent.
group_name	Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults): • `v1v2creadu` — maps to a community with `ro` permissions. • `1v2cwriteu` — maps to a community `rw` permissions.
remote *ip-address*	Enter the keywords `udp-port` then the user datagram protocol (UDP) port number on the remote device. The range is from 0 to 65535. The default is **162**.
vrf *vrf-name*	Enter the keywords `vrf` and then the name of the VRF this is used to connect to the SNMP server. **NOTE:** Use this attribute to specify a VRF name that is used to connect to the remote host. If no VRF is specified, then the default VRF is used.
udp-port *port-number*	Enter the keywords `udp-port` then the UDP (User Datagram Protocol) port number on the remote device. The range is from 0 to 65535. The default is **162**.
1 | 2c | 3	(OPTIONAL) Enter the security model version number (`1`, `2c`, or `3`): • `1` is the least secure version. • `3` is the most secure of the security modes. • `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed. The default is **1**.
encrypted	(OPTIONAL) Enter the keyword `encrypted` to specify the password appear in encrypted format (a series of digits, masking the true characters of the string).
auth	(OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.
md5 | sha	(OPTIONAL) Enter the keyword `md5` or `sha` to designate the authentication level. • `md5` — Message Digest Algorithm • `sha` — Secure Hash Algorithm
auth-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the agent to receive packets from the host. Minimum: eight characters long.
priv	(OPTIONAL) Enter the keywords `priv` to initiate a privacy authentication level setting.
des56 | aes128	(OPTIONAL) Enter the keyword `des56` or `aes128` to specify the encryption mode. • `aes128` — Use 128 bit AES algorithm in CFB mode for encryption. • `des56` — Use 56 bit DES algorithm in CBC mode for encryption.
priv password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the host to encrypt the contents of the message it sends to the agent. Minimum: eight characters long.
access *access-list-name*	(Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).

ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then the IPv6 access list name (a string up to 16 characters long).
access-list-name ipv6 access-list-name	(Optional) Enter both an IPv4 and IPv6 access list name.

Defaults As above.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6.(0.0)	Added aes 128 encryption algorithm parameter.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Usage Information

NOTE: For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP. TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs port rules are not valid for SNMP.

No default values exist for authentication or privacy algorithms and no default password exists. If you forget a password, you cannot recover it; the user must be reconfigured. You can specify either a plain-text password or an encrypted cypher-text password. In either case, the password is stored in the configuration in an encrypted form and displayed as encrypted in the `show running-config` command.

If you have an encrypted password, you can specify the encrypted string instead of the plain-text password. The following command is an Example of how to specify the command with an encrypted string.

NOTE: The number of configurable users is limited to 16.

Example

```
DellEMC# snmp-server user privuser v3group v3 encrypted auth md5
9fc53d9d908118b2804fe80e3ba8763d priv des56
d0452401a8c3ce42804fe80e3ba8763d
```

Usage Information The following command is an example of how to enter a plain-text password as the string `authpasswd` for user `authuser` of group `v3group`.

Example

```
DellEMC#conf
DellEMC(conf)# snmp-server user authuser v3group v3 auth md5 authpasswd
```

Usage Information

The following command configures a remote user named *n3user* with a v3 security model and a security level of `authNOPriv`.

Example

```
DellEMC#conf
DellEMC(conf)# snmp-server user n3user ngroup remote 172.31.1.3 udp-port
5009 3
auth md5 authpasswd
```

Related Commands

- show snmp user — displays the information configured on each SNMP user name.

snmp-server user (for AES128-CFB Encryption)

Specify that AES128-CFB encryption algorithm needs to be used for transmission of SNMP information. The Advanced Encryption Standard (AES) Cipher Feedback (CFB) 128-bit encryption algorithm is in compliance with RFC 3826. RFCs for SNMPv3 define two authentication hash algorithms, namely, HMAC-MD5-96 and HMAC-SHA1-96. These are the full forms or editions of the truncated versions, namely, HMAC-MD5 and HMAC-SHA1 authentication algorithms.

Syntax

`snmp-server user` *`name`* `{`*`group_name`* `remote` *`ip-address`* `udp-port` *`port-number`*`}` `[1 | 2c | 3] [encrypted] [auth {md5 | sha}` *`auth-password`*`] [priv {des56 | aes128-cfb}` *`priv- password`*`] [access` *`access-list-name`* `| ipv6` *`access-list-name`* `|` *`access-list-name`* `ipv6` *`access-list-name`*`]`

To remove a user from the SNMP group, use the `no snmp-server user` *`name`* `{`*`group_name`* `remote` *`ip-address`* `udp-port` *`port-number`*`} [1 | 2c | 3] [encrypted] [auth {md5 | sha}` *`auth-password`*`] [priv {des56 | aes128-cfb}` *`priv-password`*`] [access` *`access-list-name`* `| ipv6` *`access-list-name`* `|` *`access-list-name`* `ipv6` *`access-list-name`*`]` command.

Parameters

auth-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the agent to receive packets from the host and to send packets to the host. Minimum: eight characters long.
aes128	(OPTIONAL) Enter the keyword `aes128` to initiate the AES128-CFB encryption algorithm for transmission of SNMP packets.
priv-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the host to encrypt the contents of the message it sends to the agent and to decrypt the contents of the message it receives from the agent. Minimum: eight characters long.

Defaults

If no authentication or privacy option is configured, then the messages are exchanged (attempted anyway) without any authentication or encryption.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.3(0.0)	Added support for the AES128-CFB encryption algorithm on the S4820T, S4810, S6000 and Z-Series platforms

Usage Information

To enable robust, effective protection and security for SNMP packets transferred between the server and the client, you can use the `snmp-server user` *`username`* `group` *`groupname`* `3 auth` *`authentication-type auth-password`* `priv aes128` *`priv-password`* to specify that AES128-CFB encryption algorithm needs to be used.

You cannot modify the FIPS mode if SNMPv3 users are already configured and present in the system. An error message is displayed if you attempt to change the FIPS mode by using the `fips mode enable` command in Global Configuration mode. You can enable or disable FIPS mode only if SNMPv3 users are not previously set up. Otherwise, you must remove the previously configured users before you change the FIPS mode.

Example

```
DellEMC# snmp-server user privuser v3group v3 encrypted auth md5
9fc53d9d908118b2804fe80e3ba8763d priv aes128
d0452401a8c3ce42804fe80e3ba8763d
```

Related Commands

- show snmp user — Displays the information configured on each SNMP user name.

snmp-server view

Configure an SNMPv3 view.

Syntax

`snmp-server view` *`view-name oid-tree`* `{included | excluded}`

To remove an SNMPv3 view, use the `no snmp-server view` *`view-name oid-tree`* `{included | excluded}` command.

Parameters

view-name	Enter the name of the view (not to exceed 20 characters).
oid-tree	Enter the OID sub tree for the view (not to exceed 20 characters).
included	(OPTIONAL) Enter the keyword `included` to include the MIB family in the view.
excluded	(OPTIONAL) Enter the keyword `excluded` to exclude the MIB family in the view.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The `oid-tree` variable is a full sub-tree starting from 1.3.6 and cannot specify the name of a sub-tree or a MIB. The following Example configures a view named *rview* that allows access to all objects under 1.3.6.1.

Example

```
DellEMC# conf
DellEMC#(conf) snmp-server view rview 1.3.6.1 included
```

Related Commands

- show running-config snmp — displays the SNMP running configuration.

snmp-server vrf

Configures an SNMP agent to bind to a specific VRF.

Syntax

`snmp-server vrf` *`vrf-name`*

To undo the SNMP agent configuration, use the `no snmp-server vrf` *`vrf-name`* command.

Parameters

vrf vrf-name	Enter the keyword `vrf` and then the name of the VRF to associate an SNMP agent with that VRF.

Defaults

Not Enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S-Series and Z9000.

Usage Information

Use this command to bind an SNMP agent to a VRF. The SNMP agent processes the requests from the interfaces that belong to the specified VRF. If no VRF is specified, then the default VRF is used.

Related Commands

- show snmp user — display the information configured on each SNMP user name.

snmp trap link-status

Enable the interface to send SNMP link traps, which indicate whether the interface is up or down.

Syntax

```
snmp trap link-status
```

To disable sending link trap messages, use the `no snmp trap link-status` command.

Defaults

Enabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

If the interface is expected to flap during normal usage, you could disable this command.

Syslog Commands

The following commands allow you to configure logging functions on all Dell EMC Networking switches.

clear logging

Clear the messages in the logging buffer.

Syntax `clear logging`

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- show logging — display logging settings and system messages in the internal buffer.

clear logging auditlog

Clears audit log.

Syntax `clear logging auditlog`

Defaults None

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Introduced on the FN IOM.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the MXL.

Example

```
DellEMC(conf)# clear logging auditlog
```

Related Commands

- show logging auditlog — display the audit log.

default logging buffered

Return to the default setting for messages logged to the internal buffer.

Syntax `default logging buffered`

Defaults **size = 40960; level = 7 or debugging**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands
- logging buffered — set the logging buffered parameters.

default logging console

Return the default settings for messages logged to the console.

Syntax `default logging console`

Defaults **level = 7 or debugging**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands
- logging console — set the logging console parameters.

default logging monitor

Return to the default settings for messages logged to the terminal.

Syntax `default logging monitor`

Defaults **level = 7 or debugging**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- logging monitor — set the logging monitor parameters.
- terminal monitor — send system messages to the terminal/monitor.

default logging trap

Return to the default settings for logging messages to the Syslog servers.

Syntax `default logging trap`

Defaults **level = 6 or informational**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- logging trap — limit messages logged to the Syslog servers based on severity.

logging

Configure an IP address or host name of a Syslog server where logging messages are sent. Multiple logging servers of both IPv4 and/or IPv6 can be configured.

Syntax

```
logging {ip-address | ipv6-address | hostname} {{udp {port}} | {tcp {port}}
[vrf vrf-name]
```

To disable logging, use the `no logging` command.

Parameters

ip-address	Enter the IPv4 address in dotted decimal format.
ipv6-address	Enter the IPv6 address in the x:x:x:x::X format. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
hostname	Enter the name of a host already configured and recognized by the switch.
udp	Enter the keyword `udp` to enable transmission of log message over UDP followed by port number. The default port is 514
tcp	Enter the keyword `tcp` to enable transmission of log message over TCP followed by port number.
vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF to enable the logging process in VRF mode. **NOTE:** Use this attribute to specify the VRF that is used to contact the host. By default, the default VRF is used.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Added **udp** and **tcp** keywords for the Z9500.
9.5(0.0)	Added **udp** and **tcp** keywords for the S4810, S4820T, S6000, Z9000, and MXL.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.4.1.0	Added support for IPv6.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information Multiple logging servers of both IPv4 and/or IPv6 can be configured.

Related Commands

- logging on — enables the logging asynchronously to logging buffer, console, Syslog server, and terminal lines.
- logging trap — enables logging to the Syslog server based on severity.

logging buffered

Enable logging and specify which messages are logged to an internal buffer. By default, all messages are logged to the internal buffer.

Syntax `logging buffered [level] [size]`

To return to the default values, use the `default logging buffered` command.

To disable logging stored to an internal buffer, use the `no logging buffered` command.

Parameters

level	(OPTIONAL) Indicate a value from 0 to 7 or enter one of the following equivalent words: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.
size	(OPTIONAL) Indicate the size, in bytes, of the logging buffer. The number of messages buffered depends on the size of each message. The range is from 40960 to 524288. The default is **40960 bytes**.

Defaults level = **7**; size = **40960 bytes**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

When you decrease the buffer size, all messages stored in the buffer are lost. Increasing the buffer size does not affect messages stored in the buffer.

Related Commands

- clear logging — clears the logging buffer.
- default logging buffered — returns the logging buffered parameters to the default setting.
- show logging — displays the logging setting and system messages in the internal buffer.

logging console

Specify which messages are logged to the console.

Syntax

`logging console [level]`

To return to the default values, use the `default logging console` command.

To disable logging to the console, use the `no logging console` command.

Parameters

level	(OPTIONAL) Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.

Defaults

level = **7**; size = **debugging**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- clear logging — clears the logging buffer.
- default logging console — returns the logging console parameters to the default setting.
- show logging — displays the logging setting and system messages in the internal buffer.

logging extended

Logs security and audit events to a system log server.

Syntax `logging extended`

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Usage Information

This command is available with or without RBAC enabled. When RBAC is enabled you can restrict access to audit and security logs based on the CLI sessions' user roles. If extended logging is disabled, you can only view system events, regardless of RBAC user role.

When you enabled RBAC and extended logging:

- Only the system administrator role can execute this command.
- The system administrator and system security administrator roles can view security events and system events.
- The system administrator role can view audit, security, and system events.
- The network administrator and network operator roles can view system events.

Examples

```
DellEMC(conf)#logging extended
```

Related Commands

- show logging auditlog — display the audit log.
- clear logging auditlog— clear the audit log.

logging facility

Configure the Syslog facility used for error messages sent to Syslog servers.

Syntax

`logging facility [facility-type]`

To return to the default values, use the `no logging facility` command.

Parameters

facility-type (OPTIONAL) Enter one of the following parameters:

- `auth` (authorization system)
- `cron` (Cron/at facility)
- `deamon` (system deamons)
- `kern` (kernel)
- `local0` (local use)
- `local1` (local use)
- `local2` (local use)
- `local3` (local use)
- `local4` (local use)
- `local5` (local use)
- `local6` (local use)
- `local7` (local use)
- `lpr` (line printer system)
- `mail` (mail system)
- `news` (USENET news)
- `sys9` (system use)
- `sys10` (system use)
- `sys11` (system use)
- `sys12` (system use)
- `sys13` (system use)
- `sys14` (system use)
- `syslog` (Syslog process)

- `user` (user process)
- `uucp` (Unix to Unix copy process)

The default is **local7**.

Defaults **local7**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands
- logging — enables logging to a Syslog server
- logging on — enables logging.

logging history

Specify which messages are logged to the history table of the switch and the SNMP network management station (if configured).

Syntax `logging history` *level*

To return to the default values, use the `no logging history` command.

Parameters

level Indicate a value from 0 to 7 or enter one of the following equivalent words: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **4** or **warnings**.

Defaults **warnings or 4**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information When you configure the `snmp-server trap-source` command, the system messages logged to the history table are also sent to the SNMP network management station.

Related Commands
- show logging — displays information logged to the history buffer.

logging history size

Specify the number of messages stored in the Dell EMC Networking logging history table.

Syntax `logging history size size`

To return to the default values, use the `no logging history size` command.

Parameters

size	Indicate a value as the number of messages to be stored. The range is from 0 to 500. The default is **1 message**.

Defaults **1 message**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information When the number of messages reach the limit you set with the `logging history size` command, older messages are deleted as newer ones are added to the table.

Related Commands
- show logging — displays information logged to the history buffer.

logging monitor

Specify which messages are logged to Telnet applications.

Syntax `logging monitor [level]`

To disable logging to terminal connections, use the `no logging monitor` command.

Parameters

level	Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.

Defaults **7** or **debugging**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- default logging monitor — returns the logging monitor parameters to the default setting.

logging on

Specify that debug or error messages are asynchronously logged to multiple destinations, such as the logging buffer, Syslog server, or terminal lines.

Syntax

```
logging on
```

To disable logging to logging buffer, Syslog server and terminal lines, use the `no logging on` command.

Defaults Enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
E-Series legacy command	

Usage Information

When you use the `no logging on` command, messages are logged only to the console.

Related Commands

- logging — enable logging to the Syslog server.
- logging buffered — set the logging buffered parameters.
- logging console — set the logging console parameters.
- logging monitor — set the logging parameters for the terminal connections.

logging source-interface

Specify that the IP address of an interface is the source IP address of Syslog packets sent to the Syslog server.

Syntax

`logging source-interface` *interface*

To disable this command and return to the default setting, use the `no logging source-interface` command.

Parameters

interface Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information.
- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
- For a Null interface, enter the keyword null then the Null interface number.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information Syslog messages contain the IP address of the interface used to egress the router. By configuring the `logging source-interface` command, the Syslog packets contain the IP address of the interface configured.

Related Commands
- logging — enables logging to the Syslog server.

logging synchronous

Synchronize unsolicited messages and Dell EMC Networking OS output.

Syntax `logging synchronous [level level | all] [limit number-of-buffers]`

To disable message synchronization, use the `no logging synchronous [level level | all] [limit number-of-buffers]` command.

Parameters

all	Enter the keyword `all` to ensure that all levels are printed asynchronously.
level *level*	Enter the keyword `level` then a number as the severity level. A high number indicates a low severity level and vice versa. The range is from 0 to 7. The default is **2**.
all	Enter the keyword `all` to turn off all.
limit *number-of-buffers*	Enter the keyword `limit` then the number of buffers to be queued for the terminal after which new messages are dropped. The range is from 20 to 300. The default is **20**.

Defaults Disabled. If enabled without the `level` or `number-of-buffers` options specified, level = **2** and number-of-buffers = **20** are the defaults.

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

When you enable `logging synchronous`, unsolicited messages appear between software prompts and outputs. Only the messages with a severity at or below the set level are sent to the console.

If the message queue limit is reached on a terminal line and messages are discarded, a system message appears on that terminal line. Messages may continue to appear on other terminal lines.

Related Commands

- logging on — enables logging.

logging trap

Specify which messages are logged to the Syslog server based the message severity.

Syntax

`logging trap [level]`

To return to the default values, use the `default logging trap` command.

To disable logging, use the `no logging trap` command.

Parameters

level	Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **6** or **informational**.

Defaults

6 or **informational**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series, S55.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information To block a type of message parameter, set the logging trap level to a lower number. For example, to block severity messages at level 6, set the level to 5.

Related Commands
- logging — enables the logging to another device.
- logging on — enables logging.

logging version

Displays syslog messages in a RFC 3164 or RFC 5424 format.

Syntax `logging version {0|1}`

Defaults 0

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Usage Information To display syslog messages in a RFC 3164 or RFC 5424 format, use the **log version** command in configuration mode. By default, the system log version is set to **0**.

The following describes the two supported log messages formats:

- `0` – Displays syslog messages format as described in RFC 3164, The BSD syslog Protocol
- `1` – Displays SYSLOG message format as described in RFC 5424, The Syslog Protocol

Example

```
DellEMC(conf)#logging version ?
<0-1> Select syslog version (default = 0)
DellEMC(conf)#logging version 1
```

show logging auditlog

Displays an audit log.

Syntax `show logging auditlog`

Defaults None

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Example

```
DellEMC(conf)# show logging auditlog
```

Related Commands

- clear logging auditlog — clear the audit log.

show logging

Display the logging settings and system messages logged to the internal buffer of the switch.

Syntax `show logging [number | history [reverse][number] | reverse [number] | summary]`

Parameters

number	(OPTIONAL) Enter the number of messages displayed in the output. The range is from 1 to 65535.
history	(OPTIONAL) Enter the keyword `history` to view only information in the Syslog history table.

reverse	(OPTIONAL) Enter the keyword `reverse` to view the Syslog messages in FIFO (first in, first out) order.
summary	(OPTIONAL) Enter the keyword `summary` to view a table showing the number of messages per type and per slot. Slots *7* and *8* represent RPMs.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example (Partial)

```
DellEMC#show logging
Syslog logging: enabled
    Console logging: level debugging
    Monitor logging: level debugging
    Buffer logging: level debugging, 5604 Messages Logged, Size (524288
bytes)
    Trap logging: level informational
Oct 8 09:25:37: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with neighbor
223.80.255.254 closed. Hold time
expired
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.200.13.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.13 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.14.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.14 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.11.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.5 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.4.1.3 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.4 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.6 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.12 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.15 Up
```

```
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.3 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.200.12.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.10.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Session closed by neighbor
1.1.10.2 (Hold time expired)
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.200.14.7 Up
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with neighbor
1.1.11.2 closed. Neighbor recycled
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with neighbor
1.1.14.2 closed. Neighbor recycled
--More--
```

Example (History)

```
DellEMC#show logging history
Syslog History Table: 1 maximum table entries,
saving level Warnings or higher
  SNMP notifications not Enabled
%RPM:0:0 %CHMGR-2-LINECARDDOWN - Line card 3 down - IPC timeout
DellEMC#
```

show logging driverlog stack-unit

Display the driver log for the specified hardware component.

Syntax `show logging driverlog stack-unit` *`stack-unit-number`*

Parameters

stack-unit *stack-unit-number*	Enter the keywords `stack-unit` followed by the stack member ID of the switch for which you want to display the driver log.

defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Example

```
DellEMC#show logging driverlog stack-unit 1

0:Task(tUsrRoot): [   491677]PSU FanCtrl Drv ERR:
ssnDrvPoePsuEepromWriteEnable : 66 - Psu 1 is Not Present Cannot enable
1:Task(tUsrRoot): [      338]PSU FanCtrl Drv ERR: ssnDrvPsuFanCtrlInit :
118 - Cannot enable psu -127228353
2:Task(tUsrRoot): [     6876]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Main block failed checksum calulated
checksum 0x1d actual chksum 0x0
3:Task(tUsrRoot): [       61]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Main block failed errcode 6
4:Task(tUsrRoot): [       89]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Redundant block failed checksum calulated
checksum 0xc9a6 actual chksum                    0x0
5:Task(tUsrRoot): [       57]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Redundant block failed errcode 6
6:Task(tUsrRoot): [       51]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom, failed to get any good block
7:Task(tUsrRoot): [       75]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Main block failed checksum calulated
checksum 0x1d actual chksum 0x0
8:Task(tUsrRoot): [       55]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Main block failed errcode 6
9:Task(tUsrRoot): [       62]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Redundant block failed checksum calulated
checksum 0xc9a6 actual chksum                    0x0
10:Task(tUsrRoot): [       55]EEPROM LIB ERR:
f10EepromBlkRead@psu0eeprom: Redundant block failed errcode 6
```

Usage Information

This command displays internal software driver information, which may be useful during troubleshooting switch initialization errors, such as a downed Port-Pipe.

terminal monitor

Configure the Dell EMC Networking OS to display messages on the monitor/terminal.

Syntax

`terminal monitor`

To return to default settings, use the `terminal no monitor` command.

defaults

Disabled.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

- logging monitor — set the logging parameters on the monitor/terminal.

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SNMP Traps

This section lists the traps sent by the Dell EMC Networking OS. Each trap is listed by the fields Trap Type, Trap Name, Object Name, and MIB file.

Table 9. SNMP Trap List

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
1	TR_COLD_START	1.3.6.1.6.3.1.1.5.1	COLDSTART	rfc3418.mib	SNMP COLD_START trap sent.
2	TR_WARM_START	1.3.6.1.6.3.1.1.5.2	WARMSTART	rfc3418.mib	SNMP WARM_START trap sent.
3	TR_LINK_DOWN	1.3.6.1.6.3.1.1.5.3	LINKDOWN	rfc3418.mib	changed interface state to down.
4	TR_LINK_UP	1.3.6.1.6.3.1.1.5.4	LINKUP	rfc3418.mib	changed interface state to up.
5	TR_AUTHENTICATION_FAILED	1.3.6.1.6.3.1.1.5.5	Authenticationfailure	rfc3418.mib	SNMP Authentication failed.
9	TR_BER_ERR	1.3.6.1.4.1.6027.3.3.1.2.0.3	Not available.	Not available.	High Ber detected on interface.
10	TR_BER_ERR_CLR	1.3.6.1.4.1.6027.3.3.1.2.0.4	Not available.	Not available.	High Ber cleared on interface.
11	TR_CHM_CARD_DOWN	1.3.6.1.4.1.6027.3.26.1.5.1.1	dellNetSysAlarmCardDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a card operational status is down.
12	TR_CHM_CARD_UP	1.3.6.1.4.1.6027.3.26.1.5.1.2	dellNetSysAlarmCardUp	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a card operational status is up.
14	TR_CHM_CARD_OFFLINE	1.3.6.1.4.1.6027.3.26.1.5.1.3	dellNetSysAlarmCardOffline	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a card is set to offline.
15	TR_CHM_CARD_MISMATCH	1.3.6.1.4.1.6027.3.26.1.5.1.4	dellNetSysAlarmCardMismatch	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a card is not the same as configured

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
19	TR_CHM_RPM_UP	1.3.6.1.4.1.6027.3.26.1.5.1.5	dellNetSysAlarmRpmUp	DELL-NETWORKING-CHASSIS-MIB.mib	The primary RPM generate this trap when the primary RPM or the secondary RPM is up and running.
20	TR_CHM_RPM_DOWN	1.3.6.1.4.1.6027.3.26.1.5.1.6	dellNetSysAlarmRpmDown	DELL-NETWORKING-CHASSIS-MIB.mib	The primary RPM generate this trap when the secondary RPM is down, either by software reset or being physically removed from the chassis.
21	TR_CHM_PWRSRC_DOWN	1.3.6.1.4.1.6027.3.26.1.5.1.7	dellNetSysAlarmPowersupplyDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a power supply is not operational.
22	TR_CHM_MIN_ALRM_TEMP	1.3.6.1.4.1.6027.3.26.1.5.1.8	dellNetSysAlarmMinorTemperatureHigh	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when the chassis's temperature exceed the minor threshold.
23	TR_CHM_MAJ_ALRM_TEMP	1.3.6.1.4.1.6027.3.26.1.5.1.9	dellNetSysAlarmMajorTemperatureHigh	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when the chassis's temperature exceede the major threshold.
24	TR_CHM_FANTRAY_BAD	1.3.6.1.4.1.6027.3.26.1.5.1.10	dellNetSysAlarmFanTrayDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan tray is missing or down.
25	TR_CHM_PWRSRC_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.11	dellNetSysAlarmPowersupplyClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a power supply is now operational.
26	TR_CHM_MIN_ALRM_TEMP_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.12	dellNetSysAlarmMinorTemperatureClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when the chassis's temperature within the minor threshold.
27	TR_CHM_MAJ_ALRM_TEMP_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.13	dellNetSysAlarmMajorTemperatureClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when the chassis's temperature within

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					the minor threshold.
28	TR_CHM_FANTRAY_BAD_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.14	dellNetSysAlarmFanTrayClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan tray is now operational.
29	TR_CHM_MIN_FANBAD_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.15	dellNetSysAlarmMinorFanBadClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a minor fan tray that was bad is now operational.
30	TR_CHM_FANTRAY_OR_PSU_BAD	1.3.6.1.4.1.6027.3.26.1.5.1.25	dellNetSysAlarmFanTrayOrPsuDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan tray or psu is missing or down.
31	TR_CHM_FANTRAY_OR_PSU_BAD_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.26	dellNetSysAlarmFanTrayOrPsuClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan tray or psu is now operational
32	TR_CHM_PSUFAN_FAIL	1.3.6.1.4.1.6027.3.26.1.5.1.25	dellNetSysAlarmFanTrayOrPsuDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan in a psu is down.
33	TR_CHM_PSUFAN_FAIL_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.26	dellNetSysAlarmFanTrayOrPsuClear	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a fan in a psu is now operational
34	TR_DYNAMIC_FANOUT	1.3.6.1.4.1.6027.3.1.1.4.0.59	Not available.	Not available.	This is an informational message indicating that a port has been fanned out/ fanned in.
39	TR_CHM_CPU_CLK_DEGRD	1.3.6.1.4.1.6027.3.26.1.5.1.47	dellNetSysAlarmCpuCLkDegraded	DELL-NETWORKING-CHASSIS-MIB.mib	Trap generated when a degradation is detected in CPU I/O bus clock signal
40	TR_TME_TASK_SUSPEND	1.3.6.1.4.1.6027.3.26.1.5.1.35	dellNetSysAlarmTaskSuspend	DELL-NETWORKING-CHASSIS-MIB.mib	The system generate this trap when a task is suspended.
41	TR_TME_TASK_TERM	1.3.6.1.4.1.6027.3.26.1.5.1.36	dellNetSysAlarmTaskTerm	DELL-NETWORKING-CHASSIS-MIB.mib	The system generate this trap when a task is terminated

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
42	TR_STP_NEW_ROOT	1.3.6.1.2.1.17.0.1	newRoot	BRIDGE-MIB.mib	802.1d new root trap support.
43	TR_STP_TOPOLOGY_CHANGE	1.3.6.1.2.1.17.0.2	topologyChange	BRIDGE-MIB.mib	802.1d topology change trap support.
44	TR_MSTP_NEW_ROOT_BRIDGE	1.3.6.1.4.1.6027.20.2.0.1	Not Available	Not Available	MSTP Not Supporting
45	TR_MSTP_NEW_ROOT_PORT	1.3.6.1.4.1.6027.20.2.0.2	Not Available	Not Available	MSTP Not Supporting
46	TR_MSTP_TOPOLOGY_CHANGE	1.3.6.1.4.1.6027.20.2.0.3	Not Available	Not Available	MSTP Not Supporting
47	TR_RSTP_NEW_ROOT	1.3.6.1.2.1.17.0.1	newRoot	BRIDGE-MIB.mib	802.1w new root trap support.
48	TR_RSTP_TOPOLOGY_CHANGE	1.3.6.1.2.1.17.0.2	topologyChange	BRIDGE-MIB.mib	802.1w topology change trap support.
49	TR_PVST_NEW_ROOT	1.3.6.1.2.1.17.0.1	newRoot	BRIDGE-MIB.mib	PVST new root trap support.
50	TR_PVST_TOPOLOGY_CHANGE	1.3.6.1.2.1.17.0.2	topologyChange	BRIDGE-MIB.mib	PVST topology change trap support.
51	TR_VRRP_LEAVE_MASTER	1.3.6.1.4.1.6027.3.26.1.5.1.44	dellNetSysAlarmVrrpGoMaster	DELL-NETWORKING-CHASSIS-MIB.mib	The VRRP generate this trap when it become a backup
52	TR_VRRP_GIVEUP_MASTER	1.3.6.1.4.1.6027.3.26.1.5.1.45	dellNetSysAlarmVrrpGiveupMaster	DELL-NETWORKING-CHASSIS-MIB.mib	The VRRP generate this trap when it is no longer the master and has entered non-operational state
53	TR_VRRP_NEW_MASTER.	1.3.6.1.2.1.68.0.1	vrrpTrapNewMaster	rfc2787.mib	The newMaster trap indicates that the sending agent has transitioned to 'Master' state.
54	TR_VRRP_AUTH_FAILURE.	1.3.6.1.2.1.68.0.2	vrrpTrapAuthFailure	rfc2787.mib	A vrrpAuthFailure trap signifies that a packet has been received from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					type. Implementation of this trap is optional
55	TR_VRRPV3_LEAVE_MASTER	1.3.6.1.4.1.6027.3.26.1.5.1.44	dellNetSysAlarmVrrpGoMaster	DELL-NETWORKING-CHASSIS-MIB.mib	The VRRP generate this trap when it become a backup
56	TR_VRRPV3_GIVEUP_MASTER	1.3.6.1.4.1.6027.3.26.1.5.1.45	dellNetSysAlarmVrrpGiveupMaster	DELL-NETWORKING-CHASSIS-MIB.mib	The VRRP generate this trap when it is no longer the master and has entered non-operational state
57	TR_VRRPV3_NEW_MASTER	1.3.6.1.2.1.68.0.1	vrrpTrapNewMaster	draft-ietf-vrrp-unified-mib-06.mib	The newMaster trap indicates that the sending agent has transitioned to 'Master' state.
58	TR_VRRPV3_PROTOERR_REASON	1.3.6.1.2.1.68.0.3	vrrpTrapProtoError	draft-ietf-vrrp-unified-mib-06.mib	The error trap indicates that the sending agent has encountered the protocol error indicated by vrrpTrapProtoErrorReason.
59	TR_BGP4_ESTABLISHED	1.3.6.1.4.1.6027.20.1.1.0.1	dellNetBgpM2Established	DELL-NETWORKING-BGP4-V2-MIB.mib	The BGP Established event is generated when the BGP FSM enters the ESTABLISHED state
60	TR_BGP4_BACKW_XSITION	1.3.6.1.4.1.6027.20.1.1.0.2	dellNetBgpM2BackwardTransition	DELL-NETWORKING-BGP4-V2-MIB.mib	The BGPBackwardTransition Event is generated when the BGP FSM moves from a higher numbered state to a lower numbered state.
61	TR_ECFM_FAULT_ALARM	1.0.8802.1.1.3.0.1	dot1agCfmFaultAlarm	stdecfm.mib	A MEP has a persistent defect condition. A notification (fault alarm) is sent to the management entity with the OID of the MEP that has detected the fault. Whenever a

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					MEP has a persistent defect, it may or may not generate a Fault Alarm to warn the system administrator of the problem, as controlled by the MEP Fault Notification Generator State Machine and associated Managed Objects. If a defect with a higher priority is raised after a Fault Alarm has been issued, another Fault Alarm is issued. The management entity receiving the notification can identify the system from the network source address of the notification, and can identify the MEP reporting the defect by the indices in the OID of the dot1agCfmMepHighestPrDefect variable in the notification: dot1agCfmMdIndex - Also the index of the MEP's Maintenance Domain table entry (dot1agCfmMdTable). dot1agCfmMaIndex - Also an index (with the MD table index) of the MEP's Maintenance Association table entry (dot1agCfmMaTable). dot1agCfmMepIdentifier - MEP Identifier and final

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					index into the MEP table (dot1agCfmMepTable).
62	TR_EOAM_THRSHLD_EVT	1.3.6.1.2.1.158.0.1	dot3OamThresholdEvent	stdeoam.mib	"A dot3OamThresholdEvent notification is sent when a local or remote threshold crossing event is detected. A local threshold crossing event is detected by the local entity, while a remote threshold crossing event is detected by the reception of an Ethernet OAM Event Notification OAMPDU that indicates a threshold event. This notification should not be sent more than once per second. The OAM entity can be derived from extracting the ifIndex from the variable bindings. The objects in the notification correspond to the values in a row instance in the dot3OamEventLog Table. The management entity should periodically check dot3OamEventLog Table to detect any missed events.
63	TR_EOAM_NON_THRSHLD_EVT	1.3.6.1.2.1.158.0.2	dot3OamNonThresholdEvent	stdeoam.mib	A dot3OamNonThresholdEvent notification is sent when a local or remote non-threshold crossing event is detected. A local event is detected by the local entity, while a remote event is

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					detected by the reception of an Ethernet OAM Event Notification OAMPDU that indicates a non-threshold crossing event. This notification should not be sent more than once per second. The OAM entity can be derived from extracting the ifIndex from the variable bindings. The objects in the notification correspond to the values in a row instance of the dot3OamEventLog Table. The management entity should periodically check dot3OamEventLog Table to detect any missed events
64	TR_FIPS_MAX_FCF_LIMIT_RCH	1.3.6.1.4.1.6027.3.22.4.0.1	dellNetMaxFcfsInVlanLmtRchTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when number of FCFs reached maximum allowed limit in VLAN
65	TR_FIPS_MAX_ENODE_LIMIT_RCH	1.3.6.1.4.1.6027.3.22.4.0.2	dellNetMaxENodesLmtRchTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when number of ENodes reached maximum allowed limit in the system
66	TR_FIPS_MAX_SESSION_LIMIT_RCH	1.3.6.1.4.1.6027.3.22.4.0.3	dellNetMaxSessionLmtRchTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when number of sessions reached maximum allowed limit in the system
67	TR_FIPS_FCF_DROP	1.3.6.1.4.1.6027.3.22.4.0.4	dellNetFcfDroppedTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when a new FCF discovered (Discovery Advertisement is received from FCF) is dropped, as the maximum allowed FCFs limit in a VLAN is already reached.

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
68	TR_FIPS_ENODE_DROP	1.3.6.1.4.1.6027.3.22.4.0.5	dellNetENodeDroppedTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when a new ENode discovered is dropped, as the maximum allowed ENodes limit in the system is already reached
69	TR_FIPS_SESSION_DROP	1.3.6.1.4.1.6027.3.22.4.0.6	dellNetSessionRequestDroppedTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when a new session request received is dropped, as the maximum allowed session limit in system is already reached.
70	TR_FIPS_ACL_INSTALL_FAIL	1.3.6.1.4.1.6027.3.22.4.0.7	dellNetAclInstallationFailureTrap	DELL-NETWORKING-FIPSNOOPING-MIB.mib	This trap is sent when there is a problem in installing the ACL entries due to no space or hardware failure
71	TR_ETS_MODULE_STATUS_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.1	dellNetETSModuleStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated when there is a change in the ETS Module status. This trap is generated only if dellNetETSGlobalEnableTrap is enabled to send the trap
72	TR_ETS_ADMIN_MODE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.2	dellNetETSPortAdminStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the ETS Admin status and the dellNetETSGlobalEnableTrap is enabled to send the trap for ETS Admin mode change
73	TR_ETS_PEER_STATE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.3	dellNetETSPortPeerStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the DCBX Peer Status and the

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					dellNetETSGlobalEnableTrap is enabled to send the trap for Peer Up or Peer Down
74	TR_ETS_OPER_STATE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.4	dellNetETSPortDcbxOperStateTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the ETS Operational State and the dellNetETSGlobalEnableTrap is enabled to send the trap for ETS state machine state change
75	TR_PFC_MODULE_STATUS_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.5	dellNetPFCModuleStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated when there is a change in the PFC Module status is enabled. This trap is generated only if dellNetPFCGlobalEnableTrap is enabled to send the trap
76	TR_PFC_ADMIN_MODE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.6	dellNetPFCPortAdminStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the PFC Admin Status and the dellNetPFCGlobalEnableTrap is enabled to send the trap for PFC Admin Status change
77	TR_PFC_PEER_STATE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.7	dellNetPFCPortPeerStatusTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the DCBX Peer Status and the dellNetPFCGlobalEnableTrap is

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					enabled to send the trap for Peer Up or Peer Down
78	TR_PFC_OPER_STATE_CHANGE	1.3.6.1.4.1.6027.3.15.4.0.8	dellNetPFCPortDcbxOperStateTrap	DELL-NETWORKING-DCB-MIB.mib	This trap is generated in the following conditions. Whenever there is a change in the PFC Operational State and the dellNetPFCGlobalEnableTrap is enabled to send the trap for PFC state machine state change
79	TR_MPLS_TUNNEL_UP	1.3.6.1.2.1.10.166.3.0.1	mplsTunnelUp	rfc3812.mib	This trap is generated when an lsp on a tunnel changed it operational status to up
80	TR_MPLS_TUNNEL_DOWN	1.3.6.1.2.1.10.166.3.0.2	mplsTunnelDown	rfc3812.mib	This trap is generated when an lsp on a tunnel changed it operational status to down
81	TR_MPLS_TUNNEL_RRTD	1.3.6.1.2.1.10.166.3.0.3	mplsTunnelRerouted	rfc3812.mib	This trap is generated when the path taken by a tunnel was changed.
82	TR_MPLS_TUNNEL_REOP	1.3.6.1.2.1.10.166.3.0.4	mplsTunnelReoptimized	rfc3812.mib	This trap is generated when a tunnel was reoptimized.
89	TR_CHM_MAJ_ALARM_PS	1.3.6.1.4.1.6027.3.26.1.5.1.16	dellNetSysAlarmMajorPS	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a power supply major alarm is issued.
90	TR_CHM_MAJ_ALARM_PS_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.17	dellNetSysAlarmMajorPSClr	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a power supply major alarm is cleared.
91	TR_CHM_MIN_ALARM_PS	1.3.6.1.4.1.6027.3.26.1.5.1.18	dellNetSysAlarmMinorPS	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a power supply minor alarm is issued.

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
92	TR_CHM_MIN_ALARM_PS_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.19	dellNetSysAlarmMinorPSClr	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a power supply minor alarm is cleared.
93	TR_CHM_MIN_FANBAD	1.3.6.1.4.1.6027.3.26.1.5.1.20	dellNetSysAlarmMinorFanBad	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when fan is bad.
94	TR_SYSADM_CPU_THRESHOLD	1.3.6.1.4.1.6027.3.26.1.5.1.31	dellNetSysAlarmExdCpuThreshold	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when cpu utilization excceded 80%.
95	TR_SYSADM_CPU_THRESHOLD_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.32	dellNetSysAlarmClrCpuThreshold	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when cpu utilization falls below threshold.
96	TR_SYSADM_MEM_THRESHOLD	1.3.6.1.4.1.6027.3.26.1.5.1.33	dellNetSysAlarmExdMemThreshold	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when memory utilization excceded 92%.
97	TR_SYSADM_MEM_THRESHOLD_CLR	1.3.6.1.4.1.6027.3.26.1.5.1.34	dellNetSysAlarmClrMemThreshold	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when memory utilization falls below threshold
98	TR_MACMGR_STN_MOVE	1.3.6.1.4.1.6027.3.26.1.5.1.37	dellNetSysAlarmMacStationMove	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a MAC station move exceed the threshold
99	TR_CHM_RPM_PRIMARY	1.3.6.1.4.1.6027.3.26.1.5.1.21	dellNetSysAlarmRpmPrimary	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when a standby RPM become Primary RPM after failover.
100	TR_SNMP_IP_ACL_FAILED	1.3.6.1.4.1.6027.3.26.1.5.1.22	dellNetSysSnmpIpAclDeny	DELL-NETWORKING-CHASSIS-MIB.mib	The agent generate this trap when SNMP Agent deny a SNMP request based on the IP ACL rules.
102	TR_LLDP_REM_TABLE_CHANGE	1.0.8802.1.1.2.0.0.1	lldpRemTablesChange	lldp.mib	A lldpRemTablesChange notification is sent when the value of lldpStatsRemTableLastChangeTime changes. It can be utilized by an NMS to trigger LLDP

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					remote systems table maintenance polls. Note that transmission of lldpRemTablesChange notifications are throttled by the agent, as specified by the 'lldpNotificationInterval' object.
103	TR_LLDP_MED_TOPOLOGY_CHANGE	1.0.8802.1.1.2.1.5.4795.0.1	lldpXMedTopologyChangeDetected	lldp-ext-med.mib	A notification generated by the local device sensinga change in the topology that indicates that a new remotedevice attached to a local port, or a remote device disconnectedor moved from one port to another
104	TR_OPENFLOW_SNMP_CNTLR_STATE_TRAP	1.3.6.1.4.1.6027.3.20.2.0.1	ofSwitchCntlrSessionStatusChanged	DELL-NETWORKING-OPENFLOW-MIB.mib	This notification is sent when ever Controller's Session Status has changed
105	TR_OPENFLOW_SNMP_FLOW_TABLE_TRAP	1.3.6.1.4.1.6027.3.20.2.0.2	ofSwitchFlowTableFull	DELL-NETWORKING-OPENFLOW-MIB.mib	This notification is sent when ever Flow Table reached its maximum capacity. ofSwitchFlowTableSrc gives the id of the Flow Table that reached max flows
106	TR_RMON_RISING_THRESHOLD	1.3.6.1.2.1.16.0.1	risingAlarm	rfc2819.mib	The SNMP trap that is generated when an alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps.
107	TR_RMON_FALLING_THRESHOLD	1.3.6.1.2.1.16.0.2	fallingAlarm	rfc2819.mib	The SNMP trap that is generated when an alarm entry crosses its falling threshold and

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					generates an event that is configured for sending SNMP traps.
108	TR_RMON_HC_RISING_THRESHOLD	1.3.6.1.2.1.16.29.2.0.1	hcRisingAlarm	rfc3434.mib	The SNMP notification that is generated when a high capacity alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps. The hcAlarmEntry object instances identified in the OBJECTS clause are from the entry that causes this notification to be generated.
109	TR_RMON_HC_FALLING_THRESHOLD	1.3.6.1.2.1.16.29.2.0.2	hcFallingAlarm	rfc3434.mib	The SNMP notification that is generated when a high capacity alarm entry crosses its falling threshold and generates an event that is configured for sending SNMP traps. The hcAlarmEntry object instances identified in the OBJECTS clause are from the entry that causes this notification to be generated.
110	TR_COPY_CONFIG_COMPLETE	1.3.6.1.4.1.6027.3.5.1.2.0.1	copyConfigCompleted	DELL-NETWORKING-COPY-CONFIG-MIB.mib	The agent generate this trap when a copy operational is completed
111	TR_CONFIG_CONFLICT	1.3.6.1.4.1.6027.3.5.1.2.0.2	configConflict	DELL-NETWORKING-COPY-CONFIG-MIB.mib	The agent generate this trap when a configuration conflict found during audit.
112	TR_CONFIG_CONFLICT_CLEAR	1.3.6.1.4.1.6027.3.5.1.2.0.3	configConflictClear	DELL-NETWORKING-COPY-CONFIG-MIB.mib	The agent generate this trap when a configuration

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					conflict resolved during audit
113	TR_BATCH_CONFIG_IN_PROGRESS	1.3.6.1.4.1.6027.3.5.1.2.0.4	batchConfigCommitProgress	DELL-NETWORKING-COPY-CONFIG-MIB.mib	The agent generate this trap when a configuration commit is initiated
114	TR_BATCH_CONFIG_COMPLETE	1.3.6.1.4.1.6027.3.5.1.2.0.5	batchConfigCommitCompleted	DELL-NETWORKING-COPY-CONFIG-MIB.mib	The agent generate this trap when a configuration commit is completed
115	TR_LINK_BUNDLE_UNEVEN_DISTRIBUTION	1.3.6.1.4.1.6027.3.2.2.1.1	linkBundleImbalance	DELL-NETWORKING-LINK-AGGREGATION-MIB.mib	Trap generated when traffic imbalance observed in Link Bundle
116	TR_LINK_BUNDLE_UNEVEN_DISTRIBUTION_ALARM_CLEAR	1.3.6.1.4.1.6027.3.2.2.1.2	linkBundleImbalanceClear	DELL-NETWORKING-LINK-AGGREGATION-MIB.mib	Trap generated when traffic imbalance is no longer observed
117	TR_CAM_THRESHOLD_EXCEED	1.3.6.1.4.1.6027.3.7.1.2.0.1	camUsageThresholdExceed	DELL-NETWORKING-SYSTEM-COMPONENT-MIB.mib	The agent generate this trap when the cam usage for a partition is exceeded
118	TR_CAM_IS_FULL	1.3.6.1.4.1.6027.3.7.1.2.0.2	camIsFull	DELL-NETWORKING-SYSTEM-COMPONENT-MIB.mib	The agent generate this trap when the cam is fully used.
119	TR_CAM_AUDIT_ERROR	1.3.6.1.4.1.6027.3.7.1.2.0.3	camAuditError	DELL-NETWORKING-SYSTEM-COMPONENT-MIB.mib	The agent generate this trap when a cam entry mismatches with the Software entry
128	TR_VLT_ROLE_CHANGE	1.3.6.1.4.1.6027.3.17.2.0.1	dellNetVLTRoleChange	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The agent generates this notification to denote the change in role of the VLT device in the VLT domain. This notification carries the information about the new role. The possible roles are as follows: 1. StandAlone 2. Primary 3. Secondary

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
129	TR_VLT_ICL_STATUS_CHANGE	1.3.6.1.4.1.6027.3.17.2.0.2	dellNetVLTIclStatusChange	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The agent generates this notification to denote the change in InterConnect Link Status.The notification contains information on the new ICL status. The possible states are as follows: 1. NotEstabished 2. LinkUp 3. LinkDown 4. LinkError"
130	TR_VLT_PEER_STATUS_CHANGE	1.3.6.1.4.1.6027.3.17.2.0.3	dellNetVLTPeerStatusChange	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The agent generates this notification to denote the change in Status of the Peer in the VLT domain. This notification contains information on the new status of the peer device. The possible states are as follows: 1. NotEstablished 2. PeerUp 3. PeerDown 4. LinkDown"
131	TR_VLT_HBEAT_STATUS_CHANGE	1.3.6.1.4.1.6027.3.17.2.0.4	dellNetVLTHBeatStatusChange	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The agent generates this notification to denote the change in Backup Link Status. The notification contains information on the new BackupLink Status. The possible states are as follows: 1. NotEstabished 2. LinkUp 3. LinkDown 4. LinkError"
132	TR_VLT_ICL_BW_THRESHOLD_EXCEED	1.3.6.1.4.1.6027.3.17.2.0.5	dellNetVLTIclBwUsageExceed	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The IFM agent generates this notification to denote the change

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					in Bandwidth usage of ICL Link, when it crosses the threshold above 80 %. The possible states are as follows: 0. Below threshold 1. Above threshold"
133	TR_VLT_DOMAIN_CFG_ERROR	1.3.6.1.4.1.6027.3.17.2.0.6	dellNetVLTDomainConfigError	DELL-NETWORKING-VIRTUAL-LINK-TRUNK-MIB.mib	The agent generates this notification to denote there is a error/conflict in the VLT domain config parameters (either locally or in remote node which prevent the peer up. The mismatch can be domain Id, unitId,version or system MAC. The notification contains information on the error/mismatch type
134	TR_ISIS_ADJ_CHANGE	1.3.6.1.4.1.6027.3.18.0.1	dellNetIsisAdjChanges	DELL-NETWORKING-ISIS-MIB.mib	This notification is generated when adjacency relate changes take place
135	TR_LACP_STATE_CHANGE	1.3.6.1.4.1.6027.3.2.2.0.1	dot3adAggLacpStateChange	DELL-NETWORKING-LINK-AGGREGATION-MIB.mib	The dot3adAggLacpStateChange indicates that the agent has detected a change in the Lacp state for one of the member ports of the aggregation link. This notification contains the information on the port which has gone through the state change and the oper state information of the actor and its partner
138	TR_ENT_CONFIG_CHANGE	1.3.6.1.2.1.47.2.0.1	entConfigChange	entity.mib	An entConfigChange notification is

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls. An agent should not generate more than one entConfigChange 'notification-event' in a given time interval (five seconds is the suggested default). A 'notification-event' is the transmission of a single trap or inform PDU to a list of notification destinations. If additional configuration changes occur within the throttling period, then notification-events for these changes should be suppressed by the agent until the current throttling period expires. At the end of a throttling period, one notification-event should be generated if any configuration changes occurred since the start of the throttling period. In such a case, another throttling period is started right away. An NMS should periodically check the value of entLastChangeTime to detect any missed entConfigChange notification-events, e.g., due to

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
					throttling or transmission loss.
139	TR_CHM_STACK_UNIT_ROLE	1.3.6.1.4.1.6027.3.26.1.5.1.46	dellNetSysAlarmStackUnitRoleChanged	DELL-NETWORKING-CHASSIS-MIB.mib	Trap generated when a stack unit's role in a stack changes to management/ standby/member
140	TR_CHM_VERSION_MISMATCH	1.3.6.1.4.1.6027.3.26.1.5.1.23	dellNetSysAlarmCardVersionMismatch	DELL-NETWORKING-CHASSIS-MIB.mib	Trap generated when the stack unit software version is not compatible.
141	TR_PROD_STATUS_CHANGE	1.3.6.1.4.1.674.10895.3000.2.1.0.1	productStatusGlobalStatusChange	Dell_ITA.Rev_1_1.mib	This trap is sent when the product global status changes
142	TR_CHM_UNSUPPORTED_OPTICS	1.3.6.1.4.1.6027.3.26.1.5.1.24	dellNetSysAlarmUnsupportedOptic	DELL-NETWORKING-CHASSIS-MIB.mib	The Interface Agent generate this trap when an unsupported optic is inserted in a port
143	TR_HGLBM_IMBALANCE	1.3.6.1.4.1.6027.3.24.3.1.1	bpLinkBundleImbalance	DELL-NETWORKING-BPSTATS-MIB.mib	Trap generated when traffic imbalance observed in BP Link Bundles
144	TR_HGLBM_IMBALANCE_CLEAR	1.3.6.1.4.1.6027.3.24.3.1.2	bpLinkBundleImbalanceClear	DELL-NETWORKING-BPSTATS-MIB.mib	Trap generated when traffic imbalance is no longer observed on Bp Link bundles
145	TR_BRM_PE_UP	1.3.6.1.4.1.6027.3.26.1.5.1.27	dellNetSysAlarmPEUp	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a PE operational status is up. Applicable for C9010
146	TR_BRM_PE_DOWN	1.3.6.1.4.1.6027.3.26.1.5.1.28	dellNetSysAlarmPEDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a PE operational status is down
147	TR_BRM_PE_UNIT_UP	1.3.6.1.4.1.6027.3.26.1.5.1.29	dellNetSysAlarmPEUnitUp	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a PE Unit operational status is up

Table 9. SNMP Trap List (continued)

TRAP TYPE	TRAP NAME	TRAP OID	Object Name	MIB File	Explanation
148	TR_BRM_PE_UNIT_DOWN	1.3.6.1.4.1.6027.3.26.1.5.1.30	dellNetSysAlarmPEUnitDown	DELL-NETWORKING-CHASSIS-MIB.mib	The driver/agent generate this trap when a PE Unit operational status is down
149	TR_SYSLOG_SERVER_CONNECTION_SUCCESSFUL	1.3.6.1.4.1.6027.3.30.1.1.2	Not Available	Not Available	Connecting to server with Valid configuration.
150	TR_SYSLOG_SERVER_CONNECTION_FAILURE	1.3.6.1.4.1.6027.3.30.1.1.1	Not Available	Not Available	Not able to connecting with server with Invalid configuration.

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Storm Control

The Dell EMC Networking OS storm control feature allows you to limit or suppress traffic during a traffic storm (Broadcast/ Unknown Unicast Rate Limiting or Multicast on the C-Series and S-Series).

Storm control is supported on Dell EMC Networking OS.

Important Points to Remember

- Interface commands can only be applied on physical interfaces (virtual local area networks [VLANs] and link aggregation group [LAG] interfaces are not supported).
- An INTERFACE-level command only supports storm control configuration on ingress.
- An INTERFACE-level command overrides any CONFIGURATION-level ingress command for that physical interface, if both are configured.
- You can apply the CONFIGURATION-level storm control commands at ingress or egress and are supported on all physical interfaces.
- When storm control is applied on an interface, the percentage of storm control applied is calculated based on the advertised rate of the line card. It is not based on the speed setting for the line card.
- Do not apply per-VLAN quality of service (QoS) on an interface that has storm control enabled (either on an interface or globally).
- When you enable broadcast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 1 is configured for the data traffic, the traffic goes to queue 1 instead of queue 0.
- Similarly, if you enable unicast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 2 is configured for the data traffic, the traffic goes to queue 2 instead of queue 0.

NOTE: Bi-directional traffic (unknown unicast and broadcast) along with egress storm control causes the configured traffic rates split between the involved ports. The percentage of traffic that each port receives after the split is not predictable. These ports can be in the same/different port pipes or the same/different line cards.

NOTE: The policy discard drop counters are common across storm-control drops, ACL drops and QoS drops. If your configuration includes ACL and QoS, those drops are also computed and displayed in the policy discard drops counter field along with storm-control drops. The packets dropped by the storm control feature can be monitored by viewing the value of the Policy Discard Drops field of the output of the `show hardware stack-unit` *`stack-unit-number`* `drops` command.

Topics:

- polling-interval
- xoff-state threshold polling-count
- storm-control pfc in queue-drop
- queue-drop backoff-force
- queue-drop backoff-on-norxpfc
- storm-control pfc in queue-drop-state clear
- disable storm-control pfc
- show storm-control pfc status
- clear storm-control pfc drop-counters
- show storm-control pfc statistics
- clear storm-control pfc statistics
- show storm-control broadcast
- show storm-control multicast
- show storm-control unknown-unicast
- storm-control broadcast (Configuration)
- storm-control broadcast (Interface)
- storm-control multicast (Configuration)

- storm-control multicast (Interface)
- storm-control unknown-unicast (Configuration)
- storm-control unknown-unicast (Interface)

polling-interval

You can set the time interval to poll the queue depth and egress counters.

Syntax `polling–interval {interval in milli-seconds}`

Parameters

interval in milli-seconds	Enter the polling interval in milliseconds. The range is 200 to 1000. The interval should be entered in multiples of 100. The default interval value is 100 milliseconds.

Defaults 100 milli-seconds

Command Modes CONFIGURATION (conf-storm-control-pfc)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information The `polling–interval` command is used to set the interval in milliseconds to poll the queue traffic and egress counters. You can use the polling results to detect the inconsistencies in the PAUSE frames received .

Example Use the `storm-control pfc` command in the configuration mode to enter the 'storm-control-pfc' configuration mode. The commands provisioned in this mode are applicable for all the interfaces that have PFC storm enabled.

```
DellEMC(conf)#storm-control pfc
DellEMC(conf-storm-control-pfc)#polling-interval 200
```

xoff-state threshold polling-count

When a lossless queue in an interface is not able to forward traffic for a particular duration of time, it is detected as PFC storm. You can set the duration by providing the number of polling intervals. If a port/priority remains in xoff state for the specified duration, then it is detected as PFC storm condition.

Syntax `xoff-state threshold polling-count {number of polling-interval}`

Parameters

number of polling interval	Enter the number of polling intervals. The range is from 2 to 10.

Defaults 2

Command Modes CONFIGURATION (conf-storm-control-pfc)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `xoff-state threshold polling-count` command is used to set the number of times the polling should be done. If a port/priority remains in the 'xoff' state for the configured threshold number of polling-intervals, then it would be detected as PFC storm condition. The 'xoff' state means no transmission of data happens out of a port/queue even though there are packets buffered in that queue.

Example

Use the `storm-control pfc` command in the configuration mode to enter the 'storm-control-pfc' configuration mode. The commands provisioned in this mode are applicable for all the interfaces that have PFC storm enabled.

```
DellEMC(conf)#storm-control pfc
DellEMC(conf-storm-control-pfc)#xoff-state threshold polling-count 2
```

storm-control pfc in queue-drop

When a PFC storm is detected on a port or priority, you can drop the traffic meant for the specified port or priority, so that the traffic in other queues is not disturbed. You can apply `storm-control pfc in queue-drop` on an interface, to enable dropping of the traffic on all the lossless queues of the port.

Syntax `storm-control pfc in queue-drop`

Parameters None

Defaults None

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `storm-control pfc in queue-drop` command is used to drop the traffic meant for egressing through the specified port or priority where PFC storm has been detected.

Example

```
DellEMC(conf-if-tf-1/24)# storm-control pfc in queue-drop
```

queue-drop backoff-force

You can remove the queue-drop state after the specified number of polling is done.

Syntax `queue-drop backoff-force polling–count {number of polling–interval }`

Parameters

number of polling-interval	Enter the number of polling intervals. The range is from 0 to 1000. The default value is 0.

Defaults 0

Command Modes CONFIGURATION (conf-storm-control-pfc)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `queue-drop backoff-force polling—count` command is used to remove the queue-drop state unconditionally after the specified number of polling is done. The queue-drop state, which has been activated due to the detection of PFC storm, is forced to get removed. By default, the queue-drop state is not removed until it is explicitly cleared using the `storm-control pfc in queue-drop-state clear` command.

Example

Use the `storm-control pfc` command in the configuration mode to enter the 'storm-control-pfc' configuration mode. The commands provisioned in this mode are applicable for all the interfaces that have PFC storm enabled.

```
DellEMC(conf)#storm-control pfc
DellEMC(conf-storm-control-pfc)#queue-drop backoff-force polling-count 20
```

queue-drop backoff-on-norxpfc

You can remove the queue-drop state when additional PFCs are not received.

Syntax `queue-drop backoff-on-norxpfc polling-count {number of polling-interval }`

Parameters

number of polling-interval	Enter the number of polling intervals. The range is from 0 to 1000. The default value is 10.

Defaults 10

Command Modes CONFIGURATION (conf-storm-control-pfc)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `queue-drop backoff-on-norxpfc polling-count` command is used to remove the queue-drop state if additional PFCs are not received for the specified number of polling intervals.

Example

Use the `storm-control pfc` command in the configuration mode to enter the 'storm-control-pfc' configuration mode. The commands provisioned in this mode are applicable for all the interfaces that have PFC storm enabled.

```
DellEMC(conf)#storm-control pfc
DellEMC(conf-storm-control-pfc)#queue-drop backoff-on-norxpfc polling-
count 20
```

storm-control pfc in queue-drop-state clear

You can clear the queue-drop state on an interface where the PFC storm has been triggered.

Syntax `storm-control pfc in queue-drop-state clear`

Parameters None

Defaults None

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `storm-control pfc in queue-drop-state clear` command is used to clear the queue-drop state on a particular interface where the PFC storm has been triggered.

Example

```
DellEMC(conf-if-tf-1/1)# storm-control pfc in queue-drop-state clear
```

disable storm-control pfc

You can disable the PFC storm globally.

Syntax `disable`

Parameters None

Defaults None

Command Modes CONFIGURATION (conf-storm-control-pfc)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S61000–ON, Z9100–ON.

Usage Information

The `disable` command is used to disable the PFC storm feature globally. By default, PFC storm feature is enabled on all the interfaces on which "storm-control pfc in queue-drop" configuration has been applied.

Example

Use the `storm-control pfc` command in the configuration mode to enter the 'storm-control-pfc' configuration mode. The commands provisioned in this mode are applicable for all the interfaces that have PFC storm enabled.

```
DellEMC(conf)#storm-control pfc
DellEMC(conf-storm-control-pfc)#disable
```

show storm-control pfc status

You can view the status of the PFC storm on a stack unit with specific port set.

Syntax `show storm-control pfc status stack-unit {unit-number} port-set {portpipe-number}`

Parameters

unit-number	Enter the stack unit number.
portpipe-number	Enter the port set number.

Defaults None

Command Modes EXEC Privilege.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Network Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S6100–ON, Z9100–ON.

Usage Information

The `show storm-control pfc status` command is used to view the status of the PFC storm on the specified the port set.

Example

```
DellEMC#show storm-control pfc status  stack-unit 1 port-set 0
-------------------------------------------------------------------------------------------------------
Interface Priority State   Duration in discard state(in ms)
Pkts Dropped(Ingress) Pkts Dropped(Egress) Pkts Dropped(Ingress,Cumulative) Pkts
Dropped(Egress,Cumulative)-------------------------------------------------------------------------------------------------------
  Tf 1/1     4  Drop    1194740                         2389                 135759218588         2389
    135759218588

  Tf 1/1     4  Normal  0                               0                    0                    0
    0

  Tf 1/1     4  Normal  0                               0                    0                    0
    0
```

clear storm-control pfc drop-counters

Clears all the ingress & egress drop counters and time since discard. The counters are reset and started afresh from 0.

Syntax

`clear storm-control pfc drop-counters stack-unit {unit-number} port-set {portpipe-number}`

Parameters

unit-number	Enter the stack unit number.
portpipe-number	Enter the port set number.

Defaults

None

Command Modes

EXEC Privilege.

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000, S6000–ON, S6100–ON, Z9100–ON.

Usage Information

The `clear storm-control pfc drop-counters` command is used to clears all the ingress & egress drop counters and time since discard on the specified stack unit and port set.

Related Commands

show storm-control pfc status — view the status of the PFC storm on a stack unit with a specific port set.

show storm-control pfc statistics

You can view the statistical details of the PFC storm on a stack unit with specified port set.

Syntax

`show storm-control pfc statistics stack-unit {unit-number} port-set {portpipe-number`

Parameters

unit-number	Enter the stack unit number.
portpipe-number	Enter the port set number.

Defaults None

Command Modes EXEC Privilege.

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6000, S6000–ON, S6100–ON, Z9100–ON.

Usage Information The `show storm-control pfc statistics` command is used to view the statistical data of the PFC storm on the specified stack unit and the port set.

Example

```
DellEMC#show storm-control pfc statistics stack-unit 1 port-set 0
-------------------------------------------------------------------------
  Interface     Priority   Discard State      Discard State Clear Count
                           Count              forced        No rxPfc
-------------------------------------------------------------------------
  Tf 1/1        3          2                        0               0
                4          2                        0               0
                5          2                        0               0
                6          2                        0               0
  Tf 1/1        3          0                        0               0
                4          0                        0               0
                5          0                        0               0
                6          0                        0               0
  Tf 1/2        3          2                        0               0
                4          2                        0               0
                5          2                        0               0
                6          2                        0               0
  Tf 1/3        3          2                        0               0
                4          2                        0               0
                5          2                        0               0
                6          2                        0               0
  Tf 1/4        3          2                        0               0
                4          2                        0               0
                5          2                        0               0
                6          2                        0               0
  Tf 1/5        3          2                        0               0
                4          2                        0               0
                5          2                        0               0
                6          2                        0               0
  Tf 1/8        3          0                        0               0
                4          0                        0               0
                5          0                        0               0
                6          0                        0               0

DellEMC#
```

clear storm-control pfc statistics

Clears the discard state count and cleared count statistics. If the queue is in discard state during clear, the discard state count will start from 1.

Syntax `clear storm-control pfc statistics stack-unit {unit-number} port-set {portpipe-number}`

Parameters

unit-number Enter the stack unit number.

portpipe-number Enter the port set number.

Defaults None

Command Modes EXEC Privilege.

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S6000, S6000–ON, S6100–ON, Z9100–ON.

Usage Information

The `clear storm-control pfc statistics` command is used to clear the discard count and cleared count statistics on the specified stack unit and port set.

Related Commands

show storm-control pfc statistics — used to view the statistical data of the PFC storm on the specified stack unit and the port set.

show storm-control broadcast

Display the storm control broadcast configuration.

Syntax

```
show storm-control broadcast [interface]
```

Parameters

interface (OPTIONAL) Enter one of the following interfaces to display the interface-specific storm control configuration:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

show storm-control multicast

Display the storm control multicast configuration.

Syntax `show storm-control multicast [interface]`

Parameters

interface (OPTIONAL) Enter one of the following interfaces to display the interface specific storm control configuration:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-Series and S-Series.

Example

```
DellEMC# show storm-control multicast twentyFiveGigE 1/1

Multicast storm control configuration

Interface  Direction     Packets/Second
----------------------------------------
Tf 1/1     Ingress       5

DellEMC#
```

show storm-control unknown-unicast

Display the storm control unknown-unicast configuration.

Syntax `show storm-control unknown-unicast [interface]`

Parameters

interface (OPTIONAL) Enter one of the following interfaces to display the interface specific storm control configuration:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a port channel interface, enter the keywords `port-channel` then a number.

Defaults None

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.5.1.0	Introduced on the E-Series.

storm-control broadcast (Configuration)

Configure the percentage of broadcast traffic allowed in the network.

Syntax

`storm-control broadcast [packets_per_second in]`

To disable broadcast rate-limiting, use the `no storm-control broadcast [packets_per_second in]` command.

storm-control broadcast `[percentage decimal_value` **in | out]**`| [wred-profile name]]` **[***packets_per_second* **in]**

To disable broadcast rate-limiting, use the **storm-control broadcast** [*percentage decimal_value* in | out] | [wred-profile name]] [*packets_per_second* **in]** command.

Parameters

***percentagedecimal_value* in | out**	E-Series Only: Enter the percentage of broadcast traffic allowed in or out of the network. Optionally, you can designate a decimal value percentage, for example, 55.5%. The decimal range is from .1 to .9.
wred-profile name	E-Series Only: Enter the keyword **wred-profile** followed by the profile name to designate a wred-profile.
***packets_per_second* in**	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

CONFIGURATION (conf)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-MUX (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
6.5.1.0	Introduced on the E-Series.

Usage Information Broadcast storm control is valid on Layer 2/Layer 3 interfaces only. Layer 2 broadcast traffic is treated as unknown-unicast traffic.

storm-control broadcast (Interface)

Configure the percentage of broadcast traffic allowed on an interface (ingress only).

Syntax `storm-control broadcast [packets_per_second in]`

To disable broadcast storm control on the interface, use the `no storm-control broadcast [packets_per_second in]` command.

Parameters

***packets_per_second* in**	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults none

Command Modes INTERFACE (conf-if-*interface-slot/port*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.

Version	Description
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
6.5.1.0	Introduced on the E-Series.

storm-control multicast (Configuration)

Configure the packets per second (pps) of multicast traffic allowed into the C-Series and S-Series networks only.

Syntax

`storm-control multicast` *`packets_per_second`* `in`

To disable storm-control for multicast traffic into the network, use the `no storm-control multicast` *`packets_per_second`* `in` command.

Parameters

packets_per_second **in**	Enter the packets per second of multicast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

CONFIGURATION (conf)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-MUX (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-series and S-Series.

Usage Information Broadcast traffic (all 0xFs) should be counted against the broadcast storm control meter, not against the multicast storm control meter. It is possible, however, that some multicast control traffic may get dropped when storm control thresholds are exceeded.

storm-control multicast (Interface)

Configure the percentage of multicast traffic allowed on an C-Series or S-Series interface (ingress only) network only.

Syntax `storm-control multicast packets_per_second in`

To disable multicast storm control on the interface, use the `no storm-control multicast packets_per_second in` command.

Parameters

***packets_per_second* in**	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults none

Command Modes INTERFACE (conf-if-*interface-slot/port*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the C-series and S-Series.

storm-control unknown-unicast (Configuration)

Configure the percentage of unknown-unicast traffic allowed in or out of the network.

Syntax `storm-control unknown-unicast [packets_per_second in]`

To disable storm control for unknown-unicast traffic, use the `no storm-control unknown-unicast [packets_per_second in]` command.

Parameters

***packets_per_second* in**	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
6.5.1.0	Introduced on the E-Series.

Usage Information Unknown Unicast Storm-Control is valid for Layer 2 and Layer 2/Layer 3 interfaces.

storm-control unknown-unicast (Interface)

Configure percentage of unknown-unicast traffic allowed on an interface (ingress only).

Syntax `storm-control unknown-unicast [percentage decimal_value in] | [wred-profile name]] [packets_per_second in]`

To disable unknown-unicast storm control on the interface, use the `no storm-control unknown-unicast [percentage decimal_value in] | [wred-profile name]] [packets_per_second in]` command.

Parameters

***percentage decimal_value* [in | out]**	E-Series Only: Enter the percentage of broadcast traffic allowed in or out of the network. Optionally, you can designate a decimal value percentage, for example, 55.5%. The percentage is from 0 to 100: • 0% blocks all related traffic. • 100% allows all traffic into the interface. The decimal range is from 0.1 to 0.9.
wred-profile name	E-Series Only: (Optionally) Enter the keywords `wred-profile` followed by the profile name to designate a wred-profile.

***packets_per_second* in**	C-Series and S-Series Only: Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554431.

Defaults none

Command Modes INTERFACE (conf-if-*interface-slot/port*)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
6.5.1.0	Introduced on the E-Series.

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Spanning Tree Protocol (STP)

The commands in this section configure and monitor the IEEE 802.1d spanning tree protocol (STP) and are supported on the Dell EMC Networking switch/routing platform.

Topics:

- bridge-priority
- bpdu-destination-mac-address
- debug spanning-tree
- description
- disable
- forward-delay
- hello-time
- max-age
- protocol spanning-tree
- show config
- show spanning-tree 0
- spanning-tree

bridge-priority

Set the bridge priority of the switch in an IEEE 802.1D spanning tree.

Syntax `bridge-priority {priority-value | primary | secondary}`

To return to the default value, use the `no bridge-priority` command.

Parameters

priority-value	Enter a number as the bridge priority value. The range is from 0 to 65535. The default is **32768**.
primary	Enter the keyword `primary` to designate the bridge as the root bridge.
secondary	Enter the keyword `secondary` to designate the bridge as a secondary root bridge.

Defaults priority-value = **32768**

Command Modes SPANNING TREE (The prompt is “config-stp”.)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

bpdu-destination-mac-address

Use the Provider Bridge Group address in Spanning Tree or GVRP PDUs.

Syntax `bpdu-destination-mac-address [stp | gvrp] provider-bridge-group`

Parameters

xstp	Force STP, RSTP, and MSTP to use the Provider Bridge Group address as the destination MAC address in its BPDUs.
gvrp	Forces GVRP to use the Provider Bridge GVRP Address as the destination MAC address in its PDUs.

Defaults The destination MAC address for BPDUs is the Bridge Group Address.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the S4810.
8.2.1.0	Introduced on the C-Series and S-Series.

debug spanning-tree

Enable debugging of the spanning tree protocol and view information on the protocol.

Syntax

`debug spanning-tree {stp-id [all | bpdu | config | events | exceptions | general | root] | protocol}`

To disable debugging, use the `no debug spanning-tree` command.

Parameters

stp-id	Enter zero (0). The switch supports one spanning tree group with a group ID of 0.
protocol	Enter the keyword for the type of STP to debug, either `mstp`, `pvst`, or `rstp`.
all	(OPTIONAL) Enter the keyword `all` to debug all spanning tree operations.
bpdu	(OPTIONAL) Enter the keyword `bpdu` to debug bridge protocol data units.
config	(OPTIONAL) Enter the keyword `config` to debug configuration information.
events	(OPTIONAL) Enter the keyword `events` to debug STP events.
general	(OPTIONAL) Enter the keyword `general` to debug general STP operations.
root	(OPTIONAL) Enter the keyword `root` to debug STP root transactions.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

When you enable `debug spanning-tree bpdu` for multiple interfaces, the software only sends information on BPDUs for the last interface specified.

Related Commands

- protocol spanning-tree — enters SPANNING TREE mode on the switch.

description

Enter a description of the spanning tree.

Syntax

`description {description}`

To remove the description from the spanning tree, use the `no description {description}` command.

Parameters

description Enter a description to identify the spanning tree (80 characters maximum).

Defaults

none

Command Modes

SPANNING TREE (The prompt is "config-stp".)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced

Related Commands

- protocol spanning-tree — enter SPANNING TREE mode on the switch.

disable

Disable the spanning tree protocol globally on the switch.

Syntax

`disable`

To enable Spanning Tree Protocol, use the `no disable` command.

Defaults

Enabled (that is, the spanning tree protocol is disabled.)

Command Modes

SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- protocol spanning-tree — enter SPANNING TREE mode on the switch.

forward-delay

The amount of time the interface waits in the Listening state and the Learning state before transitioning to the Forwarding state.

Syntax `forward-delay` *seconds*

To return to the default setting, use the `no forward-delay` command.

Parameters

seconds	Enter the number of seconds the Dell EMC Networking OS waits before transitioning STP to the Forwarding state. The range is from 4 to 30. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- max-age — changes the wait time before STP refreshes protocol configuration information.
- hello-time — changes the time interval between BPDUs.

hello-time

Set the time interval between generation of the spanning tree bridge protocol data units (BPDUs).

Syntax `hello-time seconds`

To return to the default value, use the `no hello-time` command.

Parameters

seconds	Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10. The default is **2 seconds**.

Defaults **2 seconds**

Command Modes SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- forward-delay — changes the wait time before STP transitions to the Forwarding state.
- max-age — changes the wait time before STP refreshes protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the spanning tree bridge.

Syntax `max-age seconds`

To return to the default values, use the `no max-age` command.

Parameters

seconds	Enter a number of seconds the Dell EMC Networking OS waits before refreshing configuration information. The range is from 6 to 40. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes SPANNING TREE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Related Commands

- forward-delay — changes the wait time before STP transitions to the Forwarding state.
- hello-time — changes the time interval between BPDUs.

protocol spanning-tree

To enable and configure the spanning tree group, enter SPANNING TREE mode.

Syntax `protocol spanning-tree stp-id`

To disable the Spanning Tree group, use the `no protocol spanning-tree stp-id` command.

Parameters

stp-id	Enter zero (0). Dell EMC Networking OS supports one spanning tree group, group 0.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information STP is not enabled when you enter SPANNING TREE mode. To enable STP globally on the switch, use the `no disable` command from SPANNING TREE mode.

Example

```
DellEMC(conf)# protocol spanning-tree 0
DellEMC(config-stp)#
```

Related Commands

- disable — disables spanning tree group 0. To enable spanning tree group 0, use the `no disable` command.

show config

Display the current configuration for the mode. Only non-default values display.

Syntax `show config`

Command Modes SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(config-stp)# show config
protocol spanning-tree 0
  no disable
DellEMC(config-stp)#
```

show spanning-tree 0

Display the spanning tree group configuration and status of interfaces in the spanning tree group.

Syntax

```
show spanning-tree 0 [active | brief | guard | interface interface | root | summary]
```

Parameters

0	Enter `0` (zero) to display information about that specific spanning tree group.
active	(OPTIONAL) Enter the keyword `active` to display only active interfaces in spanning tree group 0.
brief	(OPTIONAL) Enter the keyword `brief` to display a synopsis of the spanning tree group configuration information.
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on an STP interface and the current port state.
interface *interface*	(OPTIONAL) Enter the keyword `interface` and the type slot/port of the interface you want displayed. Type slot/port options are the following: • For a port-channel interface, enter the keywords `port-channel` then the port-channel ID. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information.

- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

root (OPTIONAL) Enter the keyword `root` to display configuration information on the spanning tree group root.

summary (OPTIONAL) Enter the keyword `summary` to only the number of ports in the spanning tree group and their state.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.5.1.0	Added support for 4-port 40G line cards on the E-Series.
8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series.
8.3.7.0	Introduced on the S4810.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information Enable spanning tree group 0 prior to using this command.

The following describes the `show spanning-tree 0` command shown in the example.

Field	Description
"Bridge Identifier..."	Lists the bridge priority and the MAC address for this STP bridge.
"Configured hello..."	Displays the settings for hello time, max age, and forward delay.
"We are..."	States whether this bridge is the root bridge for the STG.

Field	Description
"Current root..."	Lists the bridge priority and MAC address for the root bridge.
"Topology flag..."	States whether the topology flag and the detected flag were set.
"Number of..."	Displays the number of topology changes, the time of the last topology change, and on what interface the topology change occurred.
"Timers"	Lists the values for the following bridge timers: hold time, topology change, hello time, max age, and forward delay.
"Times"	List the number of seconds since the last: • hello time • topology change • notification • aging
"Port 1..."	Displays the Interface type slot/port information and the status of the interface (Disabled or Enabled).
"Port path..."	Displays the path cost, priority, and identifier for the interface.
"Designated root..."	Displays the priority and MAC address of the root bridge of the STG that the interface belongs.
"Designated port..."	Displays the designated port ID.

Example

```
DellEMC# show spann 0

Executing IEEE compatible Spanning Tree Protocol
 Bridge Identifier has priority 32768, Address 0001.e800.0a56
 Configured hello time 2, max age 20, forward delay 15
 We are the root of the spanning tree
 Current root has priority 32768 address 0001.e800.0a56
 Topology change flag set, detected flag set
 Number of topology changes 1 last change occurred 0:00:05 ago
   from twentyFiveGigE 1/1
 Timers:hold 1, topology change 35
        hello 2, max age 20, forward_delay 15
 Times:hello 1, topology change 1, notification 0, aging 2

Port 26 (twentyFiveGigE 1/2) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.26
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.26, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
 Number of transitions to forwarding state 1
 BPDU: sent:18, received 0
 The port is not in the portfast mode

Port 27 (twentyFiveGigE 1/3) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.27
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.27, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
 Number of transitions to forwarding state 1
 BPDU: sent:18, received 0
 The port is not in the portfast mode

Port 28 (twentyFiveGigE 1/4) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.28
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.28, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
```

```
 Number of transitions to forwarding state 1
 BPDU: sent:31, received 0
 The port is not in the portfast mode

DellEMC#
```

Example (Brief)

```
DellEMC# show span 0 brief
  Executing IEEE compatible Spanning Tree Protocol
    Root ID Priority 32768
      Address 0001.e800.0a56
    Root Bridge hello time 2, max age 20, forward delay 15
    Bridge ID Priority 32768,
      Address 0001.e800.0a56
    Configured hello time 2, max age 20, forward delay 15
Interface                          Designated
Name    PortID  Prio Cost Sts Cost Bridge ID           PortID
--------------- ------ ---- ---- --- ----- ------------------
Tf 1/1  8.26    8    4      FWD 0    32768 0001.e800.0a56 8.26
Tf 1/2  8.27    8    4      FWD 0    32768 0001.e800.0a56 8.27
Tf 1/3  8.28    8    4      FWD 0    32768 0001.e800.0a56 8.28
DellEMC#
```

Usage Information

The following describes the `show spanning-tree 0 guard` command shown in the example.

Field	Description
Interface Name	STP interface.
Instance	STP 0 instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Guard)

```
DellEMC#show spanning-tree 0 guard
Interface
Name       Instance   Sts         Guard type
--------   --------  ---------    ----------
Tf 1/1       0       INCON(Root)  Rootguard
Tf 1/2       0       LIS          Loopguard
Tf 1/3       0       EDS (Shut)   Bpduguard
```

spanning-tree

Assigns a Layer 2 interface to STP instance 0 and configures a port cost or port priority, or enables loop guard, root guard, or the Portfast feature on the interface.

Syntax

`spanning-tree` *`stp-id`* `{cost` *`cost`* `| {loopguard | rootguard} | portfast [bpduguard [shutdown-on-violation]] | priority` *`priority`*`}`

To disable Spanning Tree group on an interface, use the `no spanning-tree` *`stp-id`* `{cost` *`cost`* `| {loopguard | rootguard} | portfast [bpduguard [shutdown-on-violation]] | priority` *`priority`*`}` command.

Parameters

stp-id Enter the STP instance ID. The range is 0.

cost *cost* Enter the keyword `cost` then a number as the cost. The range is from 1 to 65535. The defaults are:

- 1-Gigabit Ethernet interface = **4**.
- 10-Gigabit Ethernet interface = **2**.
- Port Channel interface with 100 Mb/s Ethernet = **18**.
- Port Channel interface with 1 Gigabit Ethernet = **3**.

- Port Channel interface with 10 Gigabit Ethernet = **1**.

loopguard	Enter the keyword `loopguard` to enable STP loop guard on a port or port-channel interface.
rootguard	Enter the keyword `rootguard` to enable STP root guard on a port or port-channel interface.
portfast [bpduguard [shutdown-on-viol ation]]	Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails. Enter the optional keyword `bpduguard` to disable the port when it receives a BPDU. Enter the optional keyword `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.
priority *priority*	Enter keyword `priority` then a number as the priority. The range is from zero (0) to 15. The default is **8**.

Defaults cost = depends on the interface type; priority = **8**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.10.1	Introduced the `loopguard` and `rootguard` options on the S4810.
8.4.2.1	Introduced the `loopguard` and `rootguard` options on the E-Series, C-Series, and S-Series.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced the `shutdown-on-violation` option.
7.7.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information If you enable `portfast bpduguard` on an interface and the interface receives a BPDU, the software disables the interface and sends a message stating that fact. The port is in ERR_DISABLE mode, yet appears in the `show interface` commands as enabled. If you do not enable `shutdown-on-violation`, BPDUs are still sent to the RPM CPU.

STP loop guard and root guard are supported on a port or port-channel enabled in any Spanning Tree mode: Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), and Per-VLAN Spanning Tree Plus (PVST+).

Root guard is supported on any STP-enabled port or port-channel except when used as a stacking port. When enabled on a port, root guard applies to all VLANs configured on the port.

STP root guard and loop guard cannot be enabled at the same time on a port. For example, if you configure loop guard on a port on which root guard is already configured, the following error message is displayed: `% Error: RootGuard is configured. Cannot configure LoopGuard`.

Do not enable Portfast BPDU guard and loop guard at the same time on a port. Enabling both features may result in a port that remains in a blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.
- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

To display the type of STP guard (Portfast BPDU, root, or loop guard) enabled on a port, enter the `show spanning-tree 0` command.

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SupportAssist

SupportAssist sends troubleshooting data securely to Dell. SupportAssist in this Dell EMC Networking OS release does not support automated email notification at the time of hardware fault alert, automatic case creation, automatic part dispatch, or reports. SupportAssist requires Dell EMC Networking OS 9.9(0.0) and SmartScripts 9.7 or later to be installed on the Dell EMC Networking device. For more information on SmartScripts, see *Dell EMC Networking Open Automation guide*.

NOTE: SupportAssist is enabled by default on the system. To disable SupportAssist, enter the `eula-consent support-assist reject` command in Global Configuration mode and save the configuration.

Topics:

- eula-consent
- support-assist
- support-assist activate
- support-assist activity
- SupportAssist Commands
- SupportAssist Activity Commands
- SupportAssist Company Commands
- SupportAssist Person Commands
- SupportAssist Server Commands
- show eula-consent
- show running-config
- show support-assist status

eula-consent

Accept or reject the end user license agreement (EULA).

Syntax `eula-consent {support-assist} {accept | reject}`

Parameters

support-assist	Enter the keywords `support-assist` to either accept or reject the EULA for the specified service.
accept	Enter the keyword `accept` to accept the EULA for the specified service.
reject	Enter the keyword `reject` to reject the EULA for the specified service.

Defaults None

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

- When you run the command, the system displays a message with the information directing to the URL for further information.
- Even before you accept or reject the EULA, the configuration data is sent to the default centrally deployed SupportAssist Server. If you reject the EULA, the configuration data is not transmitted to the SupportAssist server.
- If there is an existing SupportAssist configuration, the configuration is not removed and the feature is disabled.

Example

Accept the EULA:

```
DellEMC(conf)# eula-consent support-assist accept
I accept the terms of the license agreement. You can reject
the license agreement by configuring this command
'eula-consent support-assist reject'.

By installing SupportAssist, you allow Dell to save your
contact information (e.g. name, phone number and/or
email address) which would be used to provide technical
support for your Dell products and services.  Dell may use
the information for providing recommendations to improve
your IT infrastructure.

Dell SupportAssist also collects and stores machine diagnostic
information, which may include but is not limited to
configuration information, user supplied contact information,
names of data volumes, IP addresses, access control lists,
diagnostics & performance information, network configuration
information, host/server configuration & performance
information and related data ("Collected Data") and transmits
this information to Dell. By downloading SupportAssist and
agreeing to be bound by these terms and the Dell end user
license agreement, available at: www.dell.com/aeula, you
agree to allow Dell to provide remote monitoring services of
your IT environment and you give Dell the right to collect the
Collected Data in accordance with Dells Privacy Policy,
available at: www.dell.com/privacypolicycountryspecific,
in order to enable the performance of all of the various
functions of SupportAssist during your entitlement to receive
related repair services from Dell,.  You further agree to
allow Dell to transmit and store the Collected Data from
SupportAssist in accordance with these terms.  You agree
that the provision of SupportAssist may involve international
transfers of data from you to Dell and/or to Dells affiliates,
subcontractors or business partners.  When making such
transfers, Dell shall ensure appropriate protection is in
place to safeguard the Collected Data being transferred in
connection with SupportAssist.  If you are downloading
SupportAssist on behalf of a company or other legal entity,
you are further certifying to Dell that you have
appropriate authority to provide this consent on behalf
of that entity.  If you do not consent to the collection,
transmission and/or use of the Collected Data, you may
not download, install or otherwise use SupportAssist.
```

Reject the EULA:

```
DellEMC(conf)#eula-consent support-assist reject
Aug 24 22:35:38: %STKUNIT1-M:CP %SUPPORT_ASSIST-6-SUPASSIST_EVT: Event
monitor service stopped
I do not accept the terms of the license agreement. The SupportAssist
feature has
been deactivated and can no longer be used.
To enable SupportAssist configurations, accept the terms of the license
agreement
by configuring this command 'eula-consent support-assist accept'.
DellEMC(conf)#
DellEMC(conf)#
Aug 24 22:35:49: %STKUNIT1-M:CP %SUPPORT_ASSIST-6-
SUPASSIST_PKG_UNINSTALLED: SupportAssist package uninstalled
DellEMC(conf)#
```

Related Commands

- support-assist — moves to the SupportAssist Configuration mode.

support-assist

Move to the SupportAssist configuration mode.

Syntax

```
support-assist
```

To remove all the configuration of the SupportAssist service, use the `no support-assist` command.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

If you reject the EULA, the data is not transmitted to the SupportAssist server.

Related Commands

- eula-consent — accept or reject the EULA.

support-assist activate

Launch the configuration wizard that enables SupportAssist service and guides through a series of commands to configure SupportAssist.

Syntax

```
support-assist activate
```

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

You are guided through a series of queries to configure SupportAssist. The generated commands are added to the running configuration, including the DNS resolve commands, if configured.

This command starts the configuration wizard for the SupportAssist. At any time, you can exit by entering Ctrl-C. If necessary, you can skip some data entry.

Once you exit the wizard, the Dell EMC Networking OS starts a full transfer.

support-assist activity

Trigger an activity event immediately.

Syntax `support-assist activity {full-transfer | core-transfer} start now`

Parameters

full-transfer	Enter the keyword `full-transfer` to specify transfer of configuration, inventory, logs, and other information.
core-transfer	Enter the keyword `core-transfer` to specify transfer of core files.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information Use the command to trigger the activity that enables transfer of information. You can choose a full transfer that includes all the details or core transfer that includes only the core files.

NOTE: The full transfer includes the core files as well in the information sent. The core transfer does not send core files that are older than 30 days.

SupportAssist Commands

Dell EMC Networking OS supports the following SupportAssist mode commands.

activity

Move to the SupportAssist Activity mode for an activity. Allow the user to configure customized details for a specific activity.

Syntax `activity {activity-name}`

To remove all customized detail for a specific activity, use the `no activity {activity-name}` command.

Parameters

activity-name	Enter one of the following keywords: • Enter the keyword `full-transfer` to enable or disable full transfer. You can create a custom file to transfer the outputs from a set of show commands. By default, the full transfer runs once in every 30 days. • Enter the keyword `core-transfer` to enable or disable core transfer.

- Enter the keyword `event-transfer` to enable or disable event transfer. You can create a custom file to monitor a set of events.

Command Modes SUPPORTASSIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM. Introduced the `core-transfer` and `event-transfer` parameters.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information By default, each activity follows a set of default actions using a default schedule. Using this command, you can customize the set of actions and disable a certain activity.

contact-company

Configure the contact information for the company.

Syntax `contact-company name {company-name}[company-next-name] ... [company-next-name]`

To remove the contact company information, use the `no contact-company` command.

Parameters

company-name	Enter the name for the company. If there are multiple words in the name, use optional additional fields.
company-next-name	(OPTIONAL) Enter the next components of the company name, up to 5 components are allowed.

Command Modes SUPPORTASSIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information You can configure only one contact-company.

It is not possible to remove the components of the company name. The no form of the command removes the entire contact-company entry.

This command is optional for SupportAssist service configuration.

contact-person

Configure the contact name for an individual.

Syntax

`contact-person [first <first-name>] last <last-name>`

To remove the contact person and all their details, use the `no contact-person [first <first-name>] last <last-name>` command.

Parameters

first-name	(Optional) Enter the first name for the contact person. This is optional provided each contact person name is unique. To include a space, enter a space within double quotes.
last-name	Enter the last name for the contact person. To include a space, enter a space within double quotes.

Command Modes SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

Each contact person must be unique by their name.

You can configure only one contact person.

It is not possible to remove the first name or last name. The no form of the command removes the entire contact-person entry.

This command is optional for SupportAssist service configuration.

enable

Enable all activities and severs for the SupportAssist service.

Syntax

`enable all`

To disable the SupportAssist activities temporarily, use the `no enable all` command.

Parameters

all	Enter the keyword `all` to enable all SupportAssist service activities.

Defaults Enabled or All Enabled

Command Modes SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

server

Configure the name of the remote SupportAssist Server and move to SupportAssist Server mode.

Syntax `server {default | server-name}`

To delete a server, use the `no server server-name` command.

Parameters

default	Enter the keyword `default` for the default server.
server-name	Enter the name of the custom server to which the logs would be transferred. To include a space, enter a space within double quotes.

Defaults Default server has URL stor.g3.ph.dell.com

Command Modes SUPPORTASSIST

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information The server-name is used as a reference only and is not required to be used as part of a URL definition.

There is a reserved name of `default` for the default server at stor.g3.ph.dell.com. You can customize the defaults for this server by entering the `server default` command and use the custom commands.

You can configure one additional server.

SupportAssist Activity Commands

Dell EMC Networking OS supports the following SupportAssist Activity mode commands.

action-manifest get

Copy an action-manifest file for an activity to the system.

Syntax `action-manifest get tftp | ftp | flash <file-specification> <local-file-name>`

Parameters

file-specification	Enter the full file specification for the action-manifest file. For example:

- tftp://hostip/filepath
- ftp://userid:password@hostip/filepath
- scp://userid:password@hostip/filepath

local-file-name Enter the name of the local action-manifest file, up to 32 characters long. Allowable characters are: a to z, A to Z, 0 to 9, -, _, and space.

Command Modes SUPPORTASSIST ACTIVITY FULL-TRANSFER

SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information The remote file specification for full transfer includes the protocol that is used to copy the file from the remote system.

The default Manifest-file for full transfer includes records like alarms, logs, operational, and configuration data.

Related Commands

- action-manifest install — configure the action-manifest to use for a specific activity.
- action-manifest show — view the list of action-manifest for a specific activity.
- action-manifest remove — remove the action-manifest file for an activity.

action-manifest install

Configure action-manifest to transfer a set of customized records for full transfer and to monitor a set of specified events for event transfer.

Syntax `action-manifest install {default | <local-file-name>}`

To revert to the default action-manifest file, use the `action-manifest install default` command.

Parameters

default Enter the keyword `default` to revert back to the default set of actions for an activity.

local-file-name Enter the name of the local action-manifest file. Allowable characters are: a to z, A to Z, 0 to 9, -, _, and space.

Defaults Default

Command Modes SUPPORTASSIST ACTIVITY FULL-TRANSFER

SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

To replace the default action-manifest with a customized one, copy the action-manifest file to the system using the `action-manifest get` command and then use the `action-manifest install` command. To revert to the default action-manifest file, use the `action-manifest install default` command.

Related Commands

- action-manifest get — copy an action-manifest file for an activity to the system.
- action-manifest show — view the list of action-manifest for a specific activity.
- action-manifest remove — remove the action-manifest file for an activity.

action-manifest remove

Remove the action-manifest file from Dell EMC Networking OS.

Syntax

```
action-manifest remove <local-file-name>}
```

Parameters

local-file-name	Enter the name of the local action-manifest file. Allowable characters are: a to z, A to Z, 0 to 9, -, _, and space.

Command Modes

SUPPORTASSIST ACTIVITY FULL-TRANSFER

SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

To revert to the default action-manifest file, use the `action-manifest install` command. If necessary, you can then remove the custom action-manifest file.

Related Commands

- action-manifest get — copy an action-manifest file for an activity to the system.
- action-manifest install — configure the action-manifest to use for a specific activity.
- action-manifest show — view the list of action-manifest for a specific activity.

action-manifest show

View the list of action-manifest for a specific activity.

Syntax

```
action-manifest show {all}
```

Parameters

all	Enter the keyword `all` to view the entire list of action-manifests that are available for an activity.

Command Modes

SUPPORTASSIST ACTIVITY FULL-TRANSFER

SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Related Commands

- action-manifest get — copy an action-manifest file for an activity to the system.
- action-manifest install — configure the action-manifest to use for a specific activity.
- action-manifest remove — remove the action-manifest file for an activity.

enable

Enable a specific SupportAssist activity.

Syntax

```
enable
```

To disable a particular SupportAssist activity, use the `no enable` command.

Defaults

Enabled

Command Modes

SUPPORTASSIST ACTIVITY FULL-TRANSFER

SUPPORTASSIST ACTIVITY CORE-TRANSFER

SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

Enter the specific SupportAssist activity mode and then enable it.

NOTE: By default, the full transfer includes the core files. When you disable the core transfer activity, the full transfer excludes the core files.

Related Commands

- activity — move user to the SupportAssist Activity mode for that activity.

SupportAssist Company Commands

Dell EMC Networking OS supports the following SupportAssist Company mode commands.

address

Configure the address information for the company.

Syntax

`address [city company-city] [{province | region | state} name] [country company-country] [{postalcode | zipcode] company-code]`

To remove a portion of the company address information, use the `no address [city | province | region | state | country | postalcode | zipcode]` command. For example, to remove the city alone, use the `no address city` command.

To remove the complete company contact information, use the `no address` command.

Parameters

city *company-city*	(OPTIONAL) Enter the keyword `city` then the city or town for the company site. To include a space, enter a space within double quotes.
province | region | state *name*	(OPTIONAL) Enter the keyword `province`, `region` or `state` then the name of province, region or state for the company site. To include a space, enter a space within double quotes.
country *company-country*	(OPTIONAL) Enter the keyword `country` then the country for the company site. To include a space, enter a space within double quotes.
postalcode | zipcode *company-code*	(OPTIONAL) Enter the keyword `postalcode` or `zipcode` then the postal code or zip code for the company site, as one string with no spaces.

Command Modes SUPPORTASSIST COMPANY

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

The optional parameters must be provided in the following order: `city state country postalcode`. If specified in a different order, the command returns an error as follows:

```
DellEMC(conf-supportassist-cmpy-test)# address city Minneapolis
postalcode 55344 country USA state Minnesota
                                   ^
% Error: Invalid input at "^" marker.
```

This command is optional for SupportAssist service configuration.

Example

```
DellEMC(conf-supportassist-cmpy-test)# address city Minneapolis state
Minnesota country USA postalcode 55344
```

street-address

Configure the street address information for the company.

Syntax `street-address {address1} [address2]…[address8]`

To remove the street address, use the `no street-address` command.

Parameters

address1	Enter the street address for the company.
address2..address8	(OPTIONAL) Enter the street address of the company site. Up to 8 fields are allowed.

Command Modes SUPPORTASSIST COMPANY

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information This command is optional for SupportAssist service configuration.

territory

Configure the territory and set the coverage for the company site.

Syntax `territory company-territory`

To remove the company territory information, use the `no territory` command.

Parameters

company-territory	Enter the territory name for the company. To include a space, enter a space within double quotes. Use three-letter country codes like USA, IND, FRA, GER and so on.

Command Modes SUPPORTASSIST COMPANY

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information This command is optional for SupportAssist service configuration.

SupportAssist Person Commands

Dell EMC Networking OS supports the following SupportAssist Person mode commands.

email-address

Configure the email addresses to reach the contact person.

Syntax

`email-address primary` *`email-address`* `[alternate` *`email-address`*`]`

To remove an email address, use the `no email-address` command. To remove the primary and the alternate email addresses, use the `no email-address primary` and `no email-address alternate` commands respectively.

Parameters

primary *email-address*	Enter the keyword `primary` then the primary email address for the person.
alternate *email-address*	Enter the keyword `alternate` then the alternate email address for the person.

Command Modes SUPPORTASSIST PERSON

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

The email addresses must have the standard form of <username>@<email system> to be considered valid.

This command is optional for SupportAssist service configuration.

Related Commands

- preferred-method — configure the preferred method for contacting the person.

phone

Configure phone numbers to reach the contact person.

Syntax

`phone primary` *`phone`* `[alternate` *`phone`*`]`

To remove a phone number, use the `no phone` command. To remove the primary and alternate phone numbers, use the `no phone primary` and `no phone alternate` commands respectively.

Parameters

primary *phone*	Enter the keyword `primary` then the primary phone number for the person.
alternate *phone*	Enter the keyword `alternate` then the alternate phone number for the person.

Command Modes SUPPORTASSIST PERSON

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

The phone numbers may contain country codes, area codes and extensions, if necessary. Allowable characters are 0 to 9, x, (,), - and +.

This command is optional for SupportAssist service configuration.

Related Commands

- preferred-method — configure the preferred method for contacting the person.

preferred-method

Configure the preferred method for contacting the person.

Syntax

```
preferred-method {email | no-contact | phone]
```

Parameters

email	Enter the keyword `email` to specify email as preferred method.
no-contact	Enter the keywords `no-contact` to specify that there is no preferred method.
phone	Enter the keyword `phone` to specify phone as preferred method.

Defaults

no-contact

Command Modes

SUPPORTASSIST PERSON

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Related Commands

- email-address — configure email addresses to reach the contact person.
- phone — configure phone numbers to reach the contact person.

time-zone

Configure the time zone for contacting the person.

Syntax

```
time-zone zone +-HH:MM[start-time HH:MM] [end-time HH:MM]
```

To remove the time zone, use the `no time-zone [zone | start-time | end-time]` command.

Parameters

zone *+-HH:MM*	Enter the keyword `zone` then a time difference from GMT expressed as HH:MM. This number may be preceded by either a + or – sign.
start-time *HH:MM*	Enter the keywords `start-time` then a starting time expressed as HH:MM. Use the 24-hour clock format.
stop-time *HH:MM*	Enter the keywords `stop-time` then a stopping time expressed as HH:MM. Use the 24-hour clock format.

Command Modes SUPPORTASSIST PERSON

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information This command is optional for SupportAssist service configuration.

SupportAssist Server Commands

Dell EMC Networking OS supports the following SupportAssist Server mode commands.

proxy-ip-address

Configure a proxy for reaching the SupportAssist remote server.

Syntax `proxy-ip-address {ipv4-address | ipv6-address} port port-number [ username userid password [encryption-type] password ]`

To remove the proxy, use the `no proxy-ip-address` command.

Parameters

ipv4-address	Enter the IP address of the proxy server in a dotted decimal format (A.B.C.D).
ipv6-address	Enter the IPv6 address of the proxy server in the x:x:x:x::x format. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros. **NOTE:** To use the IPv6 address, the Open Automation package should also support IPv6 communications. For this purpose, SupportAssist requires Dell EMC Networking Open Automation 9.10(0.0) package or later.
port *port-number*	Enter the keyword `port` then the TCP/IP port number. The port number range is from 1024 to 65534.
username *userid*	(OPTIONAL) Enter the keyword `username` then the user ID used for the proxy server.
password	Enter the keyword `password` then the encryption-type or the user password.
encryption-type	(OPTIONAL) Enter an encryption type for the *password* you enter. • 0 directs the system to interpret the password as clear text.

- 7 indicates that the password is encrypted using a DES hashing algorithm.

password Enter a string up to 32 characters long.

Defaults encryption-type for the password is 0.

Command Modes SUPPORTASSIST SERVER

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information The passwords are stored encrypted in the running configuration.

enable

Enable communication with the SupportAssist server.

Syntax `enable`

To disable communication to a specific SupportAssist server, use the `no enable` command.

Defaults Enabled

Command Modes SUPPORTASSIST SERVER

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Related Commands

- server — configure the name of the remote SupportAssist server.

url

Configure the URL to reach the SupportAssist remote server.

Syntax `url *uniform-resource-locator*`

To delete the URL for the server, use the `no url` command.

Parameters

uniform-resource-locator Enter a text string for the URL using one of the following formats:

- http://[username:password@]<hostip>:<portNum>/<filepath>
- https://[username:password@]<hostip>:<portNum>/<filepath>

NOTE: The host IP for the server may be specified as an IPv4 address, an IPv6 address or as a DNS hostname. If using the DNS hostname, the DNS resolver will need to be configured and enabled.

Command Modes SUPPORTASSIST SERVER

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information The URL should be formatted to follow the ISO format.

show eula-consent

Display the EULA for the feature.

Syntax `show eula-consent {support-assist | other feature}`

Parameters

support-assist | *other feature* Enter the keywords `support-assist` or the text corresponding to other feature.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Example

```
DellEMC# show eula-consent support-assist

SupportAssist EULA has been: Accepted

Additional information about the SupportAssist EULA is as follows:

By installing SupportAssist, you allow Dell to save your contact
```

```
information
(e.g. name, phone number and/or email address) which would be used to
provide
technical support for your Dell products and services.  Dell may use the
information
for providing recommendations to improve  your IT infrastructure.

Dell SupportAssist also collects and stores machine diagnostic
information, which
may include but is not limited to configuration information, user
supplied contact
information, names of data volumes, IP addresses, access control lists,
diagnostics &
performance information, network configuration information, host/server
configuration
& performance information and related data (Collected Data) and
transmits this
information to Dell. By downloading SupportAssist and agreeing to be
bound by these
terms and the Dell end user license agreement, available at:
www.dell.com/aeula,
you agree to allow Dell to provide remote monitoring services of your IT
environment
and you give Dell the right to collect the Collected Data in accordance
with Dells
Privacy Policy, available at: www.dell.com/privacypolicycountryspecific,
in order to
enable the performance of all of the various functions of SupportAssist
during your
entitlement to receive related repair services from Dell,.  You further
agree to
allow Dell to transmit and store the Collected Data from SupportAssist
in accordance
with these terms.  You agree that the provision of SupportAssist may
involve
international transfers of data from you to Dell and/or to Dells
affiliates,
subcontractors or business partners.  When making such transfers, Dell
shall ensure
appropriate protection is in place to safeguard the Collected Data being
transferred
in connection with SupportAssist.  If you are downloading SupportAssist
on behalf
of a company or other legal entity, you are further certifying to Dell
that you
have appropriate authority to provide this consent on behalf of that
entity.  If you
do not consent to the collection, transmission and/or use of the
Collected Data,
you may not download, install or otherwise use SupportAssist.
DellEMC#
```

show running-config

Display the current configuration and changes from the default values.

Syntax `show running-config support-assist`

Parameters

support-assist	Enter the keyword `support-assist` to view the detailed configuration for the feature.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Example

```
DellEMC# show running-config support-assist
!
support-assist
enable all
!
activity event-transfer
  enable
  action-manifest install default
!
activity core-transfer
  enable
!
contact-company name Dell
  street-address F lane , Sector 30
  address city Brussels state HeadState country Belgium postalcode S328J3
!
contact-person first Fred last Nash
  email-address primary des@sed.com alternate sed@dol.com
  phone primary 123422 alternate 8395729
  preferred-method email
  time-zone zone +05:30 start-time 12:23 end-time 15:23
!
server Dell
  enable
  url http://1.1.1.1:1332
DellEMC#
```

show support-assist status

Display information on SupportAssist feature status including any activities, status of communication, last time communication sent, and so on.

Syntax `show support-assist status`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0)	Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Example

```
DellEMC#show support-assist status
SupportAssist Service: Installed
EULA: Accepted
Server: default
    Enabled: Yes
    URL: https://stor.g3.ph.dell.com
Server: Dell
    Enabled: Yes
    URL: http://1.1.1.1:1332
Service status: Enabled

Activity                 State    Last Start                Last Success
-----------------------  -------  ------------------------
------------------------
core-transfer            Success  Feb 15 2016 09:43:41 IST    Feb 15
2016 09:43:56 IST
event-transfer           Success  Feb 15 2016 09:47:43 IST    Feb 15
2016 09:48:21 IST
full-transfer            Success  Feb 15 2016 09:36:12 IST    Feb 15
2016 09:38:27 IST
DellEMC#
```

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System Time and Date

The commands in this section configure time values on the system, either using the Dell EMC Networking OS, or the hardware, or using the network time protocol (NTP). With NTP, the switch can act only as a client to an NTP clock host.

For more information, see "Network Time Protocol" of the *Management* section in the *Dell EMC Networking OS Configuration Guide*.

The commands in this chapter are generally supported on Dell EMC Networking OS with some exceptions, as notes in the Command History fields.

Topics:

- clock summer-time date
- clock summer-time recurring
- clock timezone
- debug ntp
- ntp authenticate
- ntp broadcast client
- ntp control-key-passwd
- ntp disable
- ntp master <stratum>
- ntp offset-threshold
- ntp server
- ntp source
- ntp trusted-key
- ntp authentication-key
- show clock
- show ntp associations
- show ntp vrf associations
- show ntp status

clock summer-time date

Set a date (and time zone) on which to convert the switch to daylight saving time on a one-time basis.

Syntax

```
clock summer-time time-zone date start-month start-day start-year start-time end-month end-day end-year end-time [offset]
```

To delete a daylight saving time zone configuration, use the `no clock summer-time` command.

Parameters

time-zone	Enter the three-letter name for the time zone. This name is displayed in the show clock output.
start-month	Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
start-day	Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.
start-year	Enter a four-digit number as the year. The range is from 1993 to 2035.
start-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.
end-day	Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.

	end-month	Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
	end-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.
	end-year	Enter a four-digit number as the year. The range is from 1993 to 2035.
	offset	(OPTIONAL) Enter the number of minutes to add during the summer-time period. The range is from 1 to1440. The default is **60 minutes**.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Related Commands

- clock summer-time recurring — sets a date (and time zone) on which to convert the switch to daylight saving time each year.
- show clock — displays the current clock settings.

clock summer-time recurring

Set the software clock to convert to daylight saving time on a specific day each year.

Syntax

```
clock summer-time time-zone recurring [start-week start-day start-month
start-time end-week end-day end-month end-time [offset]]
```

To delete a daylight saving time zone configuration, use the `no clock summer-time` command.

Parameters

	time-zone	Enter the three-letter name for the time zone. This name is displayed in the show clock output. You can enter up to eight characters.

start-week	(OPTIONAL) Enter one of the following as the week that daylight saving begins and then enter values for start-day through end-time: • `week-number`: Enter a number from 1 to 4 as the number of the week in the month to start daylight saving time. • `first`: Enter this keyword to start daylight saving time in the first week of the month. • `last`: Enter this keyword to start daylight saving time in the last week of the month.
start-day	Enter the name of the day that you want daylight saving time to begin. Use English three letter abbreviations; for example, Sun, Sat, Mon, and so on. The range is from Sun to Sat.
start-month	Enter the name of one of the 12 months in English.
start-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.
end-week	Enter the one of the following as the week that daylight saving ends: • `week-number`: enter a number from 1 to 4 as the number of the week to end daylight saving time. • `first`: enter the keyword `first` to end daylight saving time in the first week of the month. • `last`: enter the keyword `last` to end daylight saving time in the last week of the month.
end-day	Enter the weekday name that you want daylight saving time to end. Enter the weekdays using the three letter abbreviations; for example Sun, Sat, Mon, and so on. The range is from Sun to Sat.
end-month	Enter the name of one of the 12 months in English.
end-time	Enter the time in hours:minutes:seconds. For the hour variable, use the 24-hour format; example, 17:15:00 is 5:15 pm.
offset	(OPTIONAL) Enter the number of minutes to add during the summer-time period. The range is from 1 to 1440. The default is **60 minutes**.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Updated the `start-day` and `end-day` options to allow for using the three-letter abbreviation of the weekday name.
6.1.1.0	Introduced on the E-Series.

Related Commands

- ntp trusted-key — configures a trusted key.
- clock summer-time date — sets a date (and time zone) on which to convert the switch to daylight saving time on a one-time basis.
- show clock — displays the current clock settings.

clock timezone

Configure a timezone for the switch.

Syntax `clock timezone` *`timezone-name offset`*

To delete a timezone configuration, use the `no clock timezone` command.

Parameters

timezone-name	Enter the name of the timezone. You cannot use spaces.
offset	Enter one of the following: • a number from 1 to 23 as the number of hours in addition to universal time coordinated (UTC) for the timezone. • a minus sign (-) then a number from 1 to 23 as the number of hours.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Version	Description
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information Coordinated universal time (UTC) is the time standard based on the International Atomic Time standard, commonly known as Greenwich Mean time. When determining system time, include the differentiator between UTC and your local timezone. For example, San Jose, CA is the Pacific Timezone with a UTC offset of -8.

debug ntp

Display Network Time Protocol (NTP) transactions and protocol messages for troubleshooting.

Syntax `debug ntp {level level-number}`

To disable debugging of NTP transactions, use the `no debug ntp {level level-number}` command.

Parameters

level Enter the keyword `level` then the level–number to display information about NTP logs. The log level range is from 1 to 6.
- 1 is the most important log level.
- 6 is the least important log level.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the C9010, FN–IOM, MIOA, MXL, S3048–ON, S4048–ON, S4048T-ON, S5048F-ON, S6000, S6000–ON, S6010-ON, S6100–ON, and Z9100–ON.

ntp authenticate

Enable authentication of NTP traffic between the switch and the NTP time serving hosts.

Syntax `ntp authenticate`

To disable NTP authentication, use the `no ntp authentication` command.

Defaults Not enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information You also must configure an authentication key for NTP traffic using the `ntp authentication-key` command.

ntp broadcast client

Set up the interface to receive NTP broadcasts from an NTP server.

Syntax `ntp broadcast client`

To disable broadcast, use the `no ntp broadcast client` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.

Version	Description
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

ntp control-key-passwd

Configure control key password for NTPQ authentication. NTP control key supports encrypted and unencrypted option.

Syntax

`ntp control-key-passwd [encryption-type] password`

To delete the control key, use the `no ntp control-key-passwd [encryption-type] password` command.

Parameters

encryption-type	(OPTIONAL) Enter one of the following numbers: • 0 (zero) directs the system to store the password as clear text. It is the default encryption type when using the password option. • 7 (seven) indicates that a password is encrypted using a DES hashing algorithm. It specifies a hidden authentication data. • WORD is the un-encrypted (cleartext) authentication data.
password	Enter a string up to 32 characters as the password.

Defaults

NTPQ

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced on the S4810 and S4820T.
9.14(0.0)	Introduced on the C9010, FN–IOM, MIOA, MXL, S3048–ON, S4048–ON, S4048T–ON, S5048F–ON, S6000, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

NTP control key is not configured by default. If the encryption–type (0 or 7) is not specified, then 0 is selected by default.

ntp disable

Prevent an interface from receiving NTP packets.

Syntax

`ntp disable`

To re-enable NTP on an interface, use the `no ntp disable` command.

Defaults

Disabled (that is, if you configure an NTP host, all interfaces receive NTP packets)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

ntp master <stratum>

Configure the switch as NTP Server.

Syntax `ntp master <stratum>`

Parameters

ntp master *<stratum>*	Enter the `stratum number` to identify the NTP Server's hierarchy. The `stratum` range value is from 2 to 15 and the default value is 8.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Introduced on the S4810, S4820T, S5000, S6000, Z9000, and Z9500.
9.2(1.0)	Introduced on the Z9500.

ntp offset-threshold

Configure the threshold time interval before which the system generates an NTP audit log message if the time difference from the NTP server is greater than a threshold value (offset-threshold).

Syntax

```
ntp offset-threshold threshold-value
```

To disable the threshold value, use the `no ntp offset-threshold` command.

Parameters

offset-threshold *threshold-value*	(Optional) Enter the keyword `offset-threshold` and then the threshold value. The range is from 0 to 999.

Defaults Zero (0).

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S3038–ON, S4048-ON, S3100 Series, S4810P, S4820T, S5000, S6000, S6000–ON, S6100–ON, Z9500, and Z9100–ON.

Usage Information The `ntp offset-threshold` command does not time synchronization.

Example

```
DellEMC(config)# ntp offset-threshold 4
```

ntp server

Configure an NTP time-serving host.

Syntax

```
ntp server[vrf vrf-name] {hostname | ipv4-address | ipv6-address} [key keyid] [prefer] [version number] [minpoll] [maxpoll]
```

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF to configure an NTP time-serving host corresponding to that VRF.
ipv4-address* | *ipv6-address	Enter an IPv4 address (A.B.C.D) or IPv6 address (X:X:X:X::X) of NTP server.
hostname	Enter the host name of the server.
key *keyid*	(OPTIONAL) Enter the keyword `key` and a number as the NTP peer key. The range is from 1 to 65534.
prefer	(OPTIONAL) Enter the keyword `prefer` to indicate that this peer has priority over other servers.
version *number*	(OPTIONAL) Enter the keyword `version` and a number to correspond to the NTP version used on the server. The range is from 1 to 4.
minpoll *polling-interval*	(OPTIONAL) Enter the keyword `minpoll`then the polling-interval. The polling interval range is from 4 to 16.
maxpoll *polling-interval*	(OPTIONAL) Enter the keyword `maxpoll`then the polling-interval. The polling interval range is from 4 to 16.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	The trusted-key range value is increased from 1 to 65534. Also, introduced the `minpoll` and `maxpoll` polling interval options.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Added support for VRF.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Added IPv6 support.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information You can configure multiple time-serving hosts. From these time-serving hosts, the Dell EMC Networking OS chooses one NTP host with which to synchronize. To determine which server is selected, use the `show ntp associations` command.

Because many polls to NTP hosts can affect network performance, Dell EMC Networking recommends limiting the number of hosts configured.

By default, the system performs a time synchronization if the time difference from the time source is greater than one second.

When the Dell EMC Networking OS NTP client receives inconsistent timestamp in the origin timestamp filed, it logs the syslog message. It is due to the older versions of NTPD server implementation. Upgrade the system to the latest NTPD package in the NTP server and the system logs the following NTP syslog message:

```
Dell EMC# May 30 13:27:46 %STKUNIT2-:CP %ntp-6-: receive:
Unexpected origin timestamp 0xdeb95bee.06ba346e does not match aorg
0000000000.00000000 from server@10.16.151.117 xmt 0xdeb95bee.30907a87
```

In general, the packet denied services are dropped with no further action except incrementing the statistics counters. In certain cases, a more proactive response is required to cause the client to slow down the process. A special packet is created to serve this purpose, and it is called the kiss-o-Death (KoD) packet. When the Dell EMC Networking OS client receives KoD packets, it logs the following syslog message:

```
Dell EMC# May 27 14:32:13 %STKUNIT1-:CP %ntp-6-: receive: KoD packet
from 300::2 has inconsistent xmt/org/rec timestamps.  Ignoring.
```

Related Commands

- show ntp associations—displays the NTP servers that are configured and their status.

ntp source

Specify an interface's IP address to be included in the NTP packets.

Syntax

`ntp source interface`

To delete the configuration, use the `no ntp source` command.

Parameters

interface

Enter the following keywords and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For the Management interface, enter the keyword `ManagementEthernet` then slot/port information.
- For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14.1.0	The support for configuring management interface is introduced in S4810 and S4820T.
9.13.0.0	Added support for configuring Management interface.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.5.1.0	Added support for 4-port 40G line cards.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

ntp trusted-key

Set a key to authenticate the system to which NTP synchronizes.

Syntax

`ntp trusted-key` *`number`*

To delete the key, use the `no ntp trusted-key` *`number`* command.

Parameters

number	Enter a number as the trusted key ID. The range is from 1 to 65534.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced the trusted-key range update on the S4810 and S4820T.
9.14(0.0)	The trusted-key range value is increased from 1 to 65534.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information

The `number` parameter in the `ntp trusted-key` command must be the same number as the `number` parameter in the `ntp authentication-key` command. If you change the `ntp authentication-key` command, you must also change the `ntp trusted-key` command.

Related Commands

- ntp authentication-key—sets an authentication key for NTP.
- ntp authenticate—enables the NTP authentication parameters you set.

ntp authentication-key

Specify a key for authenticating the NTP server.

Syntax `ntp authentication-key key-number {md5 | sha1} {0 | 7} key`

Parameters

key-number	Specify a number for the authentication key. The range is from 1 to 65534. This number must be the same as the `number` parameter configured in the `ntp trusted-key` command.
md5	Specify that the authentication key is encrypted using MD5 encryption algorithm.
sha1	Specify that the authentication key is encrypted using SHA1 encryption algorithm.
0	Specify that authentication key is entered in an unencrypted format (default).
7	Specify that the authentication key is entered in DES encrypted format.
key	Enter the authentication key in the previously specified format.

Defaults NTP authentication is not configured by default. If you do not specify the option [`0` | `7`], **0** is selected by default.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(1.0)	Introduced the `sha1` option. Also, introduced on the S4810 and S4820T.
9.14(0.0)	The trusted-key range value is from 1 to 65534.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.2.1.0	Added options [`0`	`7`] for entering the authentication key.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information After configuring the `ntp authentication-key` command, configure the `ntp trusted-key` command to complete NTP authentication.

Dell EMC Networking OS versions 8.2.1.0 and later use an encryption algorithm to store the authentication key that is different from previous Dell EMC Networking OS versions; beginning in version 8.2.1.0, Dell EMC Networking OS uses DES encryption to store the key in the startup-config when you enter the `ntp authentication-key` command. Therefore, if your system boots with a startup-

configuration from an Dell EMC Networking OS versions prior to 8.2.1.0 in which you have configured `ntp authentication-key`, the system cannot correctly decrypt the key, and cannot authenticate NTP packets. In this case you must re-enter this command and save the running-config to the startup-config.

Related Commands

- ntp authenticate — enables NTP authentication.
- ntp trusted-key — configures a trusted key.

show clock

Display the current clock settings.

Syntax `show clock [detail]`

Parameters

detail	(OPTIONAL) Enter the keyword `detail` to view the source information of the clock.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Example

```
DellEMC#show clock
11:05:56.949 UTC Thu Oct 25 2001
DellEMC#
```

Example (Detail)

```
DellEMC# show clock detail
12:18:10.691 UTC Wed Jan 7 2009
Time source is RTC hardware
Summer time starts 02:00:00 UTC Sun Mar 8 2009
Summer time ends 02:00:00 ABC Sun Nov 1 2009
DellEMC#
```

Related Commands

- clock summer-time recurring — displays the time and date from the switch hardware clock.

show ntp associations

Display the NTP master and peers.

Syntax

```
show ntp associations
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Network OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ntp associations` command shown in the Example below.

Field	Description
(none)	One or more of the following symbols could be displayed: • * means synchronized to this peer. • # means almost synchronized to this peer. • + means the peer was selected for possible synchronization. • - means the peer is a candidate for selection. • x means designated falsesticker by the intersection algorithm.
remote	Displays the remote IP address of the NTP peer.
ref clock	Displays the IP address of the remote peer's reference clock.
st	Displays the peer's stratum, that is, the number of hops away from the external time source. A in this column means the NTP peer cannot reach the time source.
when	Displays the last time the switch received an NTP packet.
poll	Displays the polling interval (in seconds).

Field	Description
reach	Displays the reachability to the peer (in octal bitstream).
delay	Displays the time interval or delay for a packet to complete a round-trip to the NTP time sourc (in milliseconds).
offset	Displays the relative time of the NTP peer's clock to the switch clock (in milliseconds).
offset	Displays the relative time of the NTP peer's clock to the switch clock (in milliseconds).
disp	Displays the dispersion.
LOCAL(0)	Indicates that the local machine has synced with itself. Generally, only a NTP master syncs wit itself. Synchronization of the local machine takes place to this peer.
.LOCL.	Indicates the reference clock of the NTP master.

Example (without ntp master configuration)

```
DellEMC# show ntp associations
   remote       vrf-Id     ref clock    st when poll reach  delay  offset  disp
==============================================================================
*10.16.151.117   0       45.127.112.2   3    8   16   17    1.383  362.704  0.008
* master (synced), # backup, + selected, - outlier, x falseticker
```

Example (with ntp master configuration)

```
Dell EMC#show ntp associations
   remote       vrf-Id     ref clock     st when poll reach   delay   offset    di
==============================================================================
*LOCAL(0)         0      .LOCL.            7    6   16  377      0.000    0.000
0.002
 10.16.127.86     0      10.16.127.26      5    9   16    1     65.292  13829.9
0.002
 10.16.127.144    0      10.16.127.26      5    6   16    1      0.829  13795.2
0.002
 10.16.127.44     0      10.16.127.26      5    -   16    1      0.799  13791.5
0.002
* master (synced), # backup, + selected, - outlier, x falseticker
Dell EMC#
```

In the above example,

- `LOCAL(0)` indicates that the local machine synchronizes with itself.
- `.LOCL.` indicates reference clock of the NTP master.

Related Commands

- show ntp status — displays the current NTP status.

show ntp vrf associations

Displays the NTP servers configured for the VRF instance <vrf-name>.

Syntax show ntp `[vrf] <vrf-name>` associations.

Command Modes EXECEXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.6(0.0)	Added support for VRF.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.4.1.0	Added IPv6 support.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

show ntp status

Display the current NTP status.

Syntax `show ntp status`

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.1.1.0	Introduced on the E-Series.

Usage Information The following describes the `show ntp status` command shown in the Example below.

Field	Description
“Clock is...”	States whether or not the switch clock is synchronized, which NTP stratum the system is assigned and the IP address of the NTP peer.
“frequency is...”	Displays the frequency (in ppm), stability (in ppm) and precision (in Hertz) of the clock in this system.
“reference time is...”	Displays the reference time stamp.
“clock offset is...”	Displays the system offset to the synchronized peer and the time delay on the path to the NTP root clock.
“root dispersion is...”	Displays the root and path dispersion.
“peer mode is...”	State what NTP mode the switch is. This should be Client mode.

Example

```
DellEMC#> show ntp status
Clock is synchronized, stratum 4, reference is 10.16.151.117, vrf-id is 0
frequency is 0.000 ppm, stability is 0.000 ppm, precision is -18
reference time  dec0e68a.07b308ac [Wed, Apr  7    0  9:42:34.030 UTC] UTC
clock offset is 0.000000 msec, root delay is 152.003 msec
root dispersion is 1381.293 msec, peer dispersion is 937.690 sec
peer mode is client
DellEMC#
```

Related Commands

- show ntp associations — displays information on the NTP master and peer configurations.

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Tunneling

Tunneling is supported on Dell EMC Networking OS.

Topics:

- ip unnumbered
- ipv6 unnumbered
- tunnel allow-remote
- tunnel destination
- tunnel dscp
- tunnel flow-label
- tunnel hop-limit
- tunnel keepalive
- tunnel-mode
- tunnel source

ip unnumbered

Configure a tunnel interface to operate without a unique IPv4 address and select the interface from which the tunnel borrows its address.

Syntax

`ip unnumbered` *`interface-type`*

To set the tunnel back to default logical address use the `no ip unnumbered` command. If the tunnel was previously operational, the tunnel interface is operationally down unless you also configure the tunnel IPv6 address.

Parameters

interface-type Enter the interface type, followed by a slot/port/subport number.

Defaults

None

Command Modes

INTERFACE TUNNEL

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.1)	Introduced on the S4810, S4820T, S6000 and Z9000.

Version	Description
9.3(0.1)	Introduced on the S5000 and Z9000.

Usage Information

The ip unnumbered command fails in two conditions:

- If the logical ip address is configured.
- If Tunnel mode is ipv6ip (where ip address over tunnel interface is not possible).

To ping the unnumbered tunnels, the logical address route information must be present at both the ends.

NOTE: The `ip unnumbered` command can specify an interface name that does not exist or does not have a configured IPv6 address. The tunnel interface is not changed to operationally up until the logical IP address is identified from one of the address family.

ipv6 unnumbered

Configure a tunnel interface to operate without a unique IPv6 address and select the interface from which the tunnel borrows its address.

Syntax

`ipv6 unnumbered {interface-type interface-number}`

To set the tunnel back to default logical address use the `no ipv6 unnumbered` command. If the tunnel was previously operational, the tunnel interface is operationally down unless you also configure the tunnel IPv4 address.

Parameters

interface-type interface-number	Enter the interface type, followed by the type, and then the slot/port/subport information.

Defaults

None.

Command Modes

INTERFACE TUNNEL

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T.
9.3(0.1)	Introduced on the S6000 and Z9000.

Usage Information

The `ipv6 unnumbered` command fails in two conditions:

- If the logical IP address is configured.
- If Tunnel mode is ipv6ip (where ip address over tunnel interface is not possible).

To ping the unnumbered tunnels, the logical address route information must be present at both the ends.

NOTE: The `ipv6 unnumbered` command can specify an interface name that does not exist or does not have a configured IPv6 address. The tunnel interface is not changed to operationally up until the logical IP address is identified from one of the address family.

tunnel allow-remote

Configure an IPv4 or IPv6 address or prefix whose tunneled packets are accepted for decapsulation. If you do not configure allow-remote entries, tunneled packets from any remote peer address is accepted.

This feature is supported on Dell EMC Networking OS.

Syntax

`tunnel allow-remote {ip-address | ipv6-address} [mask]`

To delete a configured allow-remote entry use the `no tunnel allow-remote` command. Any specified address/mask values must match an existing entry for the delete to succeed. If the address and mask are not specified, this command deletes all allow-remote entries.

Parameters

ip-address	Enter the source IPv4 address in A.B.C.D format.
ipv6–address	Enter the source IPv6 address in X:X:X:X::X format.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D to match a range of remote addresses. The default mask is /32 for IPv4 addresses and /128 for IPv6 addresses, which match only the specified address.

Defaults

If you do not configure tunnel allow remote , all traffic which is destined to tunnel source address is decapsulated.

Command Modes

INTERFACE TUNNEL

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.
9.3(0.1)	Introduced on the S6000 and Z9000.

Usage Information

You can configure up to eight allow-remote entries on any multipoint receive-only tunnel.

This command fails if the address family entered does not match the outer header address family of the tunnel mode, tunnel source, or any other tunnel allow-remote.

If you configure any allow-remote , the tunnel source or tunnel mode commands fail if the outer header address family does not match that of the configured allow-remote.

tunnel destination

Set a destination endpoint for the tunnel.

Syntax

`tunnel destination {ip-address | ipv6-address}`

To delete a tunnel destination address, use the `no tunnel destination {ip-address | ipv6-address}` command.

Parameters

ip-address	Enter the destination IPv4 address for the tunnel.
ipv6–address	Enter the destination IPv6 address for the tunnel.

Defaults

none

Command Modes

INTERFACE TUNNEL (conf-if-tu)

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

The tunnel interface is inoperable without a valid tunnel destination address for the configured Tunnel mode.

To establish a logical tunnel to the particular destination address, use the destination address of the outer tunnel header. If you configure a tunnel interface or source address, the tunnel destination must be compatible.

tunnel dscp

Configure the method to set the DSCP in the outer tunnel header.

C9000 Series

Syntax

`tunnel dscp {mapped | value}`

To use the default tunnel mapping behavior, use the `no tunnel dscp value` command.

Parameters

mapped	Enter the keyword `mapped` to map the original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/Traffic Class (IPv6) depending on the mode of tunnel.

	value	Enter a value to set the DSCP value in the tunnel header. The range is from 0 to 63. The default value of **0** denotes mapping of original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/Traffic Class (IPv6) depending on the mode of tunnel.

Defaults 0 (Mapped)

Command Modes INTERFACE TUNNEL (conf-if-tu)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.9(0.0)	Introduced on the C9010.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.0)	Introduced on the S6000, S4810, S4820T, Z9000.

Usage Information This command configures the method used to set the high 6 bits (the differentiated services codepoint) of the IPv4 TOS or the IPv6 traffic class in the outer IP header.

A value of 0 copies original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/Traffic Class (IPv6) depending on the mode of tunnel.

tunnel flow-label

Configure the method to set the IPv6 flow label value in the outer tunnel header.

Syntax `tunnel flow-label value`

To return to the default value of 0, use the `no tunnel flow-label value` command.

Parameters

value	Enter a value to set the IPv6 flow label value in the tunnel header. The range is from 0 to 1048575. The default value is **0**.

Defaults **0** (Mapped original packet flow-label value to tunnel header flow-label value)

Command Modes INTERFACE TUNNEL (conf-if-tu)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.0)	Introduced on the S6000, S4810, S4820T, Z9000.

Usage Information This command is only valid for tunnel interfaces with an IPv6 outer header.

tunnel hop-limit

Configure the method to set the IPv4 time-to-live or the IPv6 hop limit value in the outer tunnel header.

Syntax `tunnel hop-limit value`

To restore the default tunnel hop-limit, use the `no tunnel hop-limit` command.

Parameters

value	Enter the hop limit (ipv6) or time-to-live (ipv4) value to include in the tunnel header. The range is from 0 to 255. The default is **64**.

Defaults **64** (Time-to-live for IPv4 outer tunnel header or hop limit for IPv6 outer tunnel header)

Command Modes INTERFACE TUNNEL (conf-if-tu)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.3(0.0)	Introduced on the S6000, S4810, S4820T, Z9000.

Usage Information A value of 0 copies the inner packet hop limit (ipv6) or time-to-live (ipv4) in the encapsulated packet to the tunnel header hop limit (ipv6) or time-to-live (ipv4) value.

tunnel keepalive

Configure the tunnel keepalive target, interval and attempts.

Syntax

```
tunnel keepalive {ip-address | ipv6-address}[interval {seconds}] [attempts {count | unlimited}]
```

To disable the tunnel keepalive probes use the **no tunnel keepalive** command.

Parameters

ip-address ipv6 address	Enter the `IPv4 or IPv6 address` of the peer to which the keepalive probes will be sent.
interval seconds	Enter the keyword `interval` then the interval time, in seconds, after which the restart process to keepalive probe packets. The range is from 5 to 255. The default is 5.
count	(OPTIONAL) Enter the keyword **count** to count packets processed by the filter. The range is from 3 to 10. The default is 3.
unlimited	Enter the keyword **unlimited** to specify the unlimited number of keepalive probe packets.

Defaults

Tunnel keepalive is disabled.

Command Modes

INTERFACE TUNNEL

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

Enabling tunnel keepalive causes ICMP echo packets to be sent to the keepalive target. The ICMP echo will be sourced from the tunnel interface logical IPv4 or IPv6 address and will be tunnel encapsulated. The response will be accepted whether it returns tunnel encapsulated or not.

When configuring tunnel keepalive at both end points of a tunnel interface it is recommended to set the tunnel keepalive target to the logical IPv4 or IPv6 address of the far end tunnel peer, rather than to the tunnel destination. This reduces the chance of both ends of the tunnel staying in keepalive down state. If both ends get into a keepalive down state that does not clear in a few seconds, then performing shutdown - no shutdown sequence on one end should bring both ends back to up.

tunnel-mode

Enable a tunnel interface.

.

Syntax `tunnel mode {ipip | ipv6 | ipv6ip}[decapsulate-any]`

To disable an active tunnel interface, use the **no tunnel** `mode` command.

Parameters

ipip	Enable tunnel in RFC 2003 mode and encapsulate IPv4 and/or IPv6 datagrams inside an IPv4 tunnel.
ipv6	Enable tunnel in RFC 2473 mode and encapsulate IPv4 and/or IPv6 datagrams inside an IPv6 tunnel.
ipv6ip	Enable tunnel in RFC 4213 mode and encapsulate IPv6 datagrams inside an IPv4 tunnel.
decapsulate-any	(Optional) Enable tunnel in multipoint receive-only mode.

Defaults There is no default tunnel mode.

Command Modes INTERFACE TUNNEL

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added the decapsulate-any command.
9.3(0.1)	Introduced on the S6000 and Z9000.

Usage Information To enable a tunnel interface, use this command. You must define a tunnel mode for the tunnel to function. If you previously defined the tunnel destination or source address, the tunnel mode must be compatible.

Including the decapsulate-any option causes the command to fail if any of the following tunnel transmit options are configured: tunnel destination, tunnel dscp, tunnel flow-label, tunnel hop-limit, or tunnel keepalive. Conversely, if you configure any tunnel allow-remote entries, the `tunnel—mode` command fails unless the decapsulate-any option is included.

Configuration of IPv6 commands over decapsulate-any tunnel causes an error.

tunnel source

Set a source address for the tunnel.

Syntax `tunnel source {ip-address | ipv6-address | interface-type-number | anylocal}`

To delete the current tunnel source address, use the `no tunnel source` command.

Parameters

ip-address	Enter the source IPv4 address in A.B.C.D format.
ipv6–address	Enter the source IPv6 address in X:X:X:X::X format.
interface-type-number	• For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094. • For a port-channel interface, enter the keywords `port-channel` then the port-channel ID.
anylocal	Enter the `anylocal` command to allow the multipoint receive-only tunnel to decapsulate tunnel packets destined to any local ip address.

Defaults none

Command Modes INTERFACE TUNNEL (conf-if-tu)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added the tunnel source anylocal command.
9.3(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information Added an optional keyword **“anylocal”** to the tunnel source command. The anylocal argument can be used in place of the ip address or interface, but only with the multipoint receive-only mode tunnels. The tunnel source `anylocal` command allows the multipoint receive-only tunnel to decapsulate tunnel packets addressed to any IPv4 or IPv6 (depending on the tunnel mode) address configured on the switch that is operationally **Up**.

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Uplink Failure Detection (UFD)

Uplink failure detection (UFD) provides detection of the loss of upstream connectivity and, if you use this with NIC teaming, automatic recovery from a failed link.

Topics:

- clear ufd-disable
- debug uplink-state-group
- description
- downstream
- downstream auto-recover
- downstream disable links
- enable
- show running-config uplink-state-group
- show uplink-state-group
- uplink-state-group
- upstream

clear ufd-disable

Re-enable one or more downstream interfaces on the switch/router that are in a UFD-Disabled Error state so that an interface can send and receive traffic.

Syntax `clear ufd-disable {interface interface | uplink-state-group group-id}`

Parameters

interface *interface*
Specify one or more downstream interfaces. For *interface*, enter one of the following interface types:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the *slot/port*[/subport] | *slot/port[/subport]-range*
- 40-Gigabit Ethernet:`fortyGigE` {*slot/port*}
- Port channel: `port-channel {1-128 | port-channel-range}`

Where `port-range` and `port-channel-range` specify a range of ports separated by a dash (-) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

uplink-state-group *group-id*
Re-enables all UFD-disabled downstream interfaces in the group. The valid group-id values are from 1 to 16.

Defaults A downstream interface in a UFD-disabled uplink-state group is also disabled and is in a UFD-Disabled Error state.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Related Commands

- downstream — assigns a port or port-channel to the uplink-state group as a downstream interface.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

debug uplink-state-group

Enable debug messages for events related to a specified uplink-state group or all groups.

Syntax

`debug uplink-state-group [group-id]`

To turn off debugging event messages, enter the `no debug uplink-state-group [group-id]` command.

Parameters

group-id	Enables debugging on the specified uplink-state group. The valid group-id values are from 1 to 16.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Related Commands

- clear ufd-disable — re-enable downstream interfaces that are in a UFD-Disabled Error state.

description

Enter a text description of an uplink-state group.

Syntax `description text`

Parameters

text	Text description of the uplink-state group. The maximum length is 80 alphanumeric characters.

Defaults none

Command Modes UPLINK-STATE-GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Example

```
DellEMC(conf-uplink-state-group-16)# description test
DellEMC(conf-uplink-state-group-16)#
```

Related Commands

- uplink-state-group — create an uplink-state group and enables the tracking of upstream links.

downstream

Assign a port or port-channel to the uplink-state group as a downstream interface.

Syntax `downstream interface`

To delete an uplink-state group, enter the `no downstream interface` command.

Parameters

interface	Enter one of the following interface types: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the *slot/port*/subport | *slot/port/subport-range* • 40-Gigabit Ethernet:`fortyGigE` {*slot/port*} • Port channel: `port-channel {1-128 | port-channel-range}` • For a 25-Gigabit interface, enter the keyword `twentyfiveGigE` then the slot/port/subport information. • For a 50-Gigabit interface, enter the keyword `fiftyGigE` then the slot/port/subport information.

- For a 100-Gigabit interface, enter the keyword `hundredGigE` then the slot/port/subport information.

Where `port-range` and `port-channel-range` specify a range of ports separated by a dash (-) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

Defaults none

Command Modes UPLINK-STATE-GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Usage Information You can assign physical port or port-channel interfaces to an uplink-state group.

You can assign an interface to only one uplink-state group. Configure each interface assigned to an uplink-state group as either an upstream or downstream interface, but not both.

You can assign individual member ports of a port channel to the group. An uplink-state group can contain either the member ports of a port channel or the port channel itself, but not both.

Related Commands

- upstream — assigns a port or port-channel to the uplink-state group as an upstream interface.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

downstream auto-recover

Enable auto-recovery so that UFD-disabled downstream ports in an uplink-state group automatically come up when a disabled upstream port in the group comes back up.

Syntax `downstream auto-recover`

To disable auto-recovery on downstream links, use the `no downstream auto-recover` command.

Defaults The auto-recovery of UFD-disabled downstream ports is enabled.

Command Modes UPLINK-STATE-GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Related Commands

- downstream — assign a port or port-channel to the uplink-state group as a downstream interface.
- uplink-state-group — create an uplink-state group and enables the tracking of upstream links.

downstream disable links

Configure the number of downstream links in the uplink-state group that are disabled if one upstream link in an uplink-state group goes down.

Syntax

```
downstream disable links {number |all}
```

To revert to the default setting, use the `no downstream disable links` command.

Parameters

number	Enter the number of downstream links the UFD brings down. The range is from 1 to 1024.
all	Brings down all downstream links in the group.

Defaults No downstream links are disabled when an upstream link in an uplink-state group goes down.

Command Modes UPLINK-STATE-GROUP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Usage Information

When one upstream interface in an uplink-state group goes down, you can configure the number of downstream interfaces in an uplink-state group are put into a link-down state with an UFD-Disabled error message.

If all upstream interfaces in an uplink-state group go down, all downstream interfaces in the same uplink-state group are put into a link-down state.

Related Commands

- downstream — assigns a port or port-channel to the uplink-state group as a downstream interface.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

enable

Enable uplink state group tracking for a specific UFD group.

Syntax

```
enable
```

To disable upstream-link tracking without deleting the uplink-state group, use the `no enable` command.

Defaults

Upstream-link tracking is automatically enabled in an uplink-state group.

Command Modes

UPLINK-STATE-GROUP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Related Commands

- uplink-state-group — create an uplink-state group and enables the tracking of upstream links.

show running-config uplink-state-group

Display the current configuration of one or more uplink-state groups.

Syntax

```
show running-config uplink-state-group [group-id]
```

Parameters

group-id Displays the current configuration of all uplink-state groups or a specified group. The valid group-id values are from 1 to 16.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Example

```
DellEMC# show running-config uplink-state-group
!
no enable
uplink state track 1
downstream twentyFiveGigE 1/2,1/4,1/6,1/11-1/19
upstream FortyGigE 1/49/1,1/53/1
upstream PortChannel 1
!
uplink state track 2
downstream twentyFiveGigE 1/1,1/3,1/5,1/7-1/10
upstream FortyGigE 1/49/1,1/53/1
```

Related Commands

- show uplink-state-group — displays the status information on a specified uplink-state group or all groups.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

show uplink-state-group

Display status information on a specified uplink-state group or all groups.

Syntax `show uplink-state-group [group-id] [detail]`

Parameters

group-id	Displays status information on a specified uplink-state group or all groups. The valid group-id values are from 1 to 16.
detail	Displays additional status information on the upstream and downstream interfaces in each group

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Example

```
DellEMC# show uplink-state-group
Uplink State Group: 1 Status: Enabled, Up
Uplink State Group: 3 Status: Enabled, Up
Uplink State Group: 5 Status: Enabled, Down
Uplink State Group: 6 Status: Enabled, Up
Uplink State Group: 7 Status: Enabled, Up
Uplink State Group: 16 Status: Disabled, Up

DellEMC# show uplink-state-group 16
Uplink State Group: 16 Status: Disabled, Up

DellEMC# show uplink-state-group detail
(Up): Interface up (Dwn): Interface down (Dis): Interface disabled
Uplink State Group    : 1 Status: Enabled, Up
Upstream Interfaces   :
Downstream Interfaces :

Uplink State Group    : 3 Status: Enabled, Up
Upstream Interfaces   : Tf 1/46(Up) Tf 1/47(Up)
Downstream Interfaces : Tf 1/1(Up) Tf 1/1(Up) Tf 1/3(Up) Tf 1/5(Up) Tf
1/6(Up)

Uplink State Group    : 5 Status: Enabled, Down
Upstream Interfaces   : Tf 1/1(Dwn) Tf 1/3(Dwn) Tf 1/5(Dwn)
Downstream Interfaces : Tf 1/2(Dis) Tf 1/4(Dis) Tf 1/11(Dis) Tf
1/12(Dis) Tf 1/13(Dis) Tf 1/14(Dis) Tf 1/15(Dis)


Uplink State Group    : 6 Status: Enabled, Up
Upstream Interfaces   :
Downstream Interfaces :

Uplink State Group    : 7 Status: Enabled, Up
Upstream Interfaces   :
Downstream Interfaces :

Uplink State Group    : 16 Status: Disabled, Up
Upstream Interfaces   : Tf 1/41(Dwn) Po 8(Dwn)
Downstream Interfaces : Tf 1/40(Dwn)
DellEMC#
```

Related Commands

- show running-config uplink-state-group — displays the current configuration of one or more uplink-state groups.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

uplink-state-group

Create an uplink-state group and enable the tracking of upstream links on a switch or router.

Syntax

`uplink-state-group group-id`

To delete an uplink-state group, enter the `no uplink-state-group group-id` command.

Parameters

group-id Enter the ID number of an uplink-state group. The range is from 1 to 16.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Usage Information

After you enter the command, to assign upstream and downstream interfaces to the group, enter Uplink-State-Group Configuration mode.

An uplink-state group is considered operationally up if at least one upstream interface in the group is in the Link-Up state.

An uplink-state group is considered operationally down if no upstream interfaces in the group are in the Link-Up state. No uplink-state tracking is performed when a group is disabled or in an operationally down state.

To disable upstream-link tracking without deleting the uplink-state group, use the `no enable` command in uplink-state-group configuration mode.

Example

```
DellEMC(conf)# uplink-state-group 16
DellEMC(conf)#
02:23:17: %RPM0-P:CP %IFMGR-5-ASTATE_UP: Changed uplink state group
Admin state to up: Group 16
DellEMC(conf)#
```

Related Commands

- show running-config uplink-state-group — displays the current configuration of one or more uplink-state groups.
- show uplink-state-group — displays the status information on a specified uplink-state group or all groups.

upstream

Assign a port or port-channel to the uplink-state group as an upstream interface.

Syntax

`upstream` *interface*

To delete an uplink-state group, use the `no upstream interface` command.

Parameters

interface

Enter one of the following interface types:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the *slot/port*[/subport] | *slot/port[/subport]-range*
- 40-Gigabit Ethernet:`fortyGigE` {*slot/port*}
- Port channel: `port-channel {1-128 | port-channel-range}`
- For a 25-Gigabit interface, enter the keyword `twentyfiveGigE` then the slot/port/subport information.
- For a 50-Gigabit interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit interface, enter the keyword `hundredGigE` then the slot/port/subport information.

Where `port-range` and `port-channel-range` specify a range of ports separated by a dash (`-`) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

Defaults

none

Command Modes

UPLINK-STATE-GROUP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10.0.2	Introduced on the Z9100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.2(1.0)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.
8.4.2.3	Introduced on the S-Series S50.

Usage Information

You can assign physical port or port-channel interfaces to an uplink-state group.

You can assign an interface to only one uplink-state group. Configure each interface assigned to an uplink-state group as either an upstream or downstream interface, but not both.

You can assign individual member ports of a port channel to the group. An uplink-state group can contain either the member ports of a port channel or the port channel itself, but not both.

Example

Related Commands

- downstream — assigns a port or port-channel to the uplink-state group as a downstream interface.
- uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

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VLAN Stacking

With the virtual local area network (VLAN)-stacking feature (also called stackable VLANs and QinQ), you can "stack" VLANs into one tunnel and switch them through the network transparently.

The Dell EMC Networking OS supports this feature.

For more information about basic VLAN commands, see the *Virtual LAN (VLAN) Commands* section in Layer 2.

Important Points to Remember

- If you do not enable the spanning tree protocol (STP) across the stackable VLAN network, STP bridge protocol data units (BPDUs) from the customer's networks are tunneled across the stackable VLAN network.
- If you do enable STP across the stackable VLAN network, STP BPDUs from the customer's networks are consumed and not tunneled across the stackable VLAN network unless you enable protocol tunneling.

  NOTE: For more information about protocol tunneling on the E-Series, see Service Provider Bridging.
- Layer 3 protocols are not supported on a stackable VLAN network.
- Assigning an IP address to a stackable VLAN is supported when all the members are only stackable VLAN trunk ports. IP addresses on a stackable VLAN-enabled VLAN are not supported if the VLAN contains stackable VLAN access ports. This facility is provided for the simple network management protocol (SNMP) management over a stackable VLAN-enabled VLAN containing only stackable VLAN trunk interfaces. Layer 3 routing protocols on such a VLAN are not supported.
- Dell EMC Networking recommends that you do not use the same MAC address, on different customer VLANs, on the same stackable VLAN.
- Interfaces configured using stackable VLAN access or stackable VLAN trunk commands do not switch traffic for the default VLAN. These interfaces are switch traffic only when they are added to a non-default VLAN.
- Starting with Dell EMC Networking OS version 7.8.1 for C-Series and S-Series (Dell EMC Networking OS version 7.7.1 for E-Series, 8.2.1.0 for E-Series ExaScale), a vlan-stack trunk port is also allowed to be configured as a tagged port and as an untagged port for single-tagged VLANs. When the vlan-stack trunk port is also a member of an untagged vlan, the port must be in Hybrid mode. For more information, see portmode hybrid.

Topics:

- dei enable
- dei honor
- dei mark
- member
- vlan-stack access
- vlan-stack compatible
- vlan-stack dot1p-mapping
- vlan-stack protocol-type
- vlan-stack trunk

dei enable

Enable packets to be dropped based on their DEI value.

Syntax	`dei enable`
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information When packets are colored green; no packets are dropped.

dei honor

Honor the incoming DEI value by mapping it to a Dell EMC Networking OS drop precedence. Enter the command once for 0 and once for 1.

Syntax `dei honor {0 | 1} {green | red | yellow}`

Parameters

0 | 1	Enter the bit value you want to map to a color.
green | red | yellow	Choose a color: • `Green`: High priority packets that are the least preferred to be dropped. • `Yellow`: Lower priority packets that are treated as best-effort. • `Red`: Lowest priority packets that are always dropped (regardless of congestion status).

Defaults Disabled; Packets with an unmapped DEI value are colored green.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.

Version	Description
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information Enable DEI before using this command.

dei mark

Set the DEI value on egress according to the color currently assigned to the packet.

Syntax `dei mark {green | yellow} {0 | 1}`

Parameters

0 | 1	Enter the bit value you want to map to a color.
green | red | yellow	Choose a color: • `Green`: High priority packets that are the least preferred to be dropped. • `Yellow`: Lower priority packets that are treated as best-effort.

Defaults All the packets on egress are marked with DEI 0.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information Enable DEI before using this command.

member

Assign a stackable VLAN access or trunk port to a VLAN. The VLAN must contain the `vlan-stack compatible` command in its configuration.

Syntax

`member interface`

To remove an interface from a Stackable VLAN, use the `no member interface` command.

Parameters

interface Enter the following keywords and the interface information:

- For a Port Channel interface, enter the keywords `port-channel`, and then a number.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.

Defaults

Not configured.

Command Modes

CONF-IF-VLAN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.11.1	Introduced on the Z9000.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series and S-Series.

Usage Information

Enable the stackable VLAN (using the `vlan-stack compatible` command) on the VLAN prior to adding a member to the VLAN.

Related Commands

- vlan-stack compatible — enables stackable VLAN on a VLAN.

vlan-stack access

Specify a Layer 2 port or port channel as an access port to the stackable VLAN network.

Syntax

`vlan-stack access`

To remove access port designation, use the `no vlan-stack access` command.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to enabling this command, to place the interface in Layer 2 mode, enter the `switchport` command.

To remove the access port designation, remove the port (using the `no member interface` command) from all stackable VLAN-enabled VLANs.

vlan-stack compatible

Enable the stackable VLAN feature on a VLAN.

Syntax

`vlan-stack compatible`

To disable the Stackable VLAN feature on a VLAN, use the `no vlan-stack compatible` command.

Defaults

Not configured.

Command Modes

CONF-IF-VLAN

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to disabling the stackable VLAN feature, remove the members.

To view the stackable VLANs, use the `show vlan` command in EXEC Privilege mode. Stackable VLANs contain members, designated by the M in the Q column of the command output.

If you enabled VRF, you cannot enable the stacked VLAN feature using this command.

If you enabled IGMP snooping, you cannot enable the stacked VLAN feature using this command.

Example

```
DellEMC# show vlan

Codes: * - Default VLAN, G - GVRP VLANs

   NUM  Status    Q Ports
*  1    Inactive
   2    Active    M Tf 1/13
                  M Tf 1/1-1/3
   3    Active    M Po1(Tf 1/14-1/17)
                  M Tf 1/18
                  M Tf 1/4
   4    Active    M Po1(Tf 1/14-1/17)
                  M Tf 1/18
                  M Tf 1/5
   5    Active    M Po1(Tf 1/14-1/17)
                  M Tf 1/18
                  M Tf 1/6
DellEMC#
```

vlan-stack dot1p-mapping

Map C-Tag dot1p values to an S-Tag dot1p value.

Syntax `vlan-stack dot1p-mapping c-tag-dot1p` *values* `sp-tag-dot1p` *value*

Parameters

c-tag-dot1p *value*	Enter the keyword `c-tag-dot1p` then the customer dot1p value that is mapped to a service provider do1p value. The range is from 0 to 7.
sp-tag-dot1p *value*	Enter the keyword `sp-tag-dot1p` then the service provider dot1p value. The range is from 0 to 7.

Defaults none

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information You can separate the C-Tag values by commas or dashed ranges. In the case of conflicts, dynamic mode CoS overrides any Layer 2 QoS configuration.

vlan-stack protocol-type

Define the stackable VLAN tag protocol identifier (TPID) for the outer VLAN tag (also called the VMAN tag). If you do not configure this command, the Dell EMC Networking OS assigns the value 0x9100.

Syntax `vlan-stack protocol-type` *number*

Parameters

number	Enter the hexadecimal number as the stackable VLAN tag. You may specify both bytes of the 2-byte S-Tag TPID. The range is from 0 to FFFF. The default is **9100**.

Defaults 0x9100

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series. C-Series and S-Series accept both bytes of the 2-byte S-Tag TPID.
8.2.1.0	Introduced on the E-Series.
7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

For specific interoperability limitations regarding the S-Tag TPID, see the *Dell EMC Networking OS Configuration Guide*.

The four characters you may enter are shown in the following table.

Number	Resulting TPID
1	0x0001
10	0x0010
81	0x0081
8100	0x8100

Related Commands

- portmode hybrid — sets a port (physical ports only) to accept both tagged and untagged frames. A port configured this way is identified as a hybrid port in report displays.
- vlan-stack trunk — specifies a Layer 2 port or port channel as a trunk port to the Stackable VLAN network.

vlan-stack trunk

Specify a Layer 2 port or port channel as a trunk port to the stackable VLAN network.

Syntax

```
vlan-stack trunk
```

To remove a trunk port designation from the selected interface, use the `no vlan-stack trunk` command.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
8.2.1.0	Introduced on the E-Series. C-Series and S-Series accept both bytes of the 2-byte S-Tag TPID.
7.8.1.0	Functionality augmented for C-Series and S-Series to enable multi-purpose use of the port.
7.7.1.0	Functionality augmented for E-Series to enable multi-purpose use of the port.
7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to using this command, to place the interface in Layer 2 mode, use the `switchport` command.

To remove the trunk port designation, first remove the port (using the `no member interface` command) from all stackable VLAN-enabled VLANs.

In Example 1, a VLAN-Stack trunk port is configured and then made part of a single-tagged VLAN.

In Example 2, the tag protocol identifier (TPID) is set to `88A8`. The Tw 3/10 port is configured to act as a VLAN-Stack access port; the Tw 5/1 port acts as a VLAN-Stack trunk port, switching stackable VLAN traffic for VLAN 10, while also switching untagged traffic for VLAN 30 and tagged traffic for VLAN 40. (To allow VLAN 30 traffic, you need the native VLAN feature. Use the `portmode hybrid` command. For more information, see the portmode hybrid command.

Example 1

```
DellEMC(conf-if-tf-1/23)# switchport
DellEMC(conf-if-tf-1/23)# vlan-stack trunk
DellEMC(conf-if-tf-1/23)# show config
!
interface twentyFiveGigE 1/23
  no ip address
  switchport
  vlan-stack trunk
  no shutdown
DellEMC(conf-if-tf-1/23)# interface vlan 100
DellEMC(conf-if-vl-100)# vlan-stack compatible
DellEMC(conf-if-vl-100-stack)# member twentyFiveGigE 1/23
DellEMC(conf-if-vl-100-stack)# show config
!
interface Vlan 100
  no ip address
  vlan-stack compatible
  member twentyFiveGigE 1/23
```

```
  shutdown
DellEMC(conf-if-vl-100-stack)# interface vlan 20
DellEMC(conf-if-vl-20)# tagged twentyFiveGigE 1/23
DellEMC(conf-if-vl-20)# show config
!
interface Vlan 20
  no ip address
  tagged twentyFiveGigE 1/23
  shutdown
DellEMC(conf-if-vl-20)# do show vlan
Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

  NUM  Status Description   Q Ports
* 1    Inactive
  20   Active               T Tf 1/23
  100  Active               M Tf 1/23
DellEMC(conf-if-vl-20)#
```

Example 2

```
DellEMC(config)# vlan-stack protocol-type 88A8
DellEMC(config)# interface twentyFiveGigE 3/10
DellEMC(conf-if-tf-3/10)# no shutdown
DellEMC(conf-if-tf-3/10)# switchport
DellEMC(conf-if-tf-3/10)# vlan-stack access
DellEMC(conf-if-tf-3/10)# exit

DellEMC(config)# interface twentyFiveGigE 5/1
DellEMC(conf-if-tf-5/1)# no shutdown
DellEMC(conf-if-tf-5/1)# portmode hybrid
DellEMC(conf-if-tf-5/1)# switchport
DellEMC(conf-if-tf-5/1)# vlan-stack trunk
DellEMC(conf-if-tf-5/1)# exit

DellEMC(config)# interface vlan 10
DellEMC(conf-if-vlan)# vlan-stack compatible
DellEMC(conf-if-vlan)# member twentyFiveGigE 4/1, twentyFiveGigE 3/10,
twentyFiveGigE 5/1
DellEMC(conf-if-vlan)# exit

DellEMC(config)# interface vlan 30
DellEMC(conf-if-vlan)# untagged twentyFiveGigE     5/1
DellEMC(conf-if-vlan)# exit
DellEMC(config)#

DellEMC(config)# interface vlan 40
DellEMC(conf-if-vlan)# tagged twentyFiveGigE 5/1
DellEMC(conf-if-vlan)# exit
DellEMC(config)#
```

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Virtual Routing and Forwarding (VRF)

Virtual routing and forwarding (VRF) allows multiple instances of a routing table to coexist on the same router at the same time.

Topics:

- ip unknown-unicast
- ipv6 unknown-unicast
- description
- ip vrf forwarding
- ip http vrf
- ip route-export
- ip route-import
- ipv6 route-export
- ipv6 route-import
- match source-protocol
- redistribute
- interface management
- maximum dynamic-routes
- show ip vrf
- show run vrf

ip unknown-unicast

Enable IPv4 catch-all route.

Syntax `ip unknown-unicast [vrf vrf-name]`

To remove the IPv4 catch-all route (0.0.0.0/0) from the LPM route forwarding table in hardware which gets added as a default configuration after the initialization of FIB Agent module, use the `no ip unknown-unicast` command.

Defaults None

Parameters

vrf *vrf-name* (Optional) Enter the keyword `vrf` followed by the name of the VRF to enable catch-all routes corresponding to that VRF.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.

Version	Description
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S–Series.

Usage Information Use this command to add the IPv4 catch-all route (0.0.0.0/0) in the LPM route forwarding table if it was deleted using the `no ip unknown-unicast` command previously. This will be the default configuration after reload.

ipv6 unknown-unicast

Disable soft forwarding of unknown IPv6 destination packets.

Syntax `[no] ipv6 unknown-unicast`

Defaults Soft forwarding is enabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information All the default catch-all entries in the longest prefix match (LPM) table collect and transmit all unresolved IPv6 packets to the CPU, even if they are destined for unknown destinations.

description

Specify a name for a customer VRF.

Syntax `description` *`string`*

To delete the descriptive name for a customer VRF, use the `no description` *`string`* command.

Parameters

string	Enter a descriptive name for the VRF.

Defaults None.

Command Modes VRF MODE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series.

ip vrf forwarding

Attach an interface to a VRF.

Syntax

`ip vrf forwarding {`*`vrf-name`* `| management}`

To delete an interface associated with a configured VRF, use the `no ip vrf forwarding {`*`vrf-name`* `| management}` command.

Parameters

vrf-name	Enter name of the VRF that you want to associate the interface to.
management	Enter the keyword `management` to associate an interface to the management VRF.

Defaults

none

Command Modes

INTERFACE-CONFIG

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information

You can attach an interface to either a nondefault VRF or a management VRF.

To assign a port-back to a default VRF, remove the VRF association from the interface. You can use this only if there is no IP address configured on the interface.

There must be no prior Layer 3 configuration on the interface when configuring VRF.

You must enable VRF before using this command.

You can configure an IP subnet or address on a physical or VLAN interface that overlaps the same IP subnet or address configured on another interface only if the interfaces are assigned to different VRFs. If you assign two interfaces to the same VRF, you cannot configure overlapping IP subnets or the same IP address to them.

Example

```
DellEMC# configure terminal
DellEMC(conf)# ip vrf red
DellEMC(conf-vrf)# description "Red Network"
DellEMC(conf-vrf)# show config
!
ip vrf red 4
 description "Red Network"
DellEMC(conf-vrf)#

DellEMC(conf-if-tf-1/4)# int tw 1/4
DellEMC(conf-if-tf-1/4)# no shut
DellEMC(conf-if-tf-1/4)# ip vrf forwarding red
DellEMC(conf-if-tf-1/4)# ip add 100.1.1.1/24
DellEMC(conf-if-tf-1/4)#
DellEMC(conf-if-tf-1/4)#
DellEMC(conf-if-tf-1/4)#
DellEMC(conf-if-tf-1/4)# show config
!
interface twentyFiveGigE 1/4
 ip vrf forwarding red
 ip address 100.1.1.1/24
 no shutdown
DellEMC(conf-if-tf-1/4)#
```

ip http vrf

Configure an HTTP client with a VRF used to connect to the HTTP server.

Syntax `ip http vrf {management | vrf-name}`

To undo the HTTP client configuration, use the `ip http vrf` command.

Parameters

management	Enter the keyword `management` for configuring the management VRF that uses an HTTP client.
vrf-name	Enter a VRF name that the HTTP client uses. If you do not specify a VRF name, the HTTP client uses the default VRF.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.8(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information

To make the HTTP clients VRF-aware, use the `ip http vrf` command. The HTTP client uses the VRF name that you specify to reach the HTTP server. If you do not specify a VRF name, the HTTP client uses the default VRF.

ip route-export

Enables route leaking between VRFs. This command exports or shares IPv4 routes corresponding to one VRF with other nondefault VRFs.

Syntax

```
ip route-export tag [route-map-name]
```

Parameters

route-export	Enter the keywords `route-export` to leak or share routes between VRFs.
tag	Enter a tag (export route target) to expose routes to other VRFs. This tag acts as an identifier for exported routes. Use this identifier while importing these routes into another nondefault VRF.
route-map-name	(Optional) Enter the name of the route-map to filter the exported routes. You can leak global routes to VRFs. As the global RTM usually contains a large pool of routes, when the destination VRF imports global routes, these routes are duplicated into the VRF's RTM. It is mandatory to use route-maps to filter out leaked routes while sharing global routes with VRFs.

Command Modes

- VRP mode
- CONFIGURATION mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information

To export all the routes corresponding to a source VRF, you can use the `ip route-export tag` command without specifying the route-map attribute. This action exposes source VRF routes to various other VRFs, which then import these routes using the `ip route-import tag` command.

In Dell EMC Networking OS, you can configure one route-export per VRF as you can only expose one set of routes for leaking. However, you can configure multiple route-import targets because a VRF can accept routes from multiple VRFs.

You can expose a unique set of routes from the source VRF for leaking to other VRFs. When two VRFs leak or export routes, there is no option to discretely filter leaked routes from each source VRF. For example, you cannot import one set of routes from one VRF and another set of routes from another VRF.

Only active routes are eligible for leaking. For example, if one VRF has two routes corresponding to BGP and OSPF, in which the BGP route is not active, the OSPF route takes precedence over BGP. Even though the target VRF has specified filtering options to match BGP, the BGP route is not leaked as that route is not active in the Source VRF.

Related Commands

- ip route-import — imports routes from another VRF.

ip route-import

Imports IPv4 routes that another VRF leaks using the VRF tag during the export of these routes.

Syntax

```
ip route-import tag [route-map—name]
```

Parameters

route-import	Enter the keywords `route-import` to import routes into the VRF.
tag	Enter a tag (ASN number) to specify an import route target for importing routes from another VRF. To import leaked routes from another VRF, use the same ASN number that is specified as the export route target at the source VRF.
route-map-name	Enter the name of the route-map to filter the imported routes. **NOTE:** Use the route-map attribute while importing routes from the global RTM. Route-maps allow you to filter routes at the import end based on the matching criteria that you define in the route-map.

Command Modes

- CONFIGURATION
- VRF mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information

It is possible to configure multiple import conditions per VRF depending on the exporting VRF.

The export-target and import-target support only the match protocol and match prefix-list options. Other options that are configured in the route-maps are ignored.

Related Commands

- ip route-export – exports routes to another VRF.

ipv6 route-export

Enables route leaking between VRFs. This command exports or shares IPv6 routes corresponding to one VRF with other nondefault VRFs.

Syntax

```
ipv6 route-export tag [route-map-name]
```

Parameters

route-export	Enter the keywords route-export to leak or share routes between VRFs.
tag	Enter a tag (ASN number) as the export route target to expose routes to other VRFs. This tag acts as an identifier for exported routes. Use this identifier while importing these routes into another nondefault VRF.
route-map-name	(Optional) Enter the name of the route-map to filter the exported routes. You can leak global routes to be made available to VRFs. As the global RTM usually contains a large pool of routes, when the destination VRF imports global routes, these routes are duplicated into the VRF's RTM. It is mandatory to use route-maps to filter out leaked routes while sharing global routes with VRFs.

Defaults

N/A

Command Modes

- VRF mode
- CONFIGURATION mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information

To export all the routes corresponding to a source VRF, use the `ip route-export tag` command without specifying the route-map attribute. This action exposes source VRF routes to other VRFs, which then import these routes using the `ip route-import tag` command.

In Dell EMC Networking OS, you can configure one route-export per VRF as you can only expose one set of routes for leaking. However, you can configure multiple route-import targets because a VRF can accept routes from multiple VRFs.

You can expose a unique set of routes from the source VRF for leaking to other VRFs. When two VRFs leak or export routes, there is no option to discretely filter leaked routes from each source VRF. For example, you cannot import one set of routes from one VRF and another set of routes from another VRF.

Only active routes are eligible for leaking. For example, if one VRF has two routes corresponding to BGP and OSPF, in which the BGP route is not active, the OSPF route takes precedence over BGP. Even though the target VRF has specified filtering options to match BGP, the BGP route is not leaked as that route is not active in the source VRF.

Related Commands

- ipv6 route-import – imports IPv6 routes from another VRF.

ipv6 route-import

Imports IPv6 routes that another VRF leaks using the tag that VRF specifies during export of these routes.

Syntax

```
ipv6 route-import tag [route-map-name]
```

Parameters

route-import	Enter the keywords `route-import` to import IPv6 routes into the VRF.
tag	Enter a tag (ASN number) to specify an import route target for importing routes from another VRF. To import leaked routes from another VRF, use the same ASN number that is specified as the export route target at the source VRF.
route-map-name	Enter the name of the route-map to filter the imported routes. **NOTE:** Use the route-map attribute while importing routes from the global RTM. Route-maps allow you to filter routes at the import end based on the matching criteria that you define in the route-map.

Defaults

N/A

Command Modes

- VRF mode
- CONFIGURATION mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information

It is possible to configure multiple import conditions per VRF depending on the exporting VRF.

The export-target and import-target support only the match the protocol and prefix-list options. Other options that you configure in the route-maps are ignored.

Related Commands

- ipv6 route-export — exports IPv6 routes to another VRF.

match source-protocol

Specify matching source-protocol criteria while exporting or importing routes.

Syntax

```
match source-protocol {bgp | isis | ospf | connected | static}
```

Parameters

bgp	Enter the keyword `bgp` to leak or share routes corresponding to the BGP protocol.
isis	Enter the keyword `isis` to leak or share routes corresponding to the ISIS protocol.
ospf	Enter the keyword `ospf` to leak or share routes corresponding to the OSPF protocol.

	connected	Enter the keyword `connected` to leak or share connected routes corresponding to the VRF.
	static	Enter the keyword `static` to leak or share static routes corresponding to the VRF.

Command Modes ROUTE MAP MODE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Usage Information Specify the matching criteria only after defining a route-map. Before using this command, you must enter Route Map mode using the `route-map` *`route-map-name`* command. The match criteria that you specify is associated with the route-map that you define.

The export-target and import-target options support only the match protocol and match prefix-list options. Other options that you configure in the route-maps are ignored.

Related Commands

- ipv6 route-import – imports IPv6 routes from another VRF.

redistribute

Redistributes leaked or exported routes corresponding to specific protocols.

Syntax `redistribute {imported-bgp | import-ospf | import-isis}`

Parameters

imported-bgp	Enter the keywords `imported-bgp` to redistribute leaked routes that are learned using the BGP protocol.
imported-ospf	Enter the keywords `imported-ospf` to redistribute leaked routes that are learned using the OSPF protocol.
imported-isis	Enter the keywords `imported-isis` to redistribute leaked routes that are learned using the ISIS protocol.
route-map	Enter the name of the route-map to specify the filtering criteria for imported routes.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4810, S4820T, S5000, S6000, S6000–ON, and Z9500.

Related Commands

- ip route-import — import routes from another VRF.

interface management

Associates a management port with a management VRF.

Syntax

```
interface management
```

To delete the association between a management port and a management VRF, use the `no interface management` command.

Command Modes VRF MODE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information When you use this command, the management ports corresponding to both the active unit and the standby unit are associated with the management VRF.

maximum dynamic-routes

Specify the maximum number of dynamic (protocol) routes a VRF can have.

Syntax

```
maximum dynamic-routes limit {warn-threshold threshold-value | warning-only}
```

To remove the limit on the maximum number of routes used, use the `no maximum dynamic-routes` command.

Parameters

limit	Maximum number of routes allowed in a VRF. The valid range is from 1 to 320,000 (or maximum allowable for that platform if a smaller value).
warning-threshold	The warning threshold value is a percentage of the limit value. When the number of routes reaches the specified percentage of the limit, a warning message appears. The valid range is from 1 to 100. After the limit is reached, additional dynamic routes are not allowed.
warning-only	When you use the `warning-only` option, when the maximum number of dynamic routes reaches the limit, a warning message appears. After the limit is reached, additional dynamic routes are still allowed.

Defaults No limit is set on the maximum number of dynamic routes for a VRF.

Command Modes CONFIGURATION-VRF

CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.4(0.0)	Introduced on the S–Series.

Usage Information If you do not specify the maximum route limit for a VRF, the VRF has unlimited space that extends to the maximum number of entries allowed for the system.

show ip vrf

Displays information corresponding to the VRFs that you configure in the system.

Syntax `show ip [vrf vrf-name]`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` then the name of the VRF to display information corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Introduced on the Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Example

```
DellEMC# show ip vrf
VRF-Name                        VRF-ID Interfaces

default                         0      Tf 1/1-1/3,1/4-1/7,
                                       Fo 1/49/1,1/51/1,1/52/1,1/53/1,
                                       Ma 1/1,
                                       Ma 2/1,
                                       Ma 3/1,
                                       Ma 4/1,
                                       Ma 5/1,
                                       Ma 6/1,

Nu 0,
                                        Vl 1
test1                           1       Tf 1/25,1/28-1/29
test2                           2       Tf 1/32
management                      64



DellEMC# show ip vrf test1
VRF-Name                         VRF-ID Interfaces

test1                            1       Tf 1/29,1/30-1/31
DellEMC#
```

show run vrf

Displays configuration information corresponding to all the VRFs in the system.

Syntax `show run vrf vrf-name`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON and Z9500.
9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information

This command displays information from the running-config corresponding to either a specific VRF or all the VRFs in the system.

Example

```
DellEMC# show run vrf test3
!
ip vrf test3
 description "Banking Customer Chennai"
DellEMC#
```

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Virtual Link Trunking (VLT)

Virtual link trunking (VLT) allows physical links between two chassis to appear as a single virtual link to the network core. VLT eliminates the requirement for Spanning Tree protocols by allowing link aggregation group (LAG) terminations on two separate distribution or core switches, and by supporting a loop-free topology.

VLT provides Layer 2 multipathing, creating redundancy through increased bandwidth and enabling multiple parallel paths between nodes and load-balancing traffic where alternative paths exist.

NOTE: When you launch the VLT link, the VLT peer-ship is not established if any of the following is **TRUE**:

- The VLT System-MAC configured on both the VLT peers do not match.
- The VLT Unit-Id configured on both the VLT peers are identical.
- The VLT System-MAC or Unit-Id is configured only on one of the VLT peers.
- The VLT domain ID is not the same on both peers.

If the VLT peer-ship is already established, changing the System-MAC or Unit-Id does not cause VLT peer-ship to go down.

Also, if the VLT peer-ship is already established and the VLT Unit-Id or System-MAC are configured on both peers, then changing the CLI configurations on the VLT Unit-Id or System-MAC is rejected if any of the following become **TRUE**:

- After making the CLI configuration change, the VLT Unit-Id becomes identical on both peers.
- After making the CLI configuration change, the VLT System-MAC do not match on both peers.

When the VLT peer-ship is already established, you can remove the VLT Unit-Id or System-MAC configuration from either or both peers. However, removing configuration settings can cause the VLT ports to go down if you configure the Unit-Id or System-MAC on only one of the VLT peers.

Topics:

- back-up destination
- clear vlt statistics
- delay-restore
- delay-restore abort-threshold
- lacp ungroup member-independent
- multicast peer-routing timeout
- peer-link port-channel
- peer-routing
- peer-routing-timeout
- primary-priority
- show vlt brief
- show vlt backup-link
- show vlt counters
- show vlt detail
- show vlt inconsistency
- show vlt mismatch
- show vlt role
- show vlt statistics
- show vlt statistics igmp-snoop
- unit-id
- vlt domain
- vlt-peer-lag port-channel

back-up destination

Configure the IPv4 or IPv6 address of the management interface on the remote VLT peer used as the VLT backup link endpoint for sending out-of-band (OOB) hello messages.

Syntax

```
back-up destination {[ipv4-address] | [ipv6 ipv6-address] [interval seconds] vrf [management vrf-name | vrf-name]}
```

Parameters

ipv4–address	Enter the IPv4 address of the backup destination.
ipv6	Enter the keyword `ipv6` then an IPv6 address in the X:X:X:X::X format.
interval *seconds*	Enter the keyword `interval` to specify the time interval to send hello messages. The range is from 1 to 5 seconds. The default is 1 second.
vrf *management vrf-name*	(OPTIONAL) Configures the management VRF instance for the backup IPv4 or IPv6 address.
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF.

Defaults **1 second**

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.2(0.2)	Added support for IPv6.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Example Following example shows that the `VRF management` is configured:

```
DellEMC#show ip vrf
VRF-Name                          VRF-ID Interfaces
default                           0      Vl 1
management                        512    Ma 1/1
```

Hence, the `back-up` destination command must be configured as:

```
DellEMC(conf-vlt-domain)#back-up destination <ip address> vrf management
vrf-name
```

clear vlt statistics

Clear the VLT operation statistics.

Syntax `clear vlt statistics [arp | domain | igmp-snoop | mac | multicast | ndp]`

Parameters

domain	Clear the VLT statistics for the domain.
multicast	Clear the VLT statistics for multicast.
mac	Clear the VLT statistics for the MAC address.
arp	Clear the VLT statistics for ARP.
igmp-snoop	Clear the VLT statistics for IGMP snooping.
ndp	Clear the VLT statistics for NDP.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.2(0.2)	Added `multicast` and `ndp` parameters.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
VLT ARP Statistics
----------------
ARP Tunnel Pkts sent:0
ARP Tunnel Pkts Rcvd:0
ARP-sync Pkts Sent:0
ARP-sync Pkts Rcvd:0
```

```
ARP Reg Request sent:19
ARP Reg Request rcvd:10
```

Related Commands

- show vlt statistics — displays statistics on VLT operations.

delay-restore

Configure the delay in bringing up VLT ports after reload or peer-link restoration between the VLT peer switches.

Syntax `delay-restore`

Parameters

delay-restore	Enter the amount of time, in seconds, to delay bringing up the VLT ports after the VLTi device reloads or after the peer-link restores between VLT peer switches. The range from 1 to 1200. The default is **90 seconds**.

Defaults Not configured.

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S8420T.
8.3.12.0	Introduced on the S4810.

Usage Information To delay the system from bringing up the VLT port for a brief period to allow IGMP snooping and Layer 3 routing protocols to converge, use the `delay-restore` command. Use this command:

- after a VLT device reloads.
- if the peer VLT device was up at the time the VLTi link failed.

Related Commands

- show vlt statistics — displays statistics on VLT operations.

delay-restore abort-threshold

Increase the boot up timer to a value greater than 60 seconds.

Syntax `delay-restore abort-threshold <interval>`

To remove the boot up timer value, use the `no delay-restore abort-threshold` command.

Parameters

interval	Enter the interval value (in seconds) for the delay restore timer to abort. The range is from 1 to 1800 seconds. The default is **60 seconds**. This delay restore timer applies only during reload/boot-up and not in other scenarios (for example, during ICL flap).

Defaults 60 seconds

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S4820T, S4810, S6000, S5000, Z9000, S6000–ON and Z9500.

Usage Information To abort the VLT delay restore timer value as the maximum threshold, during reload, apply the maximum time interval to the hold-down ICL peer-up in the start-up configurations.

lacp ungroup member-independent

Prevent possible loop during the VLT peer switch bootup or on a device that accesses the VLT domain.

Syntax `lacp ungroup member-independent {vlt | port-channel}`

Parameters

vlt	Force all VLT LACP members to become switchports.
port-channel	Force all LACP port-channel members to become switchports.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Added port-channel parameter on the S4810.
8.3.8.0	Introduced on the S4810.

Usage Information

LACP on the VLT ports (on a VLT switch or access device), which are members of the VLT, are not brought up until the VLT domain is recognized on the access device.

During boot-up in a stacking configuration, the system must be able to reach the DHCP server with the boot image and configuration image. To receive an offer on static LAGs between switches, only untagged DHCP requests are sent to the DHCP server. Configure the DHCP server to start in BMP mode.

If the switches are connected using LACP port-channels (for example, the VLT peer and top of rack [ToR]), use the `port-channel` option on the ToR-side configuration to allow member ports of an ungrouped LACP port-channel to inherit VLAN membership of that port channel. This ensures untagged VLT peer device packets reach the DHCP server on the ToR.

To ungroup the VLT and port-channel configurations, use the `no lacp ungroup member independent` command on a VLT port channel.

If you reboot both VLT peers in BMP mode with static VLT LAGs, the DHCP server reply to the DHCP discover offer may not be forwarded by the ToR to the correct node. To avoid this issue, configure the VLT LAGs to the ToR and the ToR port channel to the VLT peers with LACP.

If supported by the ToR, enable the lacp-ungroup feature on the ToR using the `lacp ungroup member-independent port-channel` command.

If the lacp-ungroup feature is not supported on the ToR, reboot the VLT peers one at a time. After rebooting, verify that VLTi (ICL) is active before attempting DHCP connectivity.

Use the `lacp ungroup member-independent` command only if the system connects to nodes using bare metal provisioning (BMP) to upgrade or boot from the network. Otherwise, when the member links flap, the links become independent switch ports and forward the traffic even before LACP is formed on that port.

Ensure that you configure all port channels as hybrid ports and as untagged members of a VLAN where the LACP ungroup option is applicable.

BMP uses untagged dynamic host configuration protocol (DHCP) packets to communicate with the DHCP server.

To disable this feature on VLT and port channels, use `no lacp ungroup member-independent {vlt | port-channel}` command under the configuration mode.

Example

```
DellEMC(conf)#lacp ungroup member-independent ?
port-channel     LACP port-channel members become switchports
vlt                                All VLT LACP members become
switchports
```

multicast peer-routing timeout

To retain synced multicast routes or synced multicast outgoing interface (OIF) after a VLT peer node failure, configure the timeout value for a VLT node.

Syntax `multicast peer-routing timeout value`

To restore the default value, use the `no multicast peer-routing timeout` command.

Parameters

value	Enter the timeout value (in seconds). The range is from 1 to 1200. The default is 150.

Command Modes VLT DOMAIN (conf-vlt-domain)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.
9.0.2.0	Introduced on the S6000.

peer-link port-channel

Configure the specified port channel as the chassis interconnect trunk between VLT peers in the domain.

Syntax `peer-link port-channel port-channel-number {peer-down-vlan vlan id}`

Parameters

port-channel-number	Enter the port-channel number that acts as the interconnect trunk.
peer-down-vlan *vlan id*	Enter the keywords `peer-down-vlan` then a VLAN ID to configure the VLAN that the VLT peer link uses when the VLT peer is down.

Defaults Not configured.

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Added support for the `peer-down-vlan` option.
8.3.8.0	Introduced on the S4810.

Usage Information To configure the VLAN from where the VLT peer forwards packets received over the VLTi from an adjacent VLT peer that is down, use the `peer-down-vlan` option. When a VLT peer with bare metal provisioning (BMP) is booting up, it sends untagged DHCP discover packets to its peer over the VLTi. To ensure that the DHCP discover packets are forwarded to the VLAN that has the DHCP server, use this configuration.

peer-routing

Enable Layer 3 (L3) VLT peer-routing. This command is applicable for both IPv6 and IPv4 interfaces.

Syntax `peer-routing`

To disable L3 VLT peer-routing, use the `no peer-routing` command.

Defaults Disabled.

Command Modes VLT DOMAIN (conf-vlt-domain)

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.

Version	Description
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added the support for IPV6 / IPV4.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.

peer-routing-timeout

Configure the delay after which peer routing disables when the peer is unavailable. This command is applicable for both IPv6 and IPv4.

Syntax

`peer-routing-timeout` *value*

To restore the default value, use the `no peer-routing-timeout` command.

Parameters

value	Enter the timeout value (in seconds). The range is from 1 to 65535. The default value is **infinity**.

Command Modes VLT DOMAIN (conf-vlt-domain)

Default Infinity

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Added support for default value on the S-Series and Z-Series.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Added the support for IPV6 / IPV4.
9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.
9.0.2.0	Introduced on the S6000.

Usage Information

When the timer expires, the software checks to see if the VLT peer is available. If the VLT peer is not available, peer-routing disables on that peer.

If you do not configure this delay value, peer-routing is not disabled even when the peer is unavailable.

primary-priority

Assign the priority for master election among VLT peers.

Syntax `[no] primary-priority`

Parameters

value To configure the primary role on a VLT peer, enter a lower value than the priority value of the remote peer. The range is from 1 to 65535. The default value is **32768**.

Default **32768**

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information After you configure a VLT domain on each peer switch and connect (cable) the two VLT peers on each side of the VLT interconnect, the system elects a primary and secondary VLT peer device. To configure the primary and secondary roles before the election process, use the `primary-priority` command. Enter a lower value on the primary peer and a higher value on the secondary peer.

If the primary peer fails, the secondary peer (with the higher priority) takes the primary role. If the primary peer (with the lower priority) later comes back online, it is assigned the secondary role (there is no preemption).

show vlt brief

Displays summarized status information about VLT domains configured on the switch.

Syntax `show vlt brief`

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information

The version shown in the `show vlt brief` output command displays the VLT version number which is different from the Dell EMC Networking OS version number. VLT version numbers begin with odd numbers.

Example (Brief)

```
DellEMC#show vlt brief
VLT Domain Brief
------------------
Domain ID                     : 1
Role                          : Secondary
Role Priority                 : 32768
ICL Link Status               : Up
HeartBeat Status              : Up
VLT Peer Status               : Up
Version                       : 6(3)
Local System MAC address      : 00:01:e8:8a:e9:91
Remote System MAC address     : 00:01:e8:8a:e9:76
Remote system version         : 6(3)
Delay-Restore timer           : 90 seconds
Delay-Restore Abort Threshold : 60 seconds
Peer-Routing                  : Disabled
Peer-Routing-Timeout timer    : 0 seconds
Multicast peer-routing timeout: 150 seconds
DellEMC#
```

show vlt backup-link

Displays information about the backup link operation.

Syntax `show vlt backup-link`

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1# show vlt backup-link

VLT Backup Link
-----------------
Destination:                  10.11.200.18
Peer HeartBeat status:        Up
HeartBeat Timer Interval:     1
HeartBeat Timeout:            3
UDP Port:                     34998
HeartBeat Messages Sent:      1026
HeartBeat Messages Received: 1025
```

show vlt counters

Displays counter information.

Syntax `show vlt counters [arp| igmp-snoop | interface | mac | ndp]`

Parameters

arp	Enter the keyword `arp` to display the ARP counter information for the VLT.
igmp-snoop	Enter the keywords `igmp-snoop` to display the igmp-snooping counter information for the VLT.
interface	Enter the keyword `interface` to display the interface counter information for the VLT.
mac	Enter the keyword `mac` to display the MAC address counter information for the VLT.
ndp	Enter the keyword `ndp` to display the VLT counter information for NDP.

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Usage Information

If you do not add a parameter such as `arp` or `mac`, the output displays all the counters.

Example

```
DellEMC# show vlt counter
Total VLT counters
-------------------------
L2 Total MAC-Address Count :
IGMP MRouter Vlans count :
IGMP Mcast Groups count :
ARP entries count :
```

Example (igmp-snoop)

```
DellEMC# show vlt counter igmp-snoop
Total IGMP VLT counters
----------------------
IGMP MRouter Vlans count : 1
IGMP Mcast Groups count  : 5
```

Example (igmp-snoop interface port-channel)

```
DellEMC#show vlt counter igmp-snoop interface port-channel 2
VLT Port-ID: 2 IGMP Counter
-----------------------
IGMP MRouter Vlans count : 0
IGMP Mcast Groups count  : 5

DellEMC# show vlt counter igmp-snoop interface port-channel 100
VLT Port-ID: 100 IGMP Counter
-----------------------
IGMP MRouter Vlans count : 1
IGMP Mcast Groups count  : 0
Ve
```

Example (NDP and Non-VLT ARP)

```
DellEMC#show vlt counters
Total VLT Counters
-------------------
L2 Total MAC-Address Count:             2
Total Arp Entries Learnt :              0
Total Arp Entries Synced :              0
Total Non-VLT Arp entries Learnt:       0
Total Non-VLT Arp Entries Synced        0
IGMP MRouter Vlans count :
IGMP Mcast Groups count :
Total VLT Ndp Entries Learnt :          2
```

```
Total VLT Ndp Entries Synced :          0
Total Non-VLT Ndp Entries Learnt :      0
Total Non-VLT Ndp Entries Synced :      0
```

show vlt detail

Displays detailed status information about VLT domains configured on the switch.

Syntax `show vlt detail`

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Example

```
DellEMC# DellEMC(conf-if-vl-100)#show vlt detail
Local LAG Id Peer LAG Id Local Status Peer Status Active VLANs
------------ ----------- ------------ ----------- -------------
10           10          UP           UP          100, 200, 300, 400,
```

show vlt inconsistency

Display run-time inconsistencies in the incoming interface (IIF) for spanned multicast routes (mroutes).

Syntax `show vlt inconsistency ip mroute`

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.

Example

```
DellEMC#show vlt inconsistency ip mroute
Spanned Multicast Routing IIF Inconsistency

Multicast Route          LocalIIF      PeerIIF
---------------          ----------    ---------
(22.22.22.200, 225.1.1.2) VLAN 5        VLAN 6
(*, 225.1.1.2)             VLAN 15      Tf 1/5
DellEMC#
```

show vlt mismatch

Display mismatches in VLT parameters.

Syntax `show vlt mismatch`

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Updated to show mismatch in VXLAN instance parameters.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced support for Q-in-Q implementation over VLT on the S-Series and Z-Series. Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.

Version	Description
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.

Example

```
DellEMC#show vlt mismatch
Domain
-------
Parameters    Local     Peer
----------    -----     -----
 Unit-ID       1          2

Vlan-config
------------
Vlan-ID      Local Mode  Peer Mode
-------      ----------  ---------

00           --            L3

Vlan IPV4 Multicast Status
--------------------------
Vlan-ID    Local Status   Peer Status
--------   ------------   -----------

   4094       Active         Inactive

DellEMC#
```

Example for Q-in-Q implementation over VLT

```
DellEMC#show vlt mismatch
Domain
------
Parameters    Local      Peer
----------    -----      ----
PB for stp    Enabled    Disabled

Vlan-type-config
----------------
Codes:: P - Primary, C - Community, I - Isolated, N - Normal vlan, M -
Vlan-stack

Vlan-ID        Local    Peer
-------        -----    ----

 100            N        M

Port-type-config
----------------
Codes:: p - PVLAN Promiscuous port, h - PVLAN Host port, t - PVLAN Trunk
port,
        mt - Vlan-stack trunk port, mu - Vlan-stack access port, n -
Normal port

Vlt Lag         Local     Peer
-------         -----     ----
128             mt        mu

Vlan-stack protocol-type
------------------------

Local      Peer
-----      ----
0x4100      0x8100

VLT-VLAN config
---------------

Local Lag  Peer Lag Local VLANs    Peer VLANs
```

```
---------  --------  -----------     ----------
 128          128        4094           100

DellEMC#
```

show vlt role

Displays the VLT peer status, role of the local VLT switch, VLT system MAC address and system priority, and the MAC address and priority of the local VLT device.

Syntax `show vlt role`

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1# show vlt role

VLT Role
----------
VLT Role:                    Primary
System MAC address:          00:01:e8:8a:df:bc
System Role Priority:        32768
Local System MAC address:    00:01:e8:8a:df:bc
Local System Role Priority: 32768

Dell_VLTpeer2# show vlt role

VLT Role
----------
VLT Role:                    Secondary
System MAC address:          00:01:e8:8a:df:bc
System Role Priority:        32768
Local System MAC address:    00:01:e8:8a:df:e6
Local System Role Priority: 32768
```

show vlt statistics

Displays VLT operations statistics.

Syntax `show vlt statistics [arp | domain | igmp-snoop | mac | multicast | ndp]`

Parameters

arp	Enter the keyword `arp` to display the ARP VLT statistics.
domain	Enter the keyword `domain` to display the domain VLT statistics.
igmp-snoop	Enter the keywords `igmp-snoop` to display the IGMP snooping VLT statistics.
mac	Enter the keyword `mac` to display the VLT MAC addresses VLT statistics.
multicast	Enter the keyword `multicast` to display the multicast VLT statistics.
ndp	Enter the keyword `ndp` to display the NDP VLT statistics.

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.2)	Added parameters `multicast` and `ndp`
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Added support in the output for ARP, MAC, and IGMP snooping.
8.3.8.0	Introduced on the S4810.

Related Commands

- clear vlt statistics — clears the statistics on VLT operations.

Example

NOTE: The following example shows the statistics for all the VLT parameters. If you enter a specific keyword, such as `mac`, only the statistics for that VLT parameter displays.

```
Dell_VLTpeer1# show vlt statistics
VLT Statistics
---------------
HeartBeat Messages Sent:     930
HeartBeat Messages Received: 909
ICL Hello's Sent:            927
ICL Hello's Received:        910
Domain Mismatch Errors:      0
```

```
Version Mismatch Errors:     0
Config Mismatch Errors:      0

VLT MAC Statistics
---------------
L2 Info Pkts sent:6, L2 Mac-sync Pkts Sent:0
L2 Info Pkts Rcvd:3, L2 Mac-sync Pkts Rcvd:2
L2 Reg Request sent:1
L2 Reg Request rcvd:2
L2 Reg Response sent:1
L2 Reg Response rcvd:1

VLT Igmp-Snooping Statistics
-----------------------------
IGMP Info Pkts sent:     4
IGMP Info Pkts Rcvd:     1
IGMP Reg Request sent:   1
IGMP Reg Request rcvd:   2
IGMP Reg Response sent:  1
IGMP Reg Response rcvd:  1
IGMP PDU Tunnel Pkt sent: 5
IGMP PDU Tunnel Pkt rcvd: 10
IGMP Tunnel PDUs sent:    10
IGMP Tunnel PDUs rcvd:    19

VLT Multicast Statistics
-----------------------------
Info Pkts Sent:                  4
Info Pkts Rcvd:                  2
Reg Request Sent:                2
Reg Request Rcvd:                2
Reg Response Sent:               1
Reg Response Rcvd:               0
Route updates sent to Peer:      0
Route updates rcvd from Peer:   0
Route update pkts sent to Peer:  0
Route update pkts rcvd from Peer: 0

VLT NDP Statistics
--------------------
NDP NA VLT Tunnel Pkts sent:16
NDP NA VLT Tunnel Pkts Rcvd:46
NDP NA Non-VLT Tunnel Pkts sent:0
NDP NA Non-VLT  Tunnel Pkts Rcvd:0
Ndp-sync Pkts Sent:144
Ndp-sync Pkts Rcvd:105
Ndp Reg Request sent:25
Ndp Reg Request rcvd:24
```

show vlt statistics igmp-snoop

Displays the informational packets and IGMP control PDUs that are exchanged between VLT peer nodes.

Syntax `show vlt statistics igmp-snoop`

Default Not configured.

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.12.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1#show vlt statistics igmp-snoop
VLT Igmp-Snooping Statistics
------------------------------
IGMP Info Pkts sent:     4
IGMP Info Pkts Rcvd:     1
IGMP Reg Request sent:   1
IGMP Reg Request rcvd:   2
IGMP Reg Response sent:  1
IGMP Reg Response rcvd:  1
IGMP PDU Tunnel Pkt sent:5
IGMP PDU Tunnel Pkt rcvd:10
IGMP Tunnel PDUs sent:   10
IGMP Tunnel PDUs rcvd:   19
```

unit-id

Configure the default unit ID of a VLT peer switch.

Syntax `unit-id [0 | 1]`

Parameters

0 | 1	Configure the default unit ID of a VLT peer switch. Enter `0` for the first peer. Enter `1` for the second peer.

Defaults Automatically assigned based on the MAC address of each VLT peer. The peer with the lower MAC address is assigned unit 0; the peer with the higher MAC address is assigned unit 1.

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version	Description
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information

When you create a VLT domain on a switch, the Dell EMC Networking OS automatically assigns a unique unit ID (0 or 1) to each peer switch. The unit IDs are used for internal system operations. To explicitly configure the unit ID of a VLT peer, use the `unit-id` command. Configure a different unit ID (0 or 1) on each peer switch.

This command minimizes the time required for the VLT system to determine the unit ID assigned to each peer switch when one peer reboots.

vlt domain

Enable VLT on a switch, configure a VLT domain, and enter VLT-Domain Configuration mode.

Syntax `vlt domain domain-id`

Parameters

domain-id	Enter the domain ID number. Configure the same domain ID on the peer switch. The range of domain IDs is from 1 to 1000.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information

The VLT domain ID must be the same between the two VLT devices. If the domain ID is not the same, a syslog message generates and VLT does not launch.

Related Commands

- show vlt brief — display the delay-restore value.

vlt-peer-lag port-channel

Associate the port channel to the corresponding VLT peer port channel for the VLT connection to an attached device.

Syntax `vlt-peer-lag port-channel id-number`

Parameters

id-number	Enter the respective VLT port-channel number of the peer device.

Defaults Not configured.

Command Modes INTERFACE PORT-CHANNEL

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.
9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

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VLT Proxy Gateway

The virtual link trucking (VLT) proxy gateway feature allows a VLT domain to locally terminate and route L3 packets that are destined to a Layer 3 (L3) end point in another VLT domain. Enable the VLT proxy gateway using the link layer discover protocol (LLDP) method or the static configuration. For more information, see the *Command Line Reference Guide*.

Topics:

- proxy-gateway lldp
- proxy-gateway static
- remote-mac-address exclude-vlan
- peer-domain-link port-channel exclude-vlan
- proxy-gateway peer-timeout
- vlt-peer-mac transmit
- show vlt-proxy-gateway

proxy-gateway lldp

Enables the proxy-gateway feature using the LLDP protocol.

Syntax `[no] proxy-gateway lldp`

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information The configuration is cached and sent to LLDP only in one of the following conditions:

1. The port-channel connecting the two VLT domains, across the DC, is a VLT LAG.
2. The `protocol lldp` command is globally enabled.
3. The proxy-gateway LLDP configuration is applied.

Example

```
DellEMC(conf)# vlt-domain 1
DellEMC(conf-vlt-domain)# proxy-gateway lldp
DellEMC(conf-vlt-domain)#
```

proxy-gateway static

Enables the proxy-gateway feature using static configurations.

Syntax `[no] proxy-gateway static`

Command Modes VLT DOMAIN

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000.

Usage Information When you add a proxy-gateway static configuration, the setting is saved in the Layer 2 module. When you remove the static proxy gateway configuration, each proxy-gateway static MAC configured is deleted from the Layer 2 module.

Example

```
DellEMC(conf)# vlt-domain 1
DellEMC(conf-vlt-domain)# proxy-gateway static
DellEMC(conf-vlt-domain)#
```

remote-mac-address exclude-vlan

Configure the proxy-gateway static entry and exclude a VLAN or a range of VLANs from proxy routing.

Syntax `[no] remote-mac-address mac–address [exclude-vlan vlan-range]`

Parameters

remote-mac-address	Specify the mac-addresses of the VLT peers which are in the remote VLT domain.
mac-address	Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.
vlan-range	Enter the VLAN IDs in which proxy gateway is not needed. The VLANs are excluded from doing proxy gateway. The value can be a single VLAN ID, comma-separated VLAN IDs, a range of VLAN IDs, or a combination. For example: Comma-separated: 3, 4, 6 Range: 5-10 Combination: 3, 4, 5-10, 8

Command Modes VLT DOMAIN PROXY GW STATIC

Command History This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information You can configure the MAC address of a VLT peer in a remote VLT domain to associate with the static VLT proxy gateway and exclude a VLAN, or a range of VLANs, from proxy routing.

Example

```
DellEMC(conf)# vlt-domain 1
DellEMC(conf-vlt-domain#proxy-gateway static
DellEMC(conf-vlt-domain-proxy-gw-static)# remote-mac-address
00:01:e8:06:95:ac exclude-vlan 3
DellEMC(conf-vlt-domain-proxy-gw-static)#
```

peer-domain-link port-channel exclude-vlan

Configure the VLT port channel, which is connected to the remote VLT domain, for the proxy gateway or configure the VLANs you want to exclude from VLT proxy gateway.

Syntax `[no] peer-domain-link port-channel interface-identifier exclude-vlan vlan-range`

Parameters

port-channel	Configure the proxy-gateway interface port-channel.
interface-identifier	Enter the interface type.
vlan-range	Enter the VLAN IDs that you want to exclude from the proxy gateway. The value can be a single VLAN ID, comma-separated VLAN IDs, a range of VLAN IDs, or a combination. For example: Comma-separated: 3, 4, 6 Range: 5-10 Combination: 3, 4, 5-10, 8

Command Modes VLT DOMAIN PROXY GW LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information You must configure the VLT port channel interface which is connecting to the remote VLT domain as peer-domain-link. You can also configure the VLANs you want to exclude from the VLT proxy gateway.

Example

```
DellEMC(conf)#vlt-domain 1
DellEMC(conf-vlt-domain)#proxy-gateway lldp
DellEMC(conf-vlt-domain-proxy-gw-lldp)#peer-domain-link port-channel 20
exclude-vlan 3
```

proxy-gateway peer-timeout

Enables the VLT node to timeout the transmission of the peer MAC address when the VLT peer is down.

Syntax `[no] peer-timeout value`

Parameters

value	Enter the timeout value (in seconds). The range is from 1 to 65535. The default is **infinity**.

Default Infinity

Command Modes VLT DOMAIN PROXY GW LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.7(0.0)	Removed the default value on the S-Series and Z-Series.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information When a VLT peer goes down, the local VLT node stops sending its peer's MAC address. If you configure this timeout, the local VLT node sends its peer's MAC address until the timer expires.

Use this timer when you enable `vlt-peer-mac transmit`. A typical use example is a square VLT topology with a single link connecting to the remote peers.

Example

```
DellEMC(conf-vlt-domain-proxy-gw-lldp)# peer-timeout 5
```

vlt-peer-mac transmit

Enables the device to transmit the peer MAC address along with its own MAC address in LLDP TLV packets to the remote VLT domain.

Syntax `[no] vlt-peer-mac transmit`

Command Modes VLT DOMAIN PROXY GW LLDP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information This command enables the device to transmit its VLT peer MAC address along with its own MAC address to the remote VLT domain. By default, a node sends only its own MAC address to the remote VLT domain.

This configuration is applicable only for an LLDP proxy gateway. A typical use example is a square VLT topology with single link connecting to the remote peers.

Example

```
DellEMC(conf-vlt-domain-proxy-gw-lldp)# vlt-peer-mac transmit
```

show vlt-proxy-gateway

Displays the VLT proxy gateway configuration.

Syntax `show vlt-proxy-gateway [info] {lldp | static}`

Parameters

lldp	Enter the keyword `lldp` to display details about the LLDP VLT proxy gateway configuration.
static	Enter the keyword `static` to display details about the static VLT proxy gateway configuration.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information

The proxy-gateway feature may go operationally down for any of the following reasons:

- LLDP is globally disabled.
- LDP is disabled per port.
- VLT port-channel is down.
- LLDP neighbor is down.

If any of these conditions is true, the proxy-gateway feature could be operationally down. If so, it is shown in the `show` command output.

When more than one VLT port-channel terminates on the same ToR, the `show VLT proxy-gateway info lldp` command output may show the port-channel ID incorrectly.

Example

```
DellEMC#show vlt proxy-gateway
 VLT Proxy Gateway Brief
-------------------------
 Config Mode:                  LLDP
 Global LLDP Config Status:    Enabled
 peer-mac-transmit Status:     Disabled

DellEMC#show vlt proxy-gateway info static
Mac Address           Exclude Vlan
-----------           ------------
00:01:e8:8a:e8:f7     3,7-8
00:01:e8:8b:1c:c0     3,7-8


DellEMC#show vlt proxy-gateway info lldp
LagId Mac Address     Exclude Vlan
----- -----------     ------------
Po 55 00:01:e8:8a:e8:f7 3,7-8 << Macs learnt via port-channel 55
Po 55 00:01:e8:8b:1c:c0 3,7-8
```

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Virtual Extensible LAN (VXLAN)

Virtual Extensible LAN (VXLAN) is supported on Dell EMC Networking OS.

Topics:

- clear vxlan vxlan-instance statistics
- clear mac-address-table dynamic
- controller
- debug vxlan
- feature vxlan
- fail-mode
- gateway-ip
- local-vtep-ip
- max_backoff
- peer-ovsdbserver-ip
- remote-vtep-ip
- vnid
- vni-profile
- vxlan-instance
- vxlan-instance (VAP)
- vxlan-instance static
- vxlan-vnid
- show running-config vxlan
- show vxlan vxlan-instance
- show vxlan vxlan-instance logical network
- show vxlan vxlan-instance physical-locator
- show vxlan vxlan-instance statistics interface
- show vxlan vxlan-instance statistics remote-vtep-ip
- show vxlan vxlan-instance unicast-mac-local
- show vxlan vxlan-instance unicast-mac-remote
- show vxlan vxlan-instance vtep-vni-map

clear vxlan vxlan-instance statistics

Clear the remote VTEP and access port statistics.

Syntax `clear vxlan vxlan-instance instance ID statistics`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information Use this command to clear the remote VTEP and access port statistics.

clear mac-address-table dynamic

Clear the MAC address table of specific or all MAC address learned dynamically.

Syntax

```
clear mac-address-table dynamic {vxlan {interface interface-type | remote-vtep-ip ip-address | vnid vnid} | all | interface | vlan | vxlan}
```

Parameters

interface *interface-type*	Enter the keyword `interface` and the interface type to clear all MAC addresses learnt on that interface. The same is also notified to the controller.
remote-vtep-ip *ip-address*	Enter the keyword `remote-vtep-ip` and the IP address of the remote VTEP to clear all MAC addresses learnt from that VTEP.
vnid *vnid*	Enter the keyword `vnid` and the VNID of to clear all MAC addresses learnt from all access interfaces that belong the VNID.
all	Enter the keyword `all` to clear both MAC address of the VXLAN and legacy VLAN.
interface	Enter the keyword `interface` to clear MAC address from a specific interface.
vlan	Enter the keyword `vlan` to clear MAC address from a specific vlan.
vxlan	Enter the keyword `vxlan` to clear MAC address from a specific vxlan.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

controller

Configures controller for the VXLAN instance on the platform.

Syntax

```
controller controller ID ip address port port-number tcp|ssl
```

Parameters

controller ID	Enter the controller ID.
ip address	Enter the IP address of the controller.
port *port-number*	(OPTIONAL) Enter the keyword `port` and the port number. The range is from 1 to 6632. The default port number is 6632.
tcp	(OPTIONAL) Enter the keyword `tcp` to configure tcp connection to controller.
ssl	(OPTIONAL) Enter the keyword `ssl` to configure ssl connection to controller (Default).

Defaults Disabled

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Related Commands vxlan-instance — Enable VXLAN instance configuration on the platform.

debug vxlan

Debug messages between the Gateway and Controller.

Syntax `debug vxlan`

Defaults Disabled

Command Modes EXEC Privilege

Command History

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S6000.

feature vxlan

Enable VXLAN configuration globally on the platform.

Syntax `feature vxlan`

To disable the VXLAN, use the `no feature vxlan` command.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10))	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Usage Information You must configure feature VXLAN to configure VXLAN-instance.

Related Commands vxlan-instance — Enable VXLAN Instance configuration on the platform.

fail-mode

Configures failure-mode on the platform.

Syntax `fail-mode secure`

To disable the `fail-mode secure`, use the `no fail-mode secure`command.

Parameters

secure	Enter the keyword `secure` to delete all its database and hardware flows/ resources, when the VTEP loses connectivity with the controller.

Defaults non secure

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Related Commands vxlan-instance— Enable VXLAN Instance configuration on the platform.

gateway-ip

Configures gateway IP address on the platform.

Syntax `gateway-ip` *`IP address`*

Parameters

IP address	Enter the IP address of the gateway for the VXLAN instance.

Defaults Disabled

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Related Commands vxlan-instance — Enable VXLAN Instance configuration on the platform.

local-vtep-ip

Set the local IP Address to be used as the source IP for VXLAN tunnels.

Syntax `local-vtep-ip` *`IP Address`*

To disable the settings, use the `no local-vtep-ip` command.

Parameters

IP Address	Enter the local IP Address to be used as a source for VXLAN tunnels.

Defaults None.

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information Use the `local-vtep-ip` *`IP Address`* command to set the local IP Address that would be used as source for VXLAN tunnels.

max_backoff

Configures time to wait between connection attempts with controller.

Syntax `max_backoff` *`time`*

Parameters

time	Enter the time in milliseconds. The range is from 1000-180000. The default value is 30000.

Defaults 30000

Command Modes VXLAN INSTANCE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Usage Information

The retry interval value caps at the value configured on the max-backoff.

Related Commands

vxlan-instance — Enable VXLAN Instance configuration on the platform.

peer-ovsdbserver-ip

Specify the IP address of the peer OVSDB server in a VLT setup.

Syntax

`peer-ovsdbserver-ip` *`peer-ip-address`*

To remove the configuration, use the `no peer-ovsdbserver-ip`

Parameters

peer-ip-address	Enter the peer OVSDB server IP address. This is usually the management IP address of the peer VLT device.

Defaults

Not configured

Command Modes

VXLAN-INSTANCE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced on the S6000, S6000–ON, S6010-ON, S4048-ON, S4048T-ON, S5048F-ON, S6100-ON, and Z9100-ON.

remote-vtep-ip

Create a remote VTEP and associate it to specified VNIDs.

Syntax

`remote–vtep–ip` *`IP Address`* `vni-profile` *`profile name`*

To delete the remote VTEP, use the `no remote–vtep–ip` command.

Parameters

IP Address	Enter the IP Address of the remote VTEP.
vni-profile	Enter the keyword `vni-profile` followed by the *profile name* to which the remote VTEP has to be associated.

Defaults

None.

Command Modes

VXLAN-INSTANCE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

Use this command to associate a specific VNID to a remote VTEP. Provide a valid profile name while associating to the remote VTEP.

NOTE: The remote VTEP IP Address cannot be any of the local IP Addresses configured in the switch.

vnid

Associate a range of VNID numbers to a specific VNI profile.

Syntax

`vnid VNID-Range`

To remove the association, use the `no vnid` command.

Parameters

VNID-Range	Enter the range of VNIDs that need to be members of the specific VNI profile. The range is from 1 to 16777215.

Defaults

None.

Command Modes

VNI-PROFILE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

Use this command to associate the specified range of VNIDs to a VNI profile.

vni-profile

Create a VNI profile to associate with remote VTEP configuration.

Syntax

`vni–profile profile name`

To delete the VNI profile, use the `no vni-profile` command.

Parameters

profile name	Enter a valid and unique profile name. The profile name can have a maximum of 32 characters.

Defaults

None

Command Modes

VXLAN-INSTANCE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

Use this command to create a VNI profile with a unique profile name to associate with remote VTEP. You can create a maximum of 1024 VNI profiles and remote VTEP IPs.

You can use this command only when you configure static VXLAN.

vxlan-instance

Enable VXLAN Instance configuration on the platform.

Syntax

`vxlan-instance` *`instance ID`* `[nsx | nuage | static]`

To delete `vxlan-instance` from the system, use `no vxlan-instance` *`instance ID`* command.

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1*.
nsx	Enter the keyword `nsx` to connect to an NSX controller. **NOTE:** When no keyword is specified, the `nsx` option is applied.
nuage	Enter the keyword `nuage` to connect to a Nuage controller.
static	Enter the keyword `static` to configure static VXLANs.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.14(0.0)	Introduced `nsx` and `Nuage` keywords on the S5048F–ON.
9.13(0.0)	Introduced `nsx` and `Nuage` keywords on the S4048–ON, S4048T-ON, S6000, S6000–ON, S6100–ON, S6010–ON, and Z9100–ON.
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Usage Information

You must configure VXLAN globally before using VXLAN-instance. Use the `no shutdown` command to enable the VXLAN instance.

Example

Enable VXLAN instance:

```
DellEMC(conf)#int 1/5/1
DellEMC(conf-if-te-1/5/1)#vxlan-instance 1
DellEMC(conf-if-te-1/5/1-vxlan-inst-1)#no shutdown
```

Disable VXLAN instance:

```
DellEMC(conf)#no vxlan-instance 1
```

Related Commands feature vxlan — Enable VXLAN configuration globally on the platform.

vxlan-instance (VAP)

To configure a VXLAN-Access Port (VAP) in to VXLAN-instance

Syntax `vxlan-instance instance ID`

To unconfigure VAP, use the `no vxlan-instance 1` command.

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Defaults Disabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.4(0.0)	Introduced on the S6000.

Usage Information You must disable `vxlan-instance` before unconfiguring VAP.

Related Commands feature vxlan — Enable VXLAN configuration globally on the platform.

vxlan-instance static

Enable VXLAN instance configuration to be static on the platform.

Syntax `vxlan-instance instance ID [static]`

To delete VXLAN instance from the system, use `no vxlan-instance instance ID` command.

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
static	Enter the keyword `static` to set the VXLAN instance in static mode.

Defaults Controller mode.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Usage Information

By default, VXLAN instance is created in controller mode. You need a controller to configure VTEP. When you create VXLAN instance in static mode, you can configure VTEP through CLIs.

Use the `no shutdown` command to enable the VXLAN instance.

Only one VXLAN instance can exist in a system.

You cannot modify a VXLAN instance mode. If you need to change the mode, you can delete the existing VXLAN instance and create a new instance with the required mode.

Example

Enable VXLAN instance:

```
DellEMC(conf)#feature vxlan
DellEMC(conf)#vxlan-instance 1 static
DellEMC(conf-vxlan-inst-1)#no shutdown
```

Disable VXLAN instance:

```
DellEMC(conf)#no vxlan-instance 1 static
```

vxlan-vnid

Associate VNID to VLAN.

Syntax `vxlan-vnid` *VNID*

To remove the association, use the `no vxlan-vnid` command.

Parameters

VNID	Enter the logical network identifier.

Defaults None

Command Modes INTERFACE VLAN

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048, S4048T, S6000, S6010, S6100, and Z9100.

Usage Information Use this command to associate a VNID to specific VLAN. Each VLAN is mapped to a single VNID.

show running-config vxlan

Displays the VXLAN configuration information from running configuration.

Syntax `show running-config vxlan`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S6000.

Example

Static Mode:

```
DellEMC#show running-config vxlan
!
feature vxlan
!
 vxlan-instance 1 static
  local-vtep-ip 1.1.1.1
  no shutdown
  vni-profile ni1
   vnid 1
  remote-vtep-ip 2.2.2.2 vni-profile ni1
```

Controller Mode:

```
DellEMC#show running-config vxlan
!
feature vxlan
!
vxlan-instance 1
gateway-ip 3.3.3.3
fail-mode secure
controller 1 192.168.122.6 port 6632 ssl
no shutdown
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance

Displays information related to Network Virtualization Overlay (NVO) Gateway.

Syntax

```
show vxlan vxlan-instance instance ID
```

Parameters

instance ID Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S6000.

Example

```
DellEMC#show vxlan vxlan-instance 1
Instance         : 1
Admin State      : enabled
Management IP    : 192.168.200.200
Gateway IP       : 3.3.3.3
MAX Backoff      : 30000
Controller 1     : 192.168.122.6:6632 ssl (connected)
Fail Mode        : secure
Port List        :
  Fo 1/49/1    Tf 1/16    Tf 1/20    Po 2
```

Related Commands vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance logical network

Displays logical network information related to Network Virtualization Overlay (NVO) Gateway.

Syntax `show vxlan vxlan-instance` *`instance ID`* `logical-network [name` *`name`*`]`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
name *name*	(OPTIONAL) Enter the keyword `name` and enter the name of VXLAN logical network up to a length of maximum 30 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.

Version	Description
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Example

```
DellEMC#show vxlan vxlan-instance 1 logical-network
Instance        : 1
Total LN count  : 1
  Name                                                    VNID
  bffc3be0-13e6-4745-9f6b-0bcbc5877f01    4656

DellEMC#$n-instance 1 logical-network n 2a8d5d19-8845-4365-
ad04-243f0b6df252
Name : 2a8d5d19-8845-4365-ad04-243f0b6df252
Description :
Tunnel Key : 2
VFI : 28674
Unknown Multicast MAC Tunnels:
    192.168.122.133 : vxlan_over_ipv4 (up)
Port Vlan Bindings:
    Tf 1/8: VLAN: 2 (0x80000001),
    Fo 1/49/1: VLAN: 2 (0x80000004),
```

Related Commands vxlan-instance — Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance physical-locator

Displays physical locators related to Network Virtualization Overlay (NVO) Gateway.

Syntax `show vxlan vxlan-instance instance ID physical—locator [vtep-ip A.B.C.D]`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
A.B.C.D	Enter the IP address of the VTEP.

Defaults Disabled

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Example

```
DellEMC#show vxlan vxlan-instance 1 physical-locator
Instance : 1
Tunnel   : count 1
    36.1.1.1 : vxlan_over_ipv4 (up)
```

Related Commands

vxlan-instance — Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance statistics interface

Displays the port VLAN statistics information related to Network Virtualization Overlay (NVO) Gateway.

Syntax

```
show vxlan vxlan-instance instance ID statisitics
interface  interface  VLAN-ID
```

Parameters

instance ID Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Port Channel, enter the keywords `port-channel`.

VLAN-ID Enter the VLAN ID.

Defaults

Disabled

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Example

```
DellEMC#show vxlan vxlan-instance 1 statistics interface fortyGigE
1/49/1 100

Port : Fo 1/49/1 Vlan : 100

Rx Packets : 13

Rx Bytes : 1317

Tx Packets : 13

Tx Bytes : 1321
```

Related Commands vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance statistics remote-vtep-ip

Displays VXLAN statistics for a specific VXLAN tunnel.

Syntax `show vxlan vxlan-instance instance ID statistics remote-vtep-ip IP Address`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
remote-vtep-ip	Enter the keyword `remote-vtep-ip` followed by the *IP Address* of the remote VTEP.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Example

```
DellEMC# show vxlan vxlan-instance 1 statistics remote-vtep-ip 1.1.1.1
Statistics for Remote-vtep-ip : 1.1.1.1
Unicast:
Rx Packets    : 0
Rx Bytes      : 0
Tx Packets    : 0
Tx Bytes      : 0
Non-Unicast:
Tx Packets    : 0
Tx Bytes      : 0
```

show vxlan vxlan-instance unicast-mac-local

Displays the information of the local unicast MAC associated with the logical network related to Network Virtualization Overlay (NVO) Gateway.

Syntax `show vxlan vxlan-instance instance ID unicast-mac-local [logical–network name | vnid VNID]`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
name	(Optional) Enter the name of VXLAN logical network with a maximum length of 30 characters.
vnid *VNID*	(Optional) Enter the keyword `vnid` and enter the ID of the VXLAN. The range is from 1 to 16777215.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Updated to show VLT peer's local macs.
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Introduced on the S6000.

Example

```
DellEMC# show vxlan vxlan-instance <1> unicast-mac-local
Total Local Mac Count:    5
VNI              MAC                              PORT      VLAN

4656             00:00:02:00:03:00     Tf 1/17     0
4656             00:00:02:00:03:01     Tf 1/17     0
4656             00:00:02:00:03:02     Tf 1/17     0
4656             00:00:02:00:03:03     Tf 1/17     0
4656             00:00:02:00:03:04     Tf 1/17     0
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance unicast-mac-remote

Displays the information of the remote unicast MACs associated with the logical network related to Network Virtualization Overlay (NVO) Gateway.

Syntax

```
show vxlan vxlan-instance instance ID unicast-mac-remote [logical-network name | vnid VNID]
```

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
name	(Optional) Enter the name of VXLAN logical network with a maximum length of 30 characters.
vnid *VNID*	(Optional) Enter the keyword `vnid` and then enter the ID of the VXLAN. The range is from 1 to 16777215.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.13(0.0)	Updated to show VLT peer's local macs.
9.12(1.0)	Introduced on the S5048F–ON.

Version	Description
9.11(0.0)	Introduced the static mode on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S6100–ON.
9.10(0.1P10)	Introduced on the Z9100–ON.
9.8(0.0)	Introduced on the S4048–ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4(0.0)	Introduced on the S6000.

Related Commands vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance vtep-vni-map

Displays information on VTEP to VNI mapping for a specific remote VTEP or all remote VTEPs

Syntax `show vxlan vxlan-instance` *`instance ID`* `vtep-vni-map remote-vtep-ip` *`IP-Address`*

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
remote-vtep-ip	Enter the keyword `remote-vtep-ip` followed by the IP address of the remote VTEP.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11(0.0)	Introduced on the S4048–ON, S4048T-ON, S6000–ON, S6010–ON, S6100–ON, and Z9100–ON.

Example

```
DellEMC# show vxlan 1 vtep-vni-map
Remote Vtep IP    : 10.10.10.10
VNI profile       : Profile1
VNID count        : 4
VNID list         : 100, 200, 300, 400

 Remote Vtep IP    : 10.10.10.11
 VNI profile       : Profile2
 VNID count        : 3
 VNID list         : 100, 200, 500
```

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Virtual Router Redundancy Protocol (VRRP)

Virtual router redundancy protocol (VRRP) is supported by the Dell EMC Networking OS.

Topics:

- IPv4 VRRP Commands
- IPv6 VRRP Commands

IPv4 VRRP Commands

The following are IPv4 VRRP commands.

advertise-interval

Set the time interval between VRRP advertisements.

Syntax `advertise-interval {seconds | centisecs centisecs }`

To return to the default settings, use the `no advertise-interval` command.

Parameters

seconds	Enter the number of seconds. The range is from 1 to 255. The default is **1 second**.
centisecs *centisecs*	Enter the keyword `centisecs` then the number of centisecs in multiples of 25 centisecs. The range is 25 to 4075 centisecs in multiples of 25 centisecs.

Defaults 1 second or 100 centisecs.

Command Modes INTERFACE-VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Added support for centisecs on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.

Version	Description
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information Dell EMC Networking recommends keeping the default setting for this command. If you do change the time interval between VRRP advertisements on one router, change it on all routers.

authentication-type

Enable authentication of VRRP data exchanges.

Syntax `authentication-type simple [encryption-type] password`

To delete an authentication type and password, use the `no authentication-type` command.

Parameters

simple	Enter the keyword `simple` to specify simple authentication.
encryption-type	(OPTIONAL) Enter one of the following: • `0` (zero) specifies an unencrypted authentication data follows. • `7` (seven) specifies a hidden authentication data follows. • `LINE` is the unencrypted (cleartext) authentication data.
password	Enter a character string up to eight characters long as a password. If you do not enter an encryption-type, the password is stored as clear text.

Defaults Not configured.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.

Version	Description
6.2.1.1	Introduced on the E-Series.

Usage Information The system encrypts the password and the `show config` command displays the encrypted text string.

clear counters vrrp

Clear the counters maintained on VRRP operations.

Syntax `clear counters vrrp [vrrp-id] [ipv6]`

Parameters

vrrp-id	(OPTIONAL) Enter the number of the VRRP group ID to clear the group's counters. The range is from 1 to 255.
ipv6	(OPTIONAL) Enter the keyword `ipv6` to clear counters from the IPv6 VRRP group.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.9(0.0)	Added support to clear the interface configurations corresponding to a range of ports.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

NOTE: This command also enables you to clear the port configurations corresponding to a range of ports. However, for Open Networking (ON) platforms the notation for specifying port range in the command is different from how you specify in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `clear counters interfaces interface-type 1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `clear counters interfaces interface-type 1/1/1 - 1/1/4`.

debug vrrp

Enable VRRP debugging.

Syntax

`debug vrrp [vrrp-id] {all | bfd | database | interface | ipv6 | packets | state | timer}`

To disable debugging, use the `no debug vrrp [vrrp-id] {all | bfd | database | interface | ipv6 | packets | state | timer}` command.

Parameters

vrrp-id	(OPTIONAL) Enter a number from 1 to 255 as the VRRP group ID.
all	Enter the keyword `all` to enable debugging of all VRRP groups.
bfd	Enter the keyword `bfd` to enable debugging of VRRP BFD interactions.
database	Enter the keyword `database` to enable debugging of configuration changes.
interface	Enter the following keywords and the interface information: • For Port Channel interface types, enter the keywords `port-channel` then the number. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then the VLAN ID. The VLAN ID range is from 1 to 4094.
interface	Enter the keyword `interface` to enable debugging of interface state changes.
ipv6	Enter the keyword `ipv6` to enable debugging for IPv6.
packets	Enter the keyword `packets` to enable debugging of VRRP control packets.
state	Enter the keyword `state` to enable debugging of VRRP state changes.
timer	Enter the keyword `timer` to enable debugging of the VRRP timer.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.

Version	Description
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information If you do not specify an option, debug is active on all interfaces and all VRRP groups.

description

Configure a short text string describing the VRRP group.

Syntax `description text`

To delete a VRRP group description, use the `no description` command.

Parameters

text	Enter a text string up to 80 characters long.

Defaults Not enabled.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

disable

Disable a VRRP group.

Syntax `disable`

To re-enable a disabled VRRP group, use the `no disable` command.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information To enable VRRP traffic, assign an IP address to the VRRP group using the `virtual-address` command and enter `no disable`.

Related Commands

- virtual-address — specify the IP address of the virtual router.

hold-time

Specify a delay (in seconds) before a switch becomes the MASTER virtual router. By delaying the initialization of the VRRP MASTER, the new switch can stabilize its routing tables.

Syntax `hold-time {seconds | centisecs centisecs}`

To return to the default value, use the `no hold-time` command.

Parameters

seconds	Enter the number of seconds. The range is from 0 to 65535. The default is **zero (0) seconds**.
centisecs *centisecs*	Enter the keyword `centisecs` then the number of *centisecs* in units of 25 centisecs. The range is from `0` to `65525` in units of 25 centisecs.

Defaults **zero (0) seconds or (0) centiseconds**

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.0)	Added support for centisecs on the Z9000, S6000, S4820T, S4810, and MXL.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information If a switch is a MASTER and you change the hold timer, disable and re-enable VRRP for the new hold timer value to take effect.

Related Commands

- disable — disables a VRRP group.

preempt

To preempt or become the MASTER router, configure a BACKUP router with a higher priority value.

Syntax `preempt`

To prohibit preemption, use the `no preempt` command.

Defaults Enabled (that is, a BACKUP router can preempt the MASTER router).

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

priority

Specify a VRRP priority value for the VRRP group. The VRRP protocol uses this value during the MASTER election process.

Syntax `priority priority`

To return to the default value, use the `no priority` command.

Parameters

priority	Enter a number as the priority. Enter 255 only if the router's virtual address is the same as the interface's primary IP address (that is, the router is the OWNER). The range is from 1 to 255. The default is **100**.

Defaults **100**

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.

Version	Description
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.16.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

To guarantee that a VRRP group becomes MASTER, configure the VRRP group's virtual address with same IP address as the interface's primary IP address and change the priority of the VRRP group to 255.

If you set the `priority` command to 255 and the `virtual-address` is not equal to the interface's primary IP address, an error message appears.

show config

View the non-default VRRP configuration.

Syntax

```
show config [verbose]
```

Parameters

verbose	(OPTIONAL) Enter the keyword `verbose` to view all the VRRP group configuration information, including default information.

Command Modes VRRP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.

Version	Description
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Example

```
DellEMC(conf-if-vrid-4)# show config
 vrrp-group 4
  virtual-address 119.192.182.124
 !
DellEMC(conf-if-vrid-4)#
```

show vrrp

View the VRRP groups that are active. If no VRRP groups are active, the Dell EMC Networking OS returns `No Active VRRP group`.

Syntax `show vrrp [vrrp-id][brief][interface type][ipv6][interface type][vrf vrf-name]`

Parameters

vrrp-id	(OPTIONAL) Enter the virtual router identifier for the VRRP group to view only that group. The range is from 1 to 255.
brief	(OPTIONAL) Enter the keyword `brief` to view a table of information about the VRRP groups.
interface type	(OPTIONAL) Enter the following keywords and the interface information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan`, and then the VLAN ID. The VLAN ID range is from 1 to 4094.
ipv6	(OPTIONAL) Enter the keyword `ipv6` to view only VRRP IPv6 groups.
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view active VRRP groups corresponding to that VRF.

Command Modes
- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.4.(0.0)	Added support for VRF.
9.2(1.0)	Introduced on the Z9500.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show vrrp brief` command.

Item	Description
Interface	Lists the interface type, slot, and port of the configured VRRP group.
Grp	Displays the VRRP group ID.
Pri	Displays the priority value assigned to the interface. If you configured the `track` command to track that interface and you disable the interface, the cost is subtracted from the priority value assigned to the interface.
Pre	States whether preempt is enabled on the interface: ● `Y` = Preempt is enabled. ● `N` = Preempt is not enabled.
State	Displays the operational state of the interface using one of the following: ● NA/IF (the interface is not available). ● MASTER (the interface associated with the MASTER router). ● BACKUP (the interface associated with the BACKUP router).
Master addr	Displays the IP address of the MASTER router.
Virtual addr(s)	Displays the virtual IP addresses of the VRRP routers associated with the interface.

Example (Brief)

```
DellEMC> Interface Grp Pri Pre State Master addr Virtual addr(s)
Description-------------------------------------------------
Tf 1/3 1 100 Y Master 200.200.200.200 200.200.200.201
Tf 1/3 2 100 Y Master 200.200.200.200 200.200.200.202 200.200.200.203
Description
Tf 1/3 3 100 Y Master 1.1.1.1 1.1.1.2
Tf 1/3 4 100 Y Master 200.200.200.200 200.200.200.206 200.200.200.207
... short desc
Tf 1/3 254 254 Y Master 200.200.200.200 200.200.200.204 200.200.200.205
DellEMC>
```

Usage Information

The following describes the `show vrrp` command.

Item	Description
TwentyfiveGigE... .	Displays the interface, VRRP group ID, and network address. If the interface is not sending VRRP packets, 0.0.0.0 appears as the network address.
State: master...	Displays the interface's state: ● Na/If (not available) ● master (MASTER virtual router) ● backup (BACKUP virtual router) Also displays the interface's priority and IP address of the MASTER.
Hold Down:...	Displays additional VRRP configuration information: ● Hold Down displays the hold down timer interval in seconds. ● Preempt displays TRUE if preempt is configured and FALSE if preempt is not configured. ● AdvInt displays the Advertise Interval in seconds.
Adv rcvd:...	Displays counters for the following: ● Adv rcvd displays the number of VRRP advertisements received on the interface. ● Adv sent displays the number of VRRP advertisements sent on the interface. ● Gratuitous ARP sent displays the number of gratuitous ARPs sent.
Virtual MAC address	Displays the virtual MAC address of the VRRP group.
Virtual IP address	Displays the virtual IP address of the interface's VRRP router.
Authentication:...	States whether authentication is configured for the VRRP group. If it is configured, this lists the authentication type and password.
Tracking states..	Displays if the `track` command is configured on an interface. Also displays the following information about the tracked interface: ● Dn or Up states whether the interface is down or up. ● The interface type slot/port information.

Example

```
DellEMC> show vrrp
------------------
twentyFiveGigE 1/3, VRID: 1, Net: 10.1.1.253
VRF: 0 default
State: Master, Priority: 105, Master: 10.1.1.253 (local)
Hold Down: 0 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Adv sent: 1862, Gratuitous ARP sent: 0
Virtual MAC address:
  00:00:5e:00:01:01
Virtual IP address:
  10.1.1.252
Authentication: (none)
Tracking states for 1 interfaces:
  Up twentyFiveGigE 1/4 priority-cost 10
------------------
twentyFiveGigE 1/4, VRID: 2, Net: 10.1.2.253
VRF: 0 default
State: Master, Priority: 110, Master: 10.1.2.253 (local)
Hold Down: 10 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Adv sent: 1862, Gratuitous ARP sent: 0
Virtual MAC address:
  00:00:5e:00:01:02
Virtual IP address:
  10.1.2.252
Authentication: (none)
Tracking states for 2 interfaces:
  Up twentyFiveGigE 1/1 priority-cost 10
  Up twentyFiveGigE 1/4 priority-cost 10
DellEMC>
```

Example (VRRP VRF)

```
DellEMC# show vrrp vrf jay
------------------
fortyGigE 1/49/1, IPv4 VRID: 20, Version: 2, Net: 10.0.0.3
VRF: 1 jay
State: Master, Priority: 100, Master: 10.0.0.3 (local)
Hold Down: 0 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Bad pkts rcvd: 0, Adv sent: 38, Gratuitous ARP sent: 0
Virtual MAC address:
 00:00:5e:00:01:14
Virtual IP address:
 10.0.0.2
Authentication: (none)
DellEMC# show vrrp vrf jay brief
Interface Group Pri Pre State  Master addr Virtual addr(s)Description
-----------------------------------------------------------
Fo 1/49/1  IPv4 20 100 Y  Master 10.0.0.3    10.0.0.2
DellEMC#
```

track

Monitor an interface and lower the priority value of the VRRP group on that interface if it is disabled.

Syntax

`track` *interface* `[priority-cost` *cost*`]`

To disable monitoring, use the `no track interface` command.

Parameters

interface (OPTIONAL) Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan`, and then the VLAN ID. The VLAN ID range is from 1 to 4094.

priority-cost (OPTIONAL) Enter a number as the amount to subtract from the priority value. The range is from 1 to 254. The default is **10**.

Defaults priority cost = **10**

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.

Version	Description
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
7.6.1.0	Introduced on the S-Series (S50 only).
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information If you disable the interface, the cost value is subtracted from the priority value and forces a new MASTER election if the priority value is lower than the priority value in the BACKUP virtual routers.

virtual-address

Configure up to 12 virtual router IP addresses in the VRRP group. To start sending VRRP packets, set at least one virtual IP address for the VRRP group.

Syntax `virtual-address` *ip-address1* `[...` *ip-address12*`]`

To delete one or more virtual IP addresses, use the `no virtual-address` *ip-address1* `[...` *ip-address12*`]` command.

Parameters

ip-address1	Enter an IP address of the virtual router in dotted decimal format. The IP address must be on the same subnet as the interface's primary IP address.
... ip-address12	(OPTIONAL) Enter up to 11 additional IP addresses of virtual routers in dotted decimal format. Separate the IP addresses with a space. The IP addresses must be on the same subnet as the interface's primary IP address.

Defaults Not configured.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(2.0)	Introduced on the S3100 series.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
7.4.1.0	Introduced support for telnetting to the VRRP group IP address assigned using this command.

Version	Description
6.2.1.1	Introduced on the E-Series.

Usage Information

The VRRP group only becomes active and sends VRRP packets when you configure a virtual IP address. When you delete the virtual address, the VRRP group stops sending VRRP packets.

A system message appears after you enter or delete the `virtual-address` command.

To guarantee that a VRRP group becomes MASTER, configure the VRRP group's virtual IP address with the same address as the interface's primary IP address and change the priority of the VRRP group to 255.

You can ping the virtual IP addresses configured in all VRRP groups.

vrrp delay minimum

Set the delay time for VRRP initialization after an interface comes up.

Syntax `vrrp delay minimum seconds`

Parameters

seconds	Enter the number of seconds for the delay for VRRP initialization after an interface becomes operational. The range is from 0 to 900 (0 indicates no delay).

Defaults 0

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information

This command applies to a single interface. When you use this command with the `vrrp delay reload` command, the later timer rules VRRP enabling. For example, if `vrrp delay reload` is 600 and `vrrp delay minimum` is 300:

- When the system reloads, VRRP waits 600 seconds (10 minutes) to bring up VRRP on all interfaces that are up and configured for VRRP.
- When an interface comes up, whether as part of a system reload or an interface reload, the system waits 300 seconds (5 minutes) to bring up VRRP on that interface.

Related Command

- vrrp delay reload — sets the delay time for VRRP initialization after a system reboot.

vrrp delay reload

Set the delay time for VRRP initialization after a system reboot.

Syntax `vrrp delay reload seconds`

Parameters

seconds	Enter the number of seconds for the delay. The frange is from 0 to 900 (0 indicates no delay).

Defaults 0

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
9.0.0.0	Introduced on the Z9000.
8.3.19.0	Introduced on the S4820T.
8.3.8.0	Introduced on the S4810.

Usage Information This command applies to all the VRRP interfaces on a system. When you use this command with the `vrrp delay minimum` command, the later timer rules VRRP enabling. For example, if `vrrp delay reload` is 600 and `vrrp delay minimum` is 300:

- When the system reloads, VRRP waits 600 seconds (10 minutes) to bring up VRRP on all interfaces that are up and configured for VRRP.
- When an interface comes up, whether as part of a system reload or an interface reload, the system waits 300 seconds (5 minutes) to bring up VRRP on that interface.

For the delay timers to take effect, save the configuration and reload the system.

Related Command

- vrrp delay minimum — sets the delay time for VRRP initialization after a line card reboot.

vrrp-group

Assign a VRRP ID to an interface. You can configure up to 12 VRRP groups per interface.

Syntax `vrrp-group vrrp-id`

Parameters

vrrp-id	Enter a number as the group ID. The range is from 1 to 255.

Defaults Not configured.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.0.2.0	Introduced on the S6000.
8.3.19.0	Introduced on the S4820T.
8.3.11.1	Introduced on the Z9000.
8.3.7.0	Introduced on the S4810.
7.6.1.0	Introduced on the S-Series.
7.5.1.0	Introduced on the C-Series.
6.2.1.1	Introduced on the E-Series.

Usage Information

The VRRP group only becomes active and sends VRRP packets when you configure a virtual IP address. When you delete the virtual IP address, the VRRP group stops sending VRRP packets.

Related Command

- virtual-address — assigns up to 12 virtual IP addresses per VRRP group.

version

Set the VRRP protocol version for the IPv4 group.

Syntax

```
version {2 | 3 | both}
```

To return to the default setting, use the `no version` command.

Parameters

2	Enter the keyword `2` to specify VRRP version 2 as defined by RFC 3768, *Virtual Router Redundancy Protocol*.
3	Enter the keyword `3` to specify VRRP version 3 as defined by RFC 5798, *Virtual Router Redundancy Protocol*.
both	Enter the keyword `both` for in-service migration from VRRP version 2 to VRRP version 3.

Defaults

2

Command Modes

VRRP

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.

Version	Description
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.5(0.1)	Introduced on the Z9500.
9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information

You can use the `both` command to migrate from VRRPv2 to VRRPv3. When you set the VRRP protocol version to `both`, the switch sends only VRRPv3 advertisements but can receive either VRRPv2 or VRRPv3 packets. To migrate an IPv4 VRRP group from VRRPv2 to VRRPv3:

1. Set the switches with the lowest priority to `both`.
2. Set the switch with the highest priority to version `3`.
3. Set all the switches from `both` to version `3`.

NOTE: Do not run VRRP version 2 and version 3 in the same group for an extended period of time.

Example

```
DellEMC(conf-if-tf-1/1-vrid-100)# version ?
2       VRRPv2
3       VRRPv3
both    Interoperable, send VRRPv3 receive both

DellEMC(conf-if-tf-1/1-vrid-100)# version 3
```

IPv6 VRRP Commands

The following are IPv6 VRRP commands.

- clear counters vrrp ipv6
- debug vrrp ipv6
- show vrrp ipv6
- vrrp-ipv6-group

The following commands apply to IPv4 and IPv6:

- advertise-interval
- description
- disable
- hold-time
- preempt
- priority
- show config
- virtual-address

clear counters vrrp ipv6

Clear the counters recorded for IPv6 VRRP groups.

Syntax `clear counters vrrp ipv6 [vrid | vrf vrf-name]`

Parameters

vrid	(OPTIONAL) Enter the number of an IPv6 VRRP group; range is from 1 to 255.

vrf *vrf-name* (OPTIONAL) Enter the name of a VRF instance to clear the counters of all IPv6 VRRP groups in the specified VRF. The maximum is 32 characters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.9(0.0)	Added support to clear the interface configurations corresponding to a range of ports.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.4.1.0	Introduced on E-Series, C-Series, and S-Series. Support was added for IPv6 VRRP groups in nondefault VRF instances.
8.3.2.0	Introduced on the E-Series.

Usage Information

NOTE: You can also clear the port configurations corresponding to a range of ports. For Open Networking (ON) platforms, the notation for specifying the port range in the command is different from how you specify the port range in non-ON platforms.

- For non-ON platforms, you can specify multiple ports as `slot/port-range`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `clear counters interfaces` *`interface-type`* `1/1 - 4`.
- For ON platforms, you can specify multiple ports as `slot/port/[subport] - slot/port/[subport]`. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as `clear counters interfaces` *`interface-type`* `1/1/1 - 1/1/4`.

debug vrrp ipv6

Enable VRRP debugging.

Syntax `debug vrrp ipv6` *`interface`* `[`*`vrid`*`] {all | packets | state | timer}`

Parameters

interface Enter the following keywords and the interface information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port/subport information.
- For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information.
- For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information.
- For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel`, and then a number.
- For a VLAN interface, enter the keyword `vlan`, and then the VLAN ID. The VLAN ID range is from 1 to 4094.

vrid	(OPTIONAL) Enter a number from 1 to 255 as the VRRP group ID.
all	Enter the keyword `all` to enable debugging of all VRRP groups.
bfd	Enter the keyword `bfd` to enable debugging of all VFFP BFD interactions.
database	Enter the keyword `database` to display changes related to group, prefix, and interface entries in the VRRP table.
packets	Enter the keyword `packets` to enable debugging of VRRP control packets.
state	Enter the keyword `state` to enable debugging of VRRP state changes.
timer	Enter the keyword `timer` to enable debugging of the VRRP timer.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.4.1.0	Introduced on E-Series, C-Series, and S-Series. Support was added for IPv6 VRRP groups in nondefault VRF instances.
8.3.2.0	Introduced on the E-Series.

Usage Information If you do not specify an option, debugging is active on all interfaces and all VRRP groups.

show vrrp ipv6

View the active IPv6 VRRP groups. If no VRRP groups are active, the Dell EMC Networking OS returns `No Active VRRP group`.

Syntax `show vrrp ipv6 [vrid] [interface] [brief] [vrf vrf-name]`

Parameters

vrid	(OPTIONAL) Enter the virtual router identifier for the VRRP group to view only that group. The range is from 1 to 255.
interface	Enter the following keywords and the number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port[/subport] information. • For a 25-Gigabit Ethernet interface, enter the keyword `twentyFiveGigE` then the slot/port[/subport] information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port/subport information. • For a 50-Gigabit Ethernet interface, enter the keyword `fiftyGigE` then the slot/port/subport information. • For a 100-Gigabit Ethernet interface, enter the keyword `hundredGigE` then the slot/port information. • For a port channel interface, enter the keywords `port-channel`, and then a number. • For a VLAN interface, enter the keyword `vlan`, and then a number from 1 to 4094.
brief	(OPTIONAL) Enter the keyword `brief` to view a table of information on the VRRP groups.
vrf *vrf-name*	Enter the keyword vrf then the name of the VRF to view IPv6 VRRP groups corresponding to that VRF.

Command Modes
- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Added support for VRF. Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.3.19.0	Introduced on the S4820T.
8.3.10.0	Introduced on the S4810.
8.3.2.0	Introduced on the E-Series.

Usage Information The following describes the `show vrrp ipv6` command.

Line starting with	Description
GigabitEthernet...	Displays the interface, VRRP group ID, and network address. If the interface is not sending VRRP packets, 0.0.0.0 appears as the network IP address.
VRF	VRF instance to which the VRRP group interface belongs.
State: master...	Displays the interface's state: ● Na/If (not available) ● master (MASTER virtual router) ● backup (BACKUP virtual router) Also displays the interface's priority and IP address of the MASTER.
Hold Down:...	Displays additional VRRP configuration information: ● Hold Down displays the hold down timer interval in seconds. ● Preempt displays TRUE if preempt is configured and FALSE if preempt is not configured. ● AdvInt displays the Advertise Interval in seconds.
Adv rcvd:...	Displays counters for the following: ● Adv rcvd displays the number of VRRP advertisements received on the interface. ● Adv sent displays the number of VRRP advertisements sent on the interface. ● Bad pkts rcvd displays the number of invalid packets received on the interface.
Virtual MAC address	Displays the virtual MAC address of the VRRP group.
Virtual IP address	Displays the virtual IP address of the VRRP router to which the interface is connected.
Tracking states...	Displays information on the tracked interfaces or objects configured for a VRRP group (`track` command), including: ● UP or DOWN state of the tracked interface or object (Up or Dn). ● Interface type and slot/port or object number, description, and time since the last change in the state of the tracked object. ● Cost subtracted from the VRRP group priority if the state of the tracked interface/object goes DOWN.

Example

```
DellEMC# show vrrp ipv6
------------------
twentyFiveGigE 1/6, IPv6 VRID: 255, Version: 3, Net:
fe80::201:e8ff:fe7a:6bb9
VRF: 0 default-vrf
State: Master, Priority: 101, Master: fe80::201:e8ff:fe7a:6bb9 (local)
Hold Down: 0 centisec, Preempt: TRUE, AdvInt: 100 centisec
Accept Mode: FALSE, Master AdvInt: 100 centisec
Adv rcvd: 0, Bad pkts rcvd: 0, Adv sent: 64
Virtual MAC address:
  00:00:5e:00:02:ff
Virtual IP address:
  1::255 fe80::255
```

vrrp-ipv6-group

Assign an interface to a VRRP group.

Syntax `vrrp-ipv6-group vrid`

Parameters

vrid	Enter the virtual-router ID number of the VRRP group. The VRID range is from 1 to 255.

Defaults Not configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.10(0.1)	Introduced on the S6010-ON and S4048T-ON.
9.10(0.0)	Introduced on the S3148.
9.10(0.0)	Introduced on the S6100–ON.
9.8(2.0)	Introduced on the S3100 series.
9.8(1.0)	Introduced on the Z9100–ON.
9.8(0.0P5)	Introduced on the S4048-ON.
9.8(0.0P2)	Introduced on the S3048-ON.
9.7(0.0)	Introduced on the S6000-ON.
9.2(1.0)	Introduced on the Z9500.
8.4.2.1	The range of valid VRID values on the E-Series when VRF microcode is loaded in CAM changed from 1 to 15.
8.4.1.0	Introduced on the E-Series, C-Series, and S-Series.
8.3.19.0	Introduced on the S4820T.
8.3.7.0	Introduced on the S4810.
8.3.2.0	Introduced on the E-Series.

Usage Information The VRRP group only becomes active and sends VRRP packets when you configure a link-local virtual IP address. When you delete the virtual address, the VRRP group stops sending VRRP packets.

- When you do not load the VRF microcode in the CAM, the VRID for a VRRP group is the same as the VRID number configured with the `vrrp-group` or `vrrp-ipv6-group` commands.
- When you load the VRF microcode in the CAM, the VRID for a VRRP group equals 16 times the `vrrp-group` or `vrrp-ipv6-group vrid` number, plus the `ip vrf vrf-id` number. For example, if you load the VRF microcode and you configure the VRRP group as 10 in VRF 2, the VRID for the VRRP group is (16 x 10) + 2, or 162. This VRID value is used in the lowest byte of the virtual MAC address of the VRRP group and is also used for VRF routing.

NOTE: For all routers to interoperate, configure the same VRID on neighboring routers (Dell EMC Networking or non- Networking) in the same VRRP group.

Related Commands

- virtual-address — assigns up to 12 virtual IP addresses per VRRP group.

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X.509v3

X.509v3 is a standard for public key infrastructure (PKI) to manage digital certificates and public key encryption. This standard specifies a format for public-key certificates or digital certificates.

Dell EMC Networking OS supports X.509v3 standards.

Topics:

- crypto ca-cert delete
- crypto ca-cert install
- crypto cert delete
- crypto cert generate
- crypto cert install
- crypto x509 ocsp
- crypto x509 revocation
- debug crypto
- logging secure
- crypto x509 ca-keyid
- ocsp-server
- ocsp-server prefer
- show crypto ca-cert
- show crypto cert

crypto ca-cert delete

Deletes a CA certificate.

Syntax

```
crypto ca-cert delete [index]
```

Parameters

index	(Optional) Enter the keyword `index` to specify the index of the CA certificate. If index is not specified, the system deletes all of the installed CA certificates.

Defaults

NA.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Before deleting a CA certificate, the system checks whether that certificate is an issuer of other installed certificate on the system. If so, the system informs you to delete other installed certificates first.

Related Commands

crypto ca-cert installcrypto cert generatecrypto ca-cert install

crypto ca-cert install

Downloads and installs the certificate of a Certificate Authority (CA) on to the device.

Syntax `crypto ca-cert install path`

Parameters

path Enter the path where the CA certificate is available for download. The format that you use to specify the location of the CA certificate also includes the protocol that is used to contact the CA. You can use the following options that you can use to download and install a certificate from the CA:

- tftp — `tftp://ca-ip-address/tftp/CAcert.pem`
- usbflash: — `usbflash:/certs/CAcert.pem`
- ftp — `ftp://userid:password@ca-ip-address/certs/CAcert.pem`
- scp — `scp://userid:password@ca-ip-address/certs/CAcert.pem`
- http — `http://192.168.1.100/certs/CAcert.pem`
- flash — `flash://filepath/filename`

Defaults NA.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Upon successful installation, the system displays a notification on the device. If remote logging is configured, the notification is also sent to the syslog server. Contents of the CA certificate's subject are displayed.

Related Commands

- crypto cert install

crypto cert delete

Deletes a trusted certificate.

Syntax `crypto cert delete`

Defaults NA.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

The certificate matching the current FIPS state is deleted. If the system is in FIPS mode, the FIPS certificate is deleted. If the system is in non-FIPS mode, the non-FIPS certificate is deleted.

Before deleting the system's trusted certificate, the system prompts you to specify whether to proceed with deletion. If you proceed, the system deletes the certificate and also the private key.

Related Commands

- crypto ca-cert install
- crypto cert generate

crypto cert generate

Generates a Certificate Signing Request (CSR) or a self-signed certificate.

Syntax

```
crypto cert generate {self-signed | request} [cert-file cert-path key-file
{private | key-path}] [country 2-letter code] [state state] [locality city]
[organization organization-name] [orgunit unit-name] [cname common-name]
[email email-address] [validity days] [length length] [altname alt-name]
```

Parameters

self-signed	Enter the keyword `self-signed` to create a self-signed certificate.
request	Enter the keyword `request` to create a certificate signing request.
cert-file	Enter the keyword `cert-file` to specify that the certificate needs to be created. **NOTE:** If the cert-file option is not specified in the command, then the system interactively prompts you to fill in rest of the fields of the certificate signing request (CSR).
cert-path	Enter the path to locally store the self-signed certificate or CSR. The path can be a full path or a relative path. If the system accepts this path, a notification is sent indicating the location where the CSR file is stored. You can then export the CSR to a CA using the "copy" command. Following is an example of a path that you can specify: `flash://certs/s4810-001-request.csr`.
key-file	Enter the keyword `key-file` to specify the private key.
private	Enter the keyword private to specify that the key is stored in a hidden location in the NVRAM. Only one private key can exist in a hidden location at any given point in time.
key-path	Enter the absolute or relative location on the device where the key is stored.
country *2–letter-code*	(OPTIONAL) Enter the keyword `country` followed by the two letter code that is used to identify the country name.
state *state*	(OPTIONAL) Enter the keyword `state` followed by the name of the state.
locality *city*	(OPTIONAL) Enter the keyword *locality* followed by the name of the city.
organization *organization-name*	(OPTIONAL) Enter the keyword `organization` followed by the name of the organization.
orgunit *unit-name*	(OPTIONAL) Enter the keyword `orgunit` followed by the name of the unit.
cname *common-name*	Enter the keyword `cname` followed by the common name that you want to assign. **NOTE:** Common Name is an important attribute while creating a CSR or a self-signed certificate. Common name is the main identity presented to connecting entities. By default, the device's host name acts as the common name. However, you can still configure a different common name for the device. For example, you can specify an IP address to act as a Common Name

for the device. If the Common Name does not match the device's presented identity, then even a properly signed certificate does not validate correctly.

email *email-address*	(OPTIONAL) Enter the keyword `email` followed a valid email address used for communication with the organization.
validity *days*	(OPTIONAL) Enter the keyword `validity` followed by the number of days for which the certificate is valid. **NOTE:** For CSRs, validity has no effect. For self-signed certificates, if validity is not specified, it defaults to 3650 days, or 10 years.
length *length*	(OPTIONAL) Enter the keyword `length` followed by a bit length value. The default key length for both FIPS and non-FIPS mode is 2048. Minimum key length value for FIPS mode is 2048. The range is from 2048 to 4096. Minimum key length value for non-FIPS mode is 1024. The range is from 1024 to 4096.
altname *altname*	(OPTIONAL) Enter the keyword `altname` followed by the subject alternate name for the organization. For example, `altname IP:192.168.1.100`.

Defaults

NA.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

If the cert-file option is not specified in the command, then the system interactively prompts you to fill in various fields of the certificate signing request (CSR). You are prompted to fill out some metadata information for the certificate. The following example shows the fields that you are prompted to fill:

```
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a
DN.
There are quite a few fields but you can leave some blank.
For some fields there will be a default value; if you enter '.', the
field will be left blank.
-----
Country Name (2 letter code) [US]:
State or Province Name (full name) [Some-State]:California
Locality Name (eg, city) []:San Francisco
Organization Name (eg, company) []:Starfleet Command
Organizational Unit Name (eg, section) []:NCC-1701A
Common Name (eg, YOUR name) [S4810-001]:
Email Address []:scotty@starfleet.com
```

You can enter only 256 characters per command. If you have field values that are larger than 256 characters in length, use the interactive mode of the command.

Related Commands

- crypto ca-cert install

crypto cert install

Installs a trusted certificate on a device.

Syntax

```
crypto cert install cert-file cert-path key-file {key-path | private}
[password passphrase]
```

Parameters

cert-file — Enter the keyword `cert-file` to specify that the certificate needs to be downloaded.

cert-path — Enter the path where the certificate is locally stored. The path can be a full path or a relative path. If the system accepts this path, a notification is sent indicating the location where the certificate file is stored. Following are example of a path that you can specify: `flash://certs/s4810-001-request.crt`and `usbflash:/certs/s4810-001-cert.pem`

NOTE: Before installing a trusted certificate, you first need to download it from a remote CA using the copy command.

.

key-file — Enter the keyword `key-file` to specify the private key.

private — Enter the keyword private to specify that the key is stored in a hidden location in the NVRAM. Only one private key can exist in a hidden location at any given point in time.

key-path — Enter the absolute or relative location on the device where the key is stored.

NOTE: After the certificate is successfully installed, the private key is deleted from the specified location and copied to the hidden location in NVRAM.

password *passphrase* — (Optional) Enter the keyword `password` followed by the password phrase used to decrypt the private key.

NOTE: You can generate the private key and certificate on another host. While doing so, you must keep the private key encrypted with a passphrase so that the private key is not compromised during transport. The password phrase acts a facility to decrypt the private key before installing it on the switch.

Defaults

NA.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command.

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Certain parameters must be met in order for this command to succeed:

- The downloaded certificate should be formatted properly.
- In order for verification to work, the CA certificate must be installed on the system before running this command.
- The downloaded certificate's public key must correspond to the private key.
- If the certificate is not self-signed, then the CA certificate (from the CA that has signed the certificate) must be installed on the system prior to running this command for verification to work.

NOTE: It is possible for the switch to store two types of certificates: one for the FIPS mode and one for the non-FIPS mode. If the system is in FIPS mode, the certificate is installed as the FIPS certificate. If the system is in non-FIPS mode, the certificate is installed as the non-FIPS certificate. When FIPS mode is enabled or disabled, the certificates (and keys) are switched by the system.

NOTE: For the switch, there are two possible certificates stored - one for FIPS mode, one for non-FIPS mode. If the system is in FIPS mode, the certificate will be installed as the FIPS certificate. If the system is in non-FIPS mode, the certificate will be installed as the non-FIPS certificate. When FIPS mode is enabled/disabled, the certificates (and keys) are switched by the system.

Related Commands

- crypto ca-cert install

crypto x509 ocsp

Configures the OCSP behavior.

Syntax `crypto x509 ocsp [nonce] [sign-requests]`

Parameters

nonce	Enter the keyword `nonce` to use the nonce feature for the OCSP requests to OCSP responder communication. This is a one-time value that must be returned in the OCSP response. If the OCSP responder is using precomputed responses, then it does not reply with the nonce. The nonce feature is off by default. The no version of the command disables the nonce feature.
sign-requests	Enter the keyword `sign-requests` to sign the OCSP requests to OCSP responder communication with the system's own certificate so that the OCSP responder may verify the requestor. The sign-requests feature is off by default. The no version of the command disables signing of requests.

Defaults NA.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced the command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Related Commands

- crypto ca-cert install
- crypto cert generate
- crypto cert install

crypto x509 revocation

Configure the revocation check behavior for the certificate.

Syntax `crypto x509 revocation ocsp {accept | reject}`

Parameters

ocsp	Enter the method used to check certificate revocation details. In this release, OCSP is the only option that is supported. So, you can specify OCSP as the method-list value.
accept	Enter the keyword `accept` to accept the presented certificate and log in if OCSP retrieval fails.
reject	Enter the keyword `reject` to reject the presented certificate and log in if OCSP retrieval fails.

Defaults crypto x509 revocation ocsp accept

Command Modes
- CONFIGURATION Mode

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Related Commands
- crypto x509 ocsp

debug crypto

This command allows you to test a certificate chain file for validity and checking revocation outside of its use in TLS communication.

Syntax `debug crypto {flash://path}`

Parameters

path	Enter the path to a local file where a certificate chain is stored in PEM format.

Defaults None.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information The following RBAC roles are allowed to issue this command:
- sysadmin
- secadmin

You can use this command to verify an X509 certificate outside of use with Syslog over TLS.

Related Commands
- crypto cert install
- crypto cert generate
- crypto ca-cert install

logging secure

Creates a log file for various events related to X.509v3 certificates.

Syntax

```
logging {hostname} {secure | tcp | udp} [vrf vrf-name] [sha1 fingerprint]
[port port-number]
```

Parameters

hostname	Enter the name of the host or device for which you wish to record logs corresponding to the certificates. **NOTE:** The hostname can be an IPV4 address, an IPV6 address, or a DNS hostname—with or without DNS suffix.
secure	Enter the keyword `secure` to enable the Syslog feature to communicate with a compatible Syslog server using the secure TLS protocol over the default port (6514). The range is from 1024 to 65535.
tcp	Enter the keyword `tcp` to enable TCP.
udp	Enter the keyword `udp` to enable UDP.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF.
sha1 *fingerprint*	Enter the keyword `sha1` followed by the finger print. This option is only available when the secure option is configured. This new option enables the Syslog feature to compare the received certificate's sha-1 fingerprint against this configured sha-1 fingerprint. If present, only the fingerprint is used for certificate revocation validation.
port *port-number*	Enter the keyword `port` followed by the port number. The default port number is 6514 for secure logging.

Defaults

None.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Following are the pre-requisites to configure logging:

- The logging command must be configured to enable event logging.
- A certificate must be installed on the switch. This certificate is only used for secure logging.
- At least one CA certificate must be installed on the switch so that the logging server's certificate can be verified. If a SHA1 fingerprint is present, only the fingerprint is used for certificate revocation validation.

Related Commands

- crypto cert install
- crypto ca-cert install
- crypto cert generate

crypto x509 ca-keyid

Creates a per-certificate configuration context using the specified subject key identifier.

Syntax

```
crypto x509 ca-keyid subject-key-identifier
```

Use to the `no crypto x509 ca-keyid` command to remove this configuration.

Parameters

subject-key-identifier Enter the content of the `SubjectKeyIdentifier` field from the CA certificate.

NOTE: To get the subject key identifier details, enter the `show crypto ca-cert` command. This command displays the CA certificate details.

Defaults None.

Command Modes

- CONFIGURATION Mode

Command History

This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information

The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

When you use this command, the device maps the current certificate context in the certificate store to a CA certificate through the subject key identifier field. The subject key identifier field contains the SHA-1 hash of the CA's public key. This configuration provides a way to uniquely identify a CA and associate it with any CA-specific settings.

This context is used to store certificate-specific settings such as alternate CRL and OCSP locations. Incoming X.509 certificates whose `AuthorityKeyIdentifier`extensions match the configured subject key identifier has these settings applied to them.

The `crypto x509 ca-keyid` command when used with the `ocsp-server` command in the global configuration mode creates a per-certificate configuration context under which the remaining commands are entered.

Related Commands

- ocsp-server
- crypto x509 ocsp

ocsp-server

Configures OCSP server on a CA.

Syntax

```
ocsp-server url [nonce] [sign-requests]
```

Parameters

url Enter the URL for the OCSP responder using standard URI format. Either http or https protocol can be used. For example, http://[1100::101]:8888.

nonce Enter the keyword `nonce` to use the nonce feature for the OCSP requests to OCSP responder communication. This number is a one-time value that must be returned in the OCSP response. If the OCSP responder is using precomputed responses, then it does not reply with the nonce. The nonce feature is off by default. The no version of the command disables the nonce feature.

sign-requests Enter the keyword `sign-requests` to sign the OCSP requests to OCSP responder communication with the system's own certificate so that the OCSP

responder may verify the requestor. The sign-requests feature is off by default. The no version of the command disables signing of requests.

Defaults None.

Command Modes CERTIFICATE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Multiple OCSP responders may be configured per CA. The system tries each one until it gets a valid response. No priority may be specified or guaranteed; the system tries them in the order in which they were configured.

Related Commands

- crypto x509 ocsp

ocsp-server prefer

Configures OCSP responder preference. You can configure the preference or order that the CA or a device should follow while contacting multiple OCSP responders.

Syntax `ocsp-server prefer`

Defaults None.

Command Modes CERTIFICATE

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

When this command is specified, the system checks the configured OCSP URLs before checking the URL of the OCSP server in the authorityInfoAccess extension of the certificate. If this command is not specified, then the system checks the OCSP server in the authorityInfoAccess extension of the certificate before checking the configured OCSP servers.

Related Commands

- crypto x509 ocsp

show crypto ca-cert

Displays the certificate information corresponding to the root CA.

Syntax

```
show crypto ca-certs
```

Defaults None.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

This show command should display the index, the certificate's subject field in plaintext, not-before and not-after dates, and the fingerprint in hexadecimal format. The index assigned to each CA certificate is used by the crypto cert delete certificate-authority command to allow the user to specify which certificate authority to remove.

Related Commands

- crypto ca-cert install

show crypto cert

Displays the certificate information that is specified.

Syntax

```
show crypto cert {path}
```

Parameters

path	(OPTIONAL) Enter the path to a local file where a certificate chain is stored in PEM format. If a path is not specified, display the certificate that is currently installed on the system.

Defaults None.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, see the relevant *Dell EMC Networking OS Command Line Reference Guide*.

The following is a list of the Dell EMC Networking OS version history for this command:

Version	Description
9.12(1.0)	Introduced on the S5048F–ON.
9.11.0.0	Introduced this command.

Usage Information The following RBAC roles are allowed to issue this command:

- sysadmin
- secadmin

Related Commands

- crypto cert install