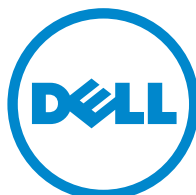


# Dell PowerConnect J-Series Ethernet Switch

Complete Software Guide for Junos OS, Release  
11.1: Volume 1



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## J-EX4200 and J-EX4500 Virtual Chassis

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# About This Guide

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- Downloading Software on page xxxiv
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- Repair and Warranty on page xxxvi
- Requesting Technical Support on page xxxvi

## How to Use This Guide

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This guide, the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 1*, provides the following information about the Junos Operating System (Junos OS) for J-EX Series switches: product overview, complete software configuration statement hierarchy, software installation, user interfaces, system setup, configuration file management, user access management, system services, system monitoring, Virtual Chassis, high availability, and interfaces.

For additional J-EX Series software information, see Volume 2.

To download the Dell PowerConnect J-EX Series documentation listed in Table 1 on page xxxiii, see the following Dell support website:

<http://www.support.dell.com/manuals>

**Table 1: List of J-EX Series Guides**

Title	Description
<i>Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide</i>	Component descriptions, site preparation, installation, replacement, and safety and compliance information for J-EX4500 switches
<i>Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide</i>	Component descriptions, site preparation, installation, replacement, and safety and compliance information for J-EX4200 switches
<i>Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide</i>	Component descriptions, site preparation, installation, replacement, and safety and compliance information for J-EX8208 switches
<i>Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide</i>	Component descriptions, site preparation, installation, replacement, and safety and compliance information for J-EX8216 switches

**Table 1: List of J-EX Series Guides (continued)**

Title	Description
<i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 1</i>	Junos OS for J-EX Series switches product overviews and complete software configuration statement hierarchy—plus feature descriptions, configuration examples, instructions, and reference pages for software installation, user interfaces, system setup, configuration file management, user access management, system services, system monitoring, Virtual Chassis, high availability, and interfaces
<i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i>	Junos OS for J-EX Series switches feature descriptions, configuration examples, instructions, and reference pages for Layer 2 bridging and Virtual LANs (VLANs), spanning-tree protocols, Layer 3 protocols, IGMP snooping and multicast, access control, rate limiting, port security, routing policy and packet filtering (firewall filters), class of service (CoS), fibre channel over Ethernet (FCoE), MPLS, and network management and monitoring





To download additional Junos OS documentation for J-EX Series and all other PowerConnect J-Series products, see the following Juniper Networks support website: <http://www.juniper.net/support/partners/dell>.

If the information in the latest release notes differs from the information in the documentation, follow the release notes.

## Downloading Software

You can download Junos OS for J-EX Series switches from the Download Software area at [juniper.net/support/csc/swdist-domestic/](http://juniper.net/support/csc/swdist-domestic/). To download the software, you must have a Juniper Networks user account. For information about obtaining an account, see <http://www.support.dell.com>.

## Documentation Symbols Key

Notice Icons		
Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Text and Syntax Conventions		
Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  <code>user@host&gt; configure</code>
Fixed-width text like this	Represents output that appears on the terminal screen.	<code>user@host&gt; show chassis alarms</code> <code>No alarms currently active</code>
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces important new terms.</li> <li>Identifies book names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos System Basics Configuration Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  <code>[edit]</code> <code>root@# set system domain-name <i>domain-name</i></code>
Plain text like this	Represents names of configuration statements, commands, files, and directories; IP addresses; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Enclose optional keywords or variables.	<code>stub &lt;default-metric <i>metric</i>&gt;;</code>
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<code>broadcast   multicast</code>  <code>(<i>string1</i>   <i>string2</i>   <i>string3</i>)</code>

Text and Syntax Conventions		
Convention	Description	Examples
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<code>rsvp { # Required for dynamic MPLS only</code>
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	<code>community name members [ community-ids ]</code>
Indentation and braces ( { } )	Identify a level in the configuration hierarchy.	<pre>[edit] routing-options {   static {     route default {       nexthop address;       retain;     }   } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
J-Web GUI Conventions		
<b>Bold text like this</b>	Represents J-Web graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Repair and Warranty



**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

For more information, see “Getting Help” in the hardware guide for your Dell PowerConnect J-EX Series Ethernet Switch.

## Requesting Technical Support

For technical support, see <http://www.support.dell.com>. For more information, see “Getting Help” in the hardware guide for your Dell PowerConnect J-EX Series Ethernet Switch.

## PART 1

# Junos OS for J-EX Series Switches Product Overview

- Software Overview on page 3
- Supported Hardware on page 29



## CHAPTER 1

# Software Overview

- J-EX Series Switch Software Features Overview on page 3
- Layer 3 Protocols Supported on J-EX Series Switches on page 17
- Layer 3 Protocols Not Supported on J-EX Series Switches on page 18
- Security Features for J-EX Series Switches Overview on page 20
- High Availability Features for J-EX Series Switches Overview on page 22
- Understanding Software Infrastructure and Processes on page 25

### J-EX Series Switch Software Features Overview

The following tables list the J-EX Series Switches software features, the Junos operating system (Junos OS) release in which they were introduced, and the first Junos OS release for each switch:

- Table 2 on page 4—First Junos OS Release for Each J-EX Series Switch
- Table 3 on page 4—Access Control Features
- Table 4 on page 5—Administration Features
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The Junos OS release for software features on a switch cannot be earlier than the first Junos OS release for that switch.

**Table 2: First Junos OS Release for Each J-EX Series Switch**

Switch	Junos OS Release
J-EX4200 switches	Junos OS Release 10.2R1
J-EX4200 Virtual Chassis	Junos OS Release 10.2R1
J-EX4500 switches	Junos OS Release 11.1R2
J-EX4500 Virtual Chassis and mixed J-EX4200 and J-EX4500 Virtual Chassis	Junos OS Release 11.1R2 <b>NOTE:</b> A mixed J-EX4200 and J-EX4500 Virtual Chassis supports the same features as a J-EX4500 Virtual Chassis.
J-EX8208 switches	Junos OS Release 10.2R1
J-EX8216 switches	Junos OS Release 10.2R1



**NOTE:** In the features tables, software features that run on J-EX4200 Virtual Chassis are indicated in the column headed "J-EX4200 Switches." If the feature is only for a J-EX4200 Virtual Chassis and not for a standalone switch, the column entry includes "(J-EX4200 Virtual Chassis only)".

**Table 3: Access Control Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
802.1X authentication (port-based, multiple supplicant)	10.2R1	Not supported	Not supported	10.2R1
802.1X authentication with VLAN assignment, VoIP VLAN support	10.2R1	Not supported	Not supported	10.3R1
802.1X user-based dynamic firewall filters	10.2R1	Not supported	Not supported	10.3R1
802.1X user-based dynamic firewall filters on multiple-suppliant ports	10.2R1	Not supported	Not supported	10.3R1



**Table 3: Access Control Features by Junos OS Release (continued)**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Authentication fallback	10.3R1	Not supported	Not supported	Not supported
Captive portal authentication for Layer 3 interfaces	10.2R1	Not supported	Not supported	Not supported
Captive portal authentication for Layer 2 interfaces	10.3R1	Not supported	Not supported	Not supported
MAC RADIUS authentication	10.2R1	10.2R1	11.1R2	10.3R1
NetBIOS snooping	11.1R2	Not supported	Not supported	11.1R2
Server fail fallback	10.2R1	11.1R2	11.1R2	10.2R1
TACACS+	10.2R1	11.1R2	11.1R2	10.2R1

**Table 4: Administration Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
System logging (syslog) over IPv4	10.2R1	11.1R2	11.1R2	10.2R1
System logging (syslog) over IPv6	10.2R1	11.1R2	Not supported	10.2R1
System snapshot	10.2R1	11.1R2	Not supported	10.2R1

**Table 5: Class-of-Service (CoS) Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Class of service (CoS)—Class-based queuing with prioritization, Layer 2 and Layer 3 classification, rewrite, and queueing; strict priority queuing on egress	10.2R1	11.1R2	11.1R2	10.2R1
CoS—DSCP, IEEE 802.1p, and IP precedence packet rewrites on routed VLAN interfaces (RVIs)	10.2R1	11.1R2	11.1R2	10.2R1
CoS—Interface-specific classifiers on routed VLAN interfaces (RVIs)	10.2R1	Not supported	Not supported	10.2R1
CoS—multidestination	Not applicable	Not applicable	Not applicable	10.2R1
CoS—per-interface classification	10.2R1	11.1R2	11.1R2	10.2R1

**Table 5: Class-of-Service (CoS) Features by Junos OS Release (continued)**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
CoS support on LAGs	10.2R1	11.1R2	Not supported	10.2R1
CoS support on routed VLAN interfaces (RVIs)	10.2R1	11.1R2	Not supported	10.2R1
Interface-specific CoS rewrite rules	10.2R1	Not supported	Not supported	10.2R1
Junos EZQoS for CoS	10.2R1	11.1R2	11.1R2	10.2R1
Port shaping and queue shaping	10.2R1	11.1R2	11.1R2	10.1R1
Remarking of bridged packets	10.2R1	11.1R2	11.1R2	10.2R1
Scheduled deficit weighted round robin (SDWRR)	10.2R1	11.1R2	11.1R2	10.2R1
Single-rate two-color marking	10.2R1	11.1R2	11.1R2	10.2R1

**Table 6: Device Security Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Automatic recovery for port error disable conditions	10.2R1	11.1R2	11.1R2	10.0R1
Storm control (broadcast and unicast)	10.2R1	11.1R2	11.1R2	10.2R1
Storm control (multicast)	10.3R2	11.1R2	Not supported	10.3R2
Unknown Layer 2 unicast forwarding	10.2R1	11.1R2	Not supported	10.2R1

**Table 7: Fibre Channel over Ethernet Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
FIP snooping	Not supported	11.1R2	Not supported	Not supported
Priority-based flow control (PFC)	Not supported	11.1R2	Not supported	Not supported

Table 8: High Availability and Resiliency Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Graceful protocol restart for BGP	10.2R1	Not applicable	11.1R2	9.4R1
Graceful protocol restart for IS-IS	10.2R1	Not applicable	11.1R2	9.4R1
Graceful protocol restart for OSPF	10.2R1	Not applicable	11.1R2	9.4R1
Graceful Routing Engine switchover (GRES) for Virtual Chassis	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	Not supported	Not applicable
GRES for ARP entries, forwarding database, and Layer 3 Protocols	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	10.2R1
GRES for port security (DHCP snooping, DAI, and IP source guard)	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	Not supported	10.2R1
LACP support for dual-homing applications in data centers	10.2R1	11.1R2	11.1R2	10.2R1
Link Aggregation Control Protocol (LACP)	10.2R1	11.1R2	11.1R2	10.2R1
Link aggregation groups (LAGs)	10.2R1	11.1R2	11.1R2	10.2R1
Link aggregation groups (LAGs) over Virtual Chassis ports (VCPs)	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	Not supported	Not applicable
Nonstop active routing (NSR) for OSPFv2	11.1R2	Not applicable	Not applicable	10.4R1
Nonstop active routing (NSR) for BGP, IS-IS, IGMP with BFD, and RIP	11.1R2 (J-EX4200 Virtual Chassis)	Not applicable	11.1R2	11.1R2
Nonstop active routing (NSR) for IPv4 and IPv6	Not supported	Not supported	Not supported	Not supported
Nonstop software upgrade (NSSU)	Not applicable	Not applicable	Not supported	10.4R1
Power budget management	Not applicable	Not applicable	Not supported	10.2R1
Redundant trunk groups	10.2R1	Not supported	Not supported	10.2R1
Virtual Chassis fast failover	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	Not supported	Not applicable

**Table 8: High Availability and Resiliency Features by Junos OS Release (continued)**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Virtual Chassis split and merge	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	Not applicable
Virtual Chassis <ul style="list-style-type: none"> <li>Automatic software update on prospective member switches</li> <li>Front-panel configuration of uplink module ports as Virtual Chassis ports (VCPs)</li> </ul>	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	Not applicable
Virtual Chassis—Autoprovisioning of Virtual Chassis ports (VCPs)	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	Not applicable
Virtual Chassis—SFP uplink module port interconnection of member switches	10.2R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	Not applicable
Virtual Router Redundancy Protocol (VRRP)	10.2R1	11.1R2	11.1R2	10.2R1
Virtual Router Redundancy Protocol (VRRP) for IPv6 (except authentication type and authentication key)	10.2R1	Not supported	Not supported	10.2R1

**Table 9: Interfaces Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Digital optical monitoring (DOM)	10.2R1	Not supported	Not supported	10.2R1
Interface ranges	10.2R1	11.1R2	Not supported	10.2R1
Power over Ethernet (PoE)	10.2R1	Not applicable	Not applicable	Not applicable
Power over Ethernet Plus (PoE+)	Not supported	Not applicable	Not applicable	Not applicable
Power over Ethernet (PoE) power management mode	10.2R1	Not applicable	Not applicable	Not applicable
Reflective relay	Not supported	11.1R2	Not supported	Not supported
Time domain reflectometry (TDR)	10.2R1	11.1R2	11.1R2	10.2R1

Table 9: Interfaces Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Unicast reverse-path forwarding (RPF)	10.2R1	Not supported	Not supported	10.2R1
VLAN-tagged Layer 3 subinterfaces	10.2R1	Not supported	Not supported	10.2R1

Table 10: IP Address Management Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
DHCP server and relay with option 82 for Layer 2 VLANs	10.2R1	11.1R2	11.1R2	10.2R1
DHCP server and relay with option 82 for Layer 3 interfaces	10.2R1	11.1R2	11.1R2	10.2R1
DNS for IPv6	10.2R1	Not supported	Not supported	Not supported
Local DHCP server	9.3R2	Not supported	Not supported	10.2R1
Static addresses	10.2R1	11.1R2	Not supported	10.2R1

Table 11: IPv6 Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
<b>NOTE:</b> A separate software license is required for IPv6. See “Understanding Software Licenses for J-EX Series Switches” on page 76.				
IPv6 CoS (multifield classification and rewrite)	10.2R1	11.1R2	Not supported	10.4R1
IPv6 management and services	10.2R1	11.1R2	Not supported	10.2R1
IPv6 multicast protocols (PIM, MLDv1/v2)	10.2R1	11.1R2	Not supported	10.2R1
IPv6 path MTU discovery	10.2R1	11.1R2	Not supported	10.2R1
IS-IS for IPv6	10.2R1	Not supported	Not supported	10.2R1
RIPng	10.2R1	11.1R2	Not supported	10.2R1
OSPFv3	10.2R1	11.1R2	Not supported	10.2R1

Table 12: Layer 2 Network Protocols Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
802.1Q VLAN tagging	10.2R1	11.1R2	11.1R2	10.2R1
Layer 2 protocol tunneling (L2PT)	10.2R1	Not supported	Not supported	Not supported
Link Layer Discovery Protocol (LLDP)	10.2R1	11.1R2	11.1R2	10.2R1
Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) with voice over IP (VoIP) integration	10.2R1	Not supported	Not supported	Not supported
MAC-based VLANs	10.2R1	11.1R2	11.1R2	9.4R1
Multiple VLAN Registration Protocol (MVRP)	10.2R1	Not supported	Not supported	10.2R1
Private VLANs (PVLANS)	10.2R1	Not supported	11.1R2	10.2R1
Private VLANs (PVLANS) support across switches	10.4R1	Not supported	11.1R2	Not supported
Proxy ARP—restricted	10.2R1	11.1R2	Not supported	10.2R1
Proxy ARP—unrestricted	10.2R1	11.1R2	11.1R2	10.2R1
Proxy ARP per VLAN	10.2R1	11.1R2	Not supported	10.2R1
Q-in-Q tunneling	10.2R1	Not supported	Not supported	11.1R2
Q-in-Q VLAN extended support for multiple S-VLANs per access interface, firewall-filter-based VLAN assignment, and routed VLAN interfaces (RVIs)	10.2R1	Not supported	Not supported	11.1R2
VLAN ID translation	10.2R1	Not supported	Not supported	Not supported
VLAN ranges	10.2R1	11.1R2	Not supported	10.2R1

Table 13: Layer 3 Protocols Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Bidirectional Forwarding Detection (BFD)	10.2R1	11.1R2	11.1R2	10.2R1
Border Gateway Protocol (BGP)	10.2R1	11.1R2	11.1R2	10.2R1

Table 13: Layer 3 Protocols Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
A separate software license is required for BGP and MBGP. See "Understanding Software Licenses for J-EX Series Switches" on page 76.				
Distributed periodic packet management (PPM) with BFD	10.4R1	Not supported	Not supported	10.4R1
Distributed periodic packet management (PPM) with LACP	10.2R1	11.1R2	11.1R2	10.2R1
Filter-based forwarding	10.2R1	Not supported	Not supported	10.2R1
Filter-based forwarding over IPv6	10.2R1	Not supported	Not supported	10.3R1
Intermediate System-to-Intermediate System (IS-IS)	10.2R1	11.1R2	Not supported	10.2R1
A separate software license is required for IS-IS. See "Understanding Software Licenses for J-EX Series Switches" on page 76.				
IPv6 Layer 3 multicast protocols	10.2R1	Not supported	Not supported	10.2R1
Jumbo frames on routed VLAN interfaces (RVIs)	10.2R1	11.1R2	Not supported	10.2R1
OSPF Multitopology Routing (MT-OSPF)	10.2R1	Not supported	Not supported	10.2R1
See the <i>Junos OS Routing Protocols Configuration Guide</i> .				
OSPFv2	10.2R1	11.1R2	11.1R2	10.2R1
OSPFv3 IPsec support	10.3R1	Not supported	Not supported	Not supported
Routed VLAN interfaces (RVIs)	10.2R1	11.1R2	11.1R2	10.2R1
Routing Information Protocol version 1 (RIPv1) and RIPv2	10.2R1	11.1R2	11.1R2	10.2R1
Static routes	10.2R1	11.1R2	11.1R2	10.2R1
Virtual routing and forwarding (VRF) with IPv4—virtual routing instances	10.2R1	11.1R2	11.1R2	10.2R1
VRF with IPv4—virtual routing instances for multicast traffic	10.2R1	11.1R2	11.1R2	10.2R1
VRF with IPv6—virtual routing instances for multicast traffic	10.2R1	Not supported	Not supported	10.2R1

**Table 13: Layer 3 Protocols Features by Junos OS Release (continued)**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
VRF with IPv6—virtual routing instances for unicast traffic	10.2R1	Not supported	Not supported	10.2R1

**Table 14: MPLS Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
A separate software license is required for MPLS. See “Understanding Software Licenses for J-EX Series Switches” on page 76.				
Aggregated Ethernet interfaces (LAGs) on circuit cross-connects (CCCs)	Not supported	Not supported	Not supported	11.1R2
CCC with a beginning and ending on the same switch	Not supported	Not supported	Not supported	11.1R2
IP over MPLS	10.2R1	Not supported	Not supported	11.1R2
LDP-based MPLS	Not supported	Not supported	Not supported	11.1R2
MPLS-based circuit cross-connects (CCC)	10.2R1	Not supported	Not supported	11.1R2
MPLS with class of service (CoS)	10.2R1	Not supported	Not supported	Not supported
MPLS with Layer 2 VPNs on Ethernet-encapsulated interfaces (VLAN encapsulated interfaces are not supported)	Not supported	Not supported	Not supported	11.1R2
MPLS with Layer 3 VPNs—including support for RVIs on customer edge (CE) interfaces	Not supported	Not supported	Not supported	11.1R2
MPLS with RSVP-based label-switched paths (LSPs)	10.2R1	Not supported	Not supported	11.1R2

**Table 15: Multicast Features by Junos OS Release**

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
IGMP (Internet Group Management Protocol) version 1 (IGMPv1) and IGMPv2	10.2R1	11.1R2	11.1R2	10.2R1
IGMP snooping with routed VLAN interfaces (RVIs)	10.2R1	11.1R2	Not supported	10.2R1



Table 15: Multicast Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
IGMPv3	10.2R1	11.1R2	11.1R2	10.2R1
IGMPv1/v2 snooping	10.2R1	11.1R2	11.1R2	10.2R1
IGMPv3 snooping	10.2R1	11.1R2	11.1R2	10.2R1
Multicast Source Discovery Protocol (MSDP)	10.2R1	11.1R2	11.1R2	10.2R1
<i>See the Junos OS Multicast Protocols Configuration Guide.</i>				
Multicast VLAN registration (MVR)	10.2R1	Not supported	Not supported	Not supported
Protocol Independent Multicast dense mode (PIM DM)	10.2R1	Not supported	Not supported	10.2R1
<i>See the Junos OS Multicast Protocols Configuration Guide.</i>				
Protocol Independent Multicast sparse mode (PIM SM)	10.2R1	11.1R2	11.1R2	10.2R1
<i>See the Junos OS Multicast Protocols Configuration Guide.</i>				
Protocol Independent Multicast source-specific multicast (PIM SSM)	10.2R1	11.1R2	11.1R2	10.2R1
<i>See the Junos OS Multicast Protocols Configuration Guide.</i>				
Single-source multicast	10.2R1	Not supported	Not supported	10.2R1

Table 16: Network Management and Monitoring Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
802.1ag Ethernet OAM connectivity fault management (CFM)	10.2R1	Not supported	Not supported	Not supported
Ethernet OAM link fault management (LFM)	10.2R1	Not supported	Not supported	10.2R1
Port mirroring	10.2R1	11.1R2	11.1R2	10.2R1
Port mirroring enhancements <ul style="list-style-type: none"> <li>• Layer 3 interface support</li> <li>• Multiple VLAN support</li> </ul>	10.2R1	Not supported	Not supported	10.2R1

Table 16: Network Management and Monitoring Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Port mirroring enhancements <ul style="list-style-type: none"> <li>Ingress-only and egress-only attributes on VLAN members to avoid flooding mirrored traffic to VLAN member interfaces VLAN on the intermediate switch</li> </ul>	10.2R1	Not supported	Not supported	Not supported
Real-time performance monitoring (RPM)	10.2R1	11.1R2	11.1R2	10.2R1
Real-time performance monitoring (RPM)—hardware timestamps with routed VLAN interfaces (RVIs)	10.3R1	11.1R2	11.1R2	10.3R1
RMON	10.2R1	11.1R2	11.1R2	10.2R1
sFlow monitoring technology	10.2R1	Not supported	Not supported	10.2R1
sFlow technology—egress sampling	10.4R1	Not supported	Not supported	10.4R1
sFlow technology— persistent IP addresses for agent IDs and use in datagrams	10.2R1	Not supported	Not supported	10.2R1
Simple Network Management Protocol version 1 (SNMPv1), SNMPv2, and SNMPv3	10.2R1	11.1R2	11.1R2	10.2R1
Uplink failure detection	11.1R2	11.1R2	Not supported	Not supported

Table 17: Port Security Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Automatic recovery for port error disable conditions	10.2R1	11.1R2	11.1R2	10.2R1
DHCP option 82	10.2R1	11.1R2	Not supported	10.2R1
DHCP snooping	10.2R1	Not supported	Not supported	10.3R1
Dynamic ARP inspection (DAI)	10.2R1	Not supported	Not supported	10.3R1
IP source guard	10.2R1	Not supported	Not supported	10.3R1
MAC limiting	10.2R1	11.1R2	11.1R2	10.2R1

Table 17: Port Security Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
MAC address limit per port	10.2R1	11.1R2	11.1R2	10.3R1
MAC move limiting	10.2R1	Not supported	Not supported	Not supported
Persistent storage for DHCP snooping	10.2R1	Not supported	Not supported	10.3R1
Self-signed digital certificates for enabling SSL services	11.1R2	11.1R2	11.1R2	11.1R2
Static ARP support	10.2R1	11.1R2	11.1R2	10.2R1

Table 18: Routing Policy and Packet Filtering Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Dynamic allocation of TCAM memory to firewall filters	10.0R1	11.1R2	11.1R2	10.3R1
Firewall filters and rate limiting	9.0R2	11.1R2	11.1R2	9.4R1
For a list of supported firewall filter match conditions and actions, see Firewall Filter Match Conditions and Actions for J-EX Series Switches in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a> .				
Firewall filters on LAGs	10.2R1	11.1R2	11.1R2	10.0R1
Firewall filters on loopback interface	10.2R1	11.1R2	11.1R2	10.2R1
Firewall filters on management interface	10.4R1	11.1R2	Not supported	10.4R1
Firewall filters on virtual management interface	10.4R1 (J-EX4200 Virtual Chassis only)	Not applicable	11.1R2	Not applicable
Firewall filters with IPv6	10.2R1	Not supported	Not supported	10.3R1
Policing	10.2R1	11.1R2	11.1R2	10.2R1

Table 19: Spanning-Tree Protocols Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
BPDU protection for spanning-tree protocols	10.2R1	11.1R2	11.1R2	10.2R1

Table 19: Spanning-Tree Protocols Features by Junos OS Release (*continued*)

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Loop protection for spanning-tree protocols	10.2R1	11.1R2	11.1R2	10.2R1
Root protection for spanning-tree protocols	10.2R1	11.1R2	11.1R2	10.2R1
Spanning tree:	10.2R1	11.1R2	11.1R2	10.2R1
<ul style="list-style-type: none"> <li>RSTP and VSTP concurrent configuration</li> </ul>				
Spanning tree:	10.2R1	11.1R2	11.1R2	10.2R1
<ul style="list-style-type: none"> <li>Spanning Tree Protocol (STP)</li> <li>Rapid Spanning Tree Protocol (RSTP)</li> <li>Multiple Spanning Tree Protocol (MSTP)</li> </ul>				
Spanning tree:	10.2R1	11.1R2	11.1R2	10.2R1
<ul style="list-style-type: none"> <li>VLAN Spanning Tree Protocol (VSTP)</li> </ul>				

Table 20: System Management Features by Junos OS Release

Feature	J-EX4200 Switches	J-EX4500 Switches	J-EX4500 Virtual Chassis	J-EX8200 Switches
Autoinstallation of configuration files	10.2R1	11.1R2	Not supported	Not supported
Automatic software download	10.2R1	11.1R2	Not supported	10.2R1
Configuration rollback	10.2R1	11.1R2	11.1R2	10.2R1
IP directed broadcast	10.2R1	11.1R2	11.1R2	10.2R1
J-Web interface, for switch configuration and management	10.2R1	11.1R2	Not supported	10.2R1
Online insertion and removal (OIR) of uplink modules	10.2R1	11.1R2	11.1R2	Not applicable

**Related Documentation**

- J-EX4200 Switches Hardware Overview on page 29
- J-EX4500 Switches Hardware Overview on page 31
- J-EX8208 Switch Hardware Overview on page 35
- J-EX8216 Switch Hardware Overview on page 38

- Layer 3 Protocols Supported on J-EX Series Switches on page 17
- Layer 3 Protocols Not Supported on J-EX Series Switches on page 18

## Layer 3 Protocols Supported on J-EX Series Switches

J-EX Series switches support the Junos OS Layer 3 features and configuration statements listed in Table 21 on page 17:

**Table 21: Supported Junos OS Layer 3 Protocol Statements and Features**

Protocol	Notes	For More Information
BGP	Fully supported.	<i>Junos OS Routing Protocols Configuration Guide</i>
BFD	Fully supported.	<i>Junos OS Routing Protocols Configuration Guide</i>
ICMP	Fully supported.	<i>Junos OS Routing Protocols Configuration Guide</i>
IGMPv1, v2 and v3	Fully supported.	<i>Junos OS Multicast Protocols Configuration Guide</i>
IS-IS	Supported, with the exceptions noted in "Layer 3 Protocols Not Supported on J-EX Series Switches" on page 18.	<i>Junos OS Routing Protocols Configuration Guide</i>
MLD	Supported on J-EX4200 and J-EX8200 switches (MLD versions 1 and 2).	<i>Junos OS Multicast Protocols Configuration Guide</i>
MPLS	Supported, with the exceptions noted in "Layer 3 Protocols Not Supported on J-EX Series Switches" on page 18.	<i>Junos OS MPLS Applications Configuration Guide</i>
OSPFv1, v2 and v3	Supported, with the exceptions noted in "Layer 3 Protocols Not Supported on J-EX Series Switches" on page 18.	<i>Junos OS Routing Protocols Configuration Guide</i>
PIM	Fully supported on J-EX4200 and J-EX8200 switches.	<i>Junos OS Multicast Protocols Configuration Guide</i>
RIP	Fully supported.	<i>Junos OS Routing Protocols Configuration Guide</i>
RIPng	Fully supported.	<i>Junos OS Routing Protocols Configuration Guide</i>
SNMP	Fully supported.	<i>Junos OS Network Management Configuration Guide</i>
VRRP	Fully supported.	See "Understanding VRRP on J-EX Series Switches" on page 928 in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a> . See also <i>Junos OS High Availability Guide</i> .

- Related Documentation**
- Layer 3 Protocols Not Supported on J-EX Series Switches on page 18
  - J-EX Series Switch Software Features Overview on page 3

## Layer 3 Protocols Not Supported on J-EX Series Switches

J-EX Series switches do not support the Junos OS Layer 3 protocols and features listed in Table 22 on page 18:

**Table 22: Junos OS Layer 3 Protocol Statements and Features That Are Not Supported**

Feature	Configuration Statements Not Supported on J-EX Series Switches
DVMRP	<ul style="list-style-type: none"> <li>• <b>dvmrp</b> and subordinate statements</li> </ul>
Flow aggregation (cflowd)	<ul style="list-style-type: none"> <li>• <b>cflow</b> and subordinate statements</li> </ul>
GRE	<ul style="list-style-type: none"> <li>• Not supported</li> </ul>
IPSec	<ul style="list-style-type: none"> <li>• <b>[edit services]</b> statements related to IPSec</li> </ul>
IS-IS: <ul style="list-style-type: none"> <li>• ES-IS</li> <li>• IPv6 in multicast routing protocols</li> </ul>	<ul style="list-style-type: none"> <li>• <b>clns-routing</b> statement</li> <li>• <b>ipv6-multicast</b> statement</li> <li>• <b>lsp-interval</b> statement</li> <li>• <b>label-switched-path</b> statement</li> <li>• <b>lsp-lifetime</b> statement</li> <li>• <b>te-metric</b> statement</li> </ul>
Logical routers	<ul style="list-style-type: none"> <li>• <b>logical-routers</b> and subordinate statements</li> </ul>
MLD	<ul style="list-style-type: none"> <li>• <b>mld</b> and all subordinate statements (J-EX4500 switches)</li> </ul>
MPLS: <ul style="list-style-type: none"> <li>• Fast Reroute (FRR)</li> <li>• Label Distribution Protocol (LDP) (except on J-EX8200 switches)</li> <li>• Layer 3 VPNs (except on J-EX8200 switches)</li> <li>• Multiprotocol BGP (MP-BGP) for VPN-IPv4 family</li> <li>• Pseudowire emulation (PWE3)</li> <li>• Routing policy statements related to Layer 3 VPNs and MPLS (except on J-EX8200 switches)</li> <li>• Virtual Private LAN Service (VPLS)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>ldp</b> and all subordinate statements (except on J-EX8200 switches)</li> </ul>

Table 22: Junos OS Layer 3 Protocol Statements and Features That Are Not Supported (*continued*)

Feature	Configuration Statements Not Supported on J-EX Series Switches
Network Address Translation (NAT)	<ul style="list-style-type: none"> <li>• <b>nat</b> and subordinate statements</li> <li>• Policy statements related to NAT</li> </ul>
OSPF	<ul style="list-style-type: none"> <li>• <b>demand-circuit</b> statement</li> <li>• <b>label-switched-path</b> and subordinate statements</li> <li>• <b>neighbor</b> statement within an OSPF area</li> <li>• <b>peer-interface</b> and subordinate statements within an OSPF area</li> <li>• <b>sham-link</b> statement</li> <li>• <b>te-metric</b> statement</li> </ul>
PIM DM	<ul style="list-style-type: none"> <li>• Not supported on J-EX4500 switches</li> </ul>
PIM: <ul style="list-style-type: none"> <li>• IPv6</li> </ul>	<ul style="list-style-type: none"> <li>• <b>inet6</b> family (J-EX4500 switches)</li> </ul>
Routed VLAN interfaces (RVIs)	<b>family mpls</b> statement
Routing instances: <ul style="list-style-type: none"> <li>• Routing instance forwarding</li> </ul>	<ul style="list-style-type: none"> <li>• <b>l2vpn</b> and subordinate statements (except on J-EX8200 switches)</li> <li>• <b>ldp</b> and subordinate statements (except on J-EX8200 switches)</li> <li>• <b>vpls</b> and subordinate statements</li> </ul>
SAP and SDP	<ul style="list-style-type: none"> <li>• <b>sap</b> and all subordinate statements</li> </ul>
General routing options in the <b>routing-options</b> hierarchy: <ul style="list-style-type: none"> <li>• MPLS and label-switched-paths</li> </ul>	<ul style="list-style-type: none"> <li>• <b>auto-export</b> and subordinate statements</li> <li>• <b>dynamic-tunnels</b> and subordinate statements</li> <li>• <b>lsp-next-hop</b> and subordinate statements</li> <li>• <b>multicast</b> and subordinate statements</li> <li>• <b>p2mp-lsp-next-hop</b> and subordinate statements</li> <li>• <b>route-distinguisher-id</b> statement (except on J-EX8200 switches)</li> </ul>
Traffic sampling and forwarding in the <b>forwarding-options</b> hierarchy	<ul style="list-style-type: none"> <li>• <b>accounting</b> and subordinate statements</li> <li>• <b>family mpls</b> and <b>family multiservice</b> under <b>hash-key</b> hierarchy</li> <li>• Under <b>monitoring group-name family inet output</b> hierarchy: <ul style="list-style-type: none"> <li>• <b>cflowd</b> statement</li> <li>• <b>export-format-cflowd-version-5</b> statement</li> <li>• <b>flow-active-timeout</b> statement</li> <li>• <b>flow-export-destination</b> statement</li> <li>• <b>flow-inactive-timeout</b> statement</li> <li>• <b>interface</b> statement</li> </ul> </li> <li>• <b>port-mirroring</b> statement (On J-EX Series switches, port mirroring is implemented using the <b>analyzer</b> statement.)</li> <li>• <b>sampling</b> and subordinate statements</li> </ul>

- Related Documentation**
- Layer 3 Protocols Supported on J-EX Series Switches on page 17
  - J-EX Series Switch Software Features Overview on page 3

## Security Features for J-EX Series Switches Overview

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The Junos operating system (Junos OS) is a network operating system that has been hardened through the separation of control forwarding and services planes, with each function running in protected memory. The control-plane CPU is protected by rate limiting, routing policy, and firewall filters to ensure switch uptime even under severe attack. In addition, the switches fully integrate with the Juniper Networks Unified Access Control (UAC) product to provide both standards-based 802.1X port-level access and Layer 2 through Layer 4 policy enforcement based on user identity. Access port security features such as dynamic Address Resolution Protocol (ARP) inspection, DHCP snooping, and MAC limiting are controlled through a single Junos OS CLI command.

J-EX Series Switches provide the following hardware and software security features:

**Console Port**—Allows use of the console port to connect to the Routing Engine through an RJ-45 cable. You then use the command-line interface (CLI) to configure the switch.

**Out-of-Band Management**—A dedicated management Ethernet port on the rear panel allows out-of-band management.

**Software Images**—All Junos OS images are signed by Juniper Networks certificate authority (CA) with public key infrastructure (PKI).

**User Authentication, Authorization, and Accounting (AAA)**—Features include:

- User and group accounts with password encryption and authentication.
- Access privilege levels configurable for login classes and user templates.
- RADIUS authentication, TACACS+ authentication, or both, for authenticating users who attempt to access the switch.
- Auditing of configuration changes through system logging or RADIUS/TACACS+.

**802.1X Authentication**—Provides network access control. Supplicants (hosts) are authenticated when they initially connect to a LAN. Authenticating supplicants before they receive an IP address from a DHCP server prevents unauthorized supplicants from gaining access to the LAN. J-EX Series switches support Extensible Authentication Protocol (EAP) methods, including EAP-MD5, EAP-TLS, EAP-TTLS, and EAP-PEAP.

**Port Security**—Access port security features include:

- DHCP snooping—Filters and blocks ingress DHCP server messages on untrusted ports; builds and maintains an IP-address/MAC-address binding database (called the DHCP snooping database).
- Dynamic ARP inspection (DAI)—Prevents ARP spoofing attacks. ARP requests and replies are compared against entries in the DHCP snooping database, and filtering decisions are made based on the results of those comparisons.



- MAC limiting—Protects against flooding of the Ethernet switching table.
- MAC move limiting—Detects MAC movement and MAC spoofing on access ports.
- Trusted DHCP server—With a DHCP server on a trusted port, protects against rogue DHCP servers sending leases.
- IP source guard—Mitigates the effects of IP address spoofing attacks on the Ethernet LAN. The source IP address in the packet sent from an untrusted access interface is validated against the source MAC address in the DHCP snooping database. The packet is allowed for further processing if the source IP address to source MAC address binding is valid; if the binding is not valid, the packet is discarded.
- DHCP option 82—Also known as the DHCP relay agent information option. Helps protect the J-EX Series switch against attacks such as spoofing (forging) of IP addresses and MAC addresses and DHCP IP address starvation. Option 82 provides information about the network location of a DHCP client, and the DHCP server uses this information to implement IP addresses or other parameters for the client.
- Unrestricted proxy ARP—The switch responds to all ARP messages with its own MAC address. Hosts that are connected to the switch's interfaces cannot communicate directly with other hosts. Instead, all communications between hosts go through the switch.
- Restricted proxy ARP—The switch does not respond to an ARP request if the physical networks of the source and target of the ARP request are the same. It does not matter whether the destination host has the same IP address as the incoming interface or a different (remote) IP address. An ARP request for a broadcast address elicits no reply.

**Device Security**—Storm control permits the switch to monitor unknown unicast and broadcast traffic and drop packets, or shut down, or temporarily disable the interface when a specified traffic level is exceeded, thus preventing packets from proliferating and degrading the LAN. You can enable storm control on access interfaces or trunk interfaces.

**Firewall Filters**—Allow auditing of various types of security violations, including attempts to access the switch from unauthorized locations. Firewall filters can detect such attempts and create audit log entries when they occur. The filters can also restrict access by limiting traffic to source and destination MAC addresses, specific protocols, or, in combination with policers, to specified data rates to prevent denial of service (DoS) attacks.

**Policers**—Provide rate-limiting capability to control the amount of traffic that enters an interface, which acts to counter DoS attacks.

**Encryption Standards**—Supported standards include:

- 128-, 192-, and 256-bit Advanced Encryption Standard (AES)
- 56-bit Data Encryption Standard (DES) and 168-bit 3DES

**Related Documentation** See the following information in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>:

- 802.1X for J-EX Series Switches Overview

- Firewall Filters for J-EX Series Switches Overview
- Port Security for J-EX Series Switches Overview
- Understanding Proxy ARP on J-EX Series Switches
- Understanding Storm Control on J-EX Series Switches
- Understanding the Use of Policers in Firewall Filters

## High Availability Features for J-EX Series Switches Overview

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*High availability* refers to the hardware and software components that provide redundancy and reliability for packet-based communications. This topic covers the following high availability features of J-EX Series Switches:

- VRRP on page 22
- Graceful Protocol Restart on page 22
- Redundant Routing Engines on page 23
- Virtual Chassis on page 23
- Graceful Routing Engine Switchover on page 24
- Link Aggregation on page 24
- Nonstop Active Routing on page 24
- Nonstop Software Upgrade on page 24

### VRRP

You can configure the Virtual Router Redundancy Protocol (VRRP) or VRRP for IPv6 on Gigabit Ethernet interfaces, 10-Gigabit Ethernet interfaces, and logical interfaces on the switches. When VRRP is configured, the switches act as virtual routing platforms. VRRP enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts. The VRRP routing platforms share the IP address corresponding to the default route configured on the hosts. At any time, one of the VRRP routing platforms is the master (active) and the others are backups. If the master routing platform fails, one of the backup routing platforms becomes the new master, providing a virtual default routing platform and enabling traffic on the LAN to be routed without relying on a single routing platform. Using VRRP, a backup switch can take over a failed default switch within a few seconds. This is done with minimum loss of VRRP traffic and without any interaction with the hosts.

### Graceful Protocol Restart

With standard implementations of routing protocols, any service interruption requires an affected switch to recalculate adjacencies with neighboring switches, restore routing table entries, and update other protocol-specific information. An unprotected restart of a switch can result in forwarding delays, route flapping, wait times stemming from protocol reconvergence, and even dropped packets. Graceful protocol restart allows a restarting switch and its neighbors to continue forwarding packets without disrupting network

performance. Because neighboring switches assist in the restart (these neighbors are called helper switches), the restarting switch can quickly resume full operation without recalculating algorithms from scratch.

On the switches, graceful protocol restart can be applied to aggregate and static routes and for routing protocols (BGP, IS-IS, OSPF, and RIP).

Graceful protocol restart works similarly for the different routing protocols. The main benefits of graceful protocol restart are uninterrupted packet forwarding and temporary suppression of all routing protocol updates. Graceful protocol restart thus allows a switch to pass through intermediate convergence states that are hidden from the rest of the network. Most graceful restart implementations define two types of switches—the restarting switch and the helper switch. The restarting switch requires rapid restoration of forwarding state information so that it can resume the forwarding of network traffic. The helper switch assists the restarting switch in this process. Individual graceful restart configuration statements typically apply to either the restarting switch or the helper switch.

## Redundant Routing Engines

Redundant Routing Engines are two Routing Engines that are installed in a switch. When a switch has two Routing Engines, one functions as the master, while the other stands by as a backup should the master Routing Engine fail. Redundant Routing Engines are supported on Dell PowerConnect J-EX Series J-EX8200 Ethernet Switches.

The master Routing Engine receives and transmits routing information, builds and maintains routing tables, communicates with interfaces and Packet Forwarding Engine components of the switch, and has full control over the control plane of the switch.

The backup Routing Engine stays in sync with the master Routing Engine in terms of protocol states, forwarding tables, and so forth. If the master becomes unavailable, the backup Routing Engine takes over the functions that the master Routing Engine performs.

Network reconvergence takes place more quickly on switches with redundant Routing Engines than on switches with a single Routing Engine.

## Virtual Chassis

A Virtual Chassis is multiple switches connected together that operate as a single network entity. The advantages of connecting multiple switches into a Virtual Chassis include better-managed bandwidth at a network layer, simplified configuration and maintenance because multiple devices can be managed as a single device, and a simplified Layer 2 network topology that minimizes or eliminates the need for loop prevention protocols such as Spanning Tree Protocol (STP). A Virtual Chassis improves high availability by introducing a variety of failover mechanisms; if a member switch, a line card, or an interface fails on a switch that is a member of a Virtual Chassis, for instance, traffic to that switch, line card, or interface can be rerouted within the Virtual Chassis.

Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches and Dell PowerConnect J-EX Series J-EX4500 Ethernet Switches can form a Virtual Chassis.

## Graceful Routing Engine Switchover

You can configure graceful Routing Engine switchover (GRES) on a switch with redundant Routing Engines or on a Virtual Chassis, allowing control to switch from the master Routing Engine to the backup Routing Engine with minimal interruption to network communications. When you configure graceful Routing Engine switchover, the backup Routing Engine automatically synchronizes with the master Routing Engine to preserve kernel state information and forwarding state. Any updates to the master Routing Engine are replicated to the backup Routing Engine as soon as they occur. If the kernel on the master Routing Engine stops operating, the master Routing Engine experiences a hardware failure, or the administrator initiates a manual switchover, mastership switches to the backup Routing Engine.

When the backup Routing Engine assumes mastership in a redundant failover configuration (that is, when graceful Routing Engine switchover is not enabled), the Packet Forwarding Engines initialize their state to the boot state before they connect to the new master Routing Engine. In contrast, in a graceful switchover configuration, the Packet Forwarding Engines do not reinitialize their state, but resynchronize their state to that of the new master Routing Engine. The interruption to traffic is minimal.

## Link Aggregation

You can combine multiple physical Ethernet ports to form a logical point-to-point link, known as a link aggregation group (LAG) or bundle. A LAG provides more bandwidth than a single Ethernet link can provide. Additionally, link aggregation provides network redundancy by load-balancing traffic across all available links. If one of the links should fail, the system automatically load-balances traffic across all remaining links. In a Virtual Chassis, LAGs can be used to load-balance network traffic between member switches.

The number of Ethernet interfaces you can include in a LAG and the number of LAGs you can configure on a switch depend on the switch model.

## Nonstop Active Routing

Nonstop active routing (NSR) provides high availability in a switch with redundant Routing Engines by enabling transparent switchover of the Routing Engines without requiring restart of supported routing protocols. Both Routing Engines are fully active in processing protocol sessions, and so each can take over for the other. The switchover is transparent to neighbor routing devices, which do not detect that a change has occurred.

To use nonstop active routing, you must also configure graceful Routing Engine switchover.

## Nonstop Software Upgrade

Nonstop software upgrade (NSSU) is available on J-EX8200 switches with redundant Routing Engines. NSSU takes advantage of graceful Routing Engine switchover and nonstop active routing to enable upgrading the Junos OS version running on a switch or Virtual Chassis with no disruption to the control plane. In addition, NSSU upgrades line cards one at a time, permitting traffic to continue to flow through the line cards that are not being upgraded. By configuring LAGs such that the member links reside on different line cards, you can achieve minimal traffic disruption when performing an NSSU.

**Related Documentation** For details on high availability features, see the following information in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals> For more information, see the *Junos OS High Availability Configuration Guide*.

- J-EX4200 Virtual Chassis Overview on page 709
- Understanding VRRP on J-EX Series Switches on page 928
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- Understanding Nonstop Active Routing on J-EX Series Switches on page 931
- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932
- For more information, see the *Junos OS High Availability Configuration Guide*.

## Understanding Software Infrastructure and Processes

Each switch runs the Junos operating system (Junos OS) for J-EX Series Switches on its general-purpose processors. Junos OS includes processes for Internet Protocol (IP) routing and for managing interfaces, networks, and the chassis.

The Junos OS runs on the Routing Engine. The Routing Engine kernel coordinates communication among the Junos OS processes and provides a link to the Packet Forwarding Engine.

With the J-Web interface and the command-line interface (CLI) to the Junos OS, you configure switching features and routing protocols and set the properties of network interfaces on your switch. After activating a software configuration, use either the J-Web or CLI user interface to monitor the switch, manage operations, and diagnose protocol and network connectivity problems.

- Routing Engine and Packet Forwarding Engine on page 25
- Junos OS Processes on page 26

## Routing Engine and Packet Forwarding Engine

A switch has two primary software processing components:

- Packet Forwarding Engine—Processes packets; applies filters, routing policies, and other features; and forwards packets to the next hop along the route to their final destination.
- Routing Engine—Provides three main functions:
  - Creates the packet forwarding switch fabric for the switch, providing route lookup, filtering, and switching on incoming data packets, then directing outbound packets to the appropriate interface for transmission to the network
  - Maintains the routing tables used by the switch and controls the routing protocols that run on the switch.

- Provides control and monitoring functions for the switch, including controlling power and monitoring system status.

## Junos OS Processes

The Junos OS running on the Routing Engine and Packet Forwarding Engine consists of multiple processes that are responsible for individual functions.

The separation of functions provides operational stability, because each process accesses its own protected memory space. In addition, because each process is a separate software package, you can selectively upgrade all or part of the Junos OS, for added flexibility.

Table 23 on page 26 describes the primary Junos OS processes.

**Table 23: Junos OS Processes**

Process	Name	Description
Chassis process	chassisd	<p>Detects hardware on the system that is used to configure network interfaces.</p> <p>Monitors the physical status of hardware components and field-replaceable units (FRUs), detecting when environment sensors such as temperature sensors are triggered.</p> <p>Relays signals and interrupts—for example, when devices are taken offline, so that the system can close sessions and shut down gracefully.</p>
Ethernet switching process	eswd	<p>Handles Layer 2 switching functionality such as MAC address learning, Spanning Tree protocol and access port security. The process is also responsible for managing Ethernet switching interfaces, VLANs, and VLAN interfaces.</p> <p>Manages Ethernet switching interfaces, VLANs, and VLAN interfaces.</p>
Forwarding process	pfem	<p>Defines how routing protocols operate on the switch. The overall performance of the switch is largely determined by the effectiveness of the forwarding process.</p>
Interface process	dcd	<p>Configures and monitors network interfaces by defining physical characteristics such as link encapsulation, hold times, and keepalive timers.</p>
Management process	mgd	<p>Provides communication between the other processes and an interface to the configuration database.</p> <p>Populates the configuration database with configuration information and retrieves the information when queried by other processes to ensure that the system operates as configured.</p> <p>Interacts with the other processes when commands are issued through one of the user interfaces on the switch.</p> <p>If a process terminates or fails to start when called, the management process attempts to restart it a limited number of times to prevent thrashing and logs any failure information for further investigation.</p>
Routing protocol process	rpd	<p>Defines how routing protocols such as RIP, OSPF, and BGP operate on the device, including selecting routes and maintaining forwarding tables.</p>

**Related  
Documentation**

- For more information about processes, see the *Junos OS Network Operations Guide*
- For more information about basic system parameters, supported protocols, and software processes, see the *Junos OS System Basics Configuration Guide*





## CHAPTER 2

# Supported Hardware

- J-EX4200 Switches Hardware Overview on page 29
- J-EX4200 Switch Models on page 31
- J-EX4500 Switches Hardware Overview on page 31
- J-EX4500 Switch Models on page 34
- J-EX8208 Switch Hardware Overview on page 35
- J-EX8216 Switch Hardware Overview on page 38

## J-EX4200 Switches Hardware Overview

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J-EX Series Switches provide scalable connectivity for the enterprise market, including branch offices, campus locations, and data centers. The switches run the Junos operating system (Junos OS), which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on J-EX Series switches also runs on all Dell PowerConnect J-SRX-Series Services Gateways.

- J-EX4200 Switches on page 29
- Uplink Modules on page 30
- Power over Ethernet (PoE) Ports on page 30

## J-EX4200 Switches

Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches provide connectivity for medium- and high-density environments and scalability for growing networks. These switches can be deployed wherever you need high density of Gigabit Ethernet ports (24 to 480 ports) or redundancy. Typically, J-EX4200 switches are used in large branch offices, campus wiring closets, and data centers where they can be positioned as the top device in a rack to provide connectivity for all the devices in the rack.

You can connect individual J-EX4200 switches together to form one unit and manage the unit as a single chassis, called a *Virtual Chassis*. You can add more member switches to the Virtual Chassis as needed, up to a total of 10 members.

J-EX4200 switches are available in models with 24 or 48 ports and with 8 ports equipped for Power over Ethernet (PoE). All models provide ports that have 10/100/1000Base-T Gigabit Ethernet connectors and optional 1-gigabit small form-factor pluggable (SFP)

transceivers, 10-gigabit small form-factor pluggable (SFP+) transceivers for use with fiber connections.

Additionally, a 24-port model provides 100Base-FX/1000Base-X SFP ports. This model is typically used as a small distribution switch.

All J-EX4200 switches have dedicated 64-Gbps Virtual Chassis ports that allow you to connect the switches to each other. You can also use optional uplink module ports to connect members of a Virtual Chassis across multiple wiring closets.

To provide carrier-class reliability, J-EX4200 switches include:

- Dual redundant power supplies that are field-replaceable and hot-swappable. An optional additional connection to an external power source is also available.
- A field-replaceable fan tray with three fans. The switch remains operational if a single fan fails.
- Redundant Routing Engines in a Virtual Chassis configuration. This redundancy enables graceful Routing Engine switchover (GRES) and nonstop active routing (NSR).
- Junos OS with its modular design that enables failed system processes to gracefully restart.

J-EX4200 switches have these features:

- Run under Junos OS for J-EX Series switches
- Have options of 24-port and 48-port models
- Have options of partial (8 ports) Power over Ethernet (PoE) capability
- Have optional uplink modules that provide connection to distribution switches

## Uplink Modules

Optional uplink modules are available for all J-EX4200 switches. Uplink modules provide four 1-gigabit small form-factor pluggable (SFP) transceivers or two 10-gigabit small form-factor pluggable (SFP+) transceivers. You can use SFP or SFP+ ports to connect an access switch to a distribution switch or to interconnect member switches of a Virtual Chassis across multiple wiring closets.

## Power over Ethernet (PoE) Ports

PoE ports provide electrical current to devices through the network cables so that separate power cords for devices such as IP phones, wireless access points, and security cameras are unnecessary. Two J-EX4200 switch models provide partial (8 ports) PoE capability.

Partial PoE models are used in environments where, for example, only a few ports for wireless access points or security cameras are required.

### Related Documentation

- J-EX4200 Switch Models on page 31
- For information about switch FRUs and site preparation, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## J-EX4200 Switch Models

The J-EX4200 switch is available with 24 or 48 ports and with partial Power over Ethernet (PoE) capability. Table 24 on page 31 lists the J-EX4200 switch models.

Table 24: J-EX4200 Switch Models

Model	Ports	Number of PoE-enabled Ports	Power Supply (Minimum)
J-EX4200-24T	24 Gigabit Ethernet	First 8 ports	320 W
J-EX4200-48T	48 Gigabit Ethernet	First 8 ports	320 W
J-EX4200-24F	24 small form-factor pluggable (SFP) transceivers	–	320 W

- Related Documentation**
- For front and rear panel illustrations and details, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
  - J-EX4200 Switches Hardware Overview on page 29

## J-EX4500 Switches Hardware Overview

Dell PowerConnect J-EX Series J-EX4500 Ethernet Switches provide high performance, scalable connectivity, and carrier-class reliability for high-density environments such as campus-aggregation and data-center networks.

You can manage J-EX4500 switches using the same interfaces that you use for managing other devices running the Junos operating system (Junos OS)—the command-line interface (CLI) and the J-Web graphical interface.

The J-EX Series Switches run Junos OS, which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on J-EX Series switches also runs on all Dell PowerConnect J-SRX Series Services Gateways.

- J-EX4500 Switches on page 31
- Virtual Chassis Module on page 33
- Uplink Modules on page 33
- Power Supplies on page 33

## J-EX4500 Switches

J-EX4500 switches provide connectivity for high-density 10-Gigabit Ethernet data center top-of-rack and aggregation deployments. Typically, J-EX4500 switches are used in data centers where they can be positioned as the top device in a rack to provide connectivity for all devices in the rack.

The J-EX4500 switch is 2 rack units (2 U) in size. Each J-EX4500 switch is designed to optimize rack space utilization and cabling. See Figure 1 on page 32 and Figure 2 on page 32.

Figure 1: J-EX4500 Switch Front

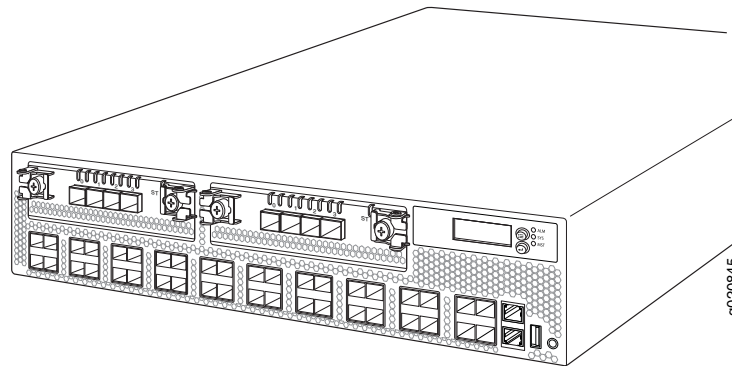
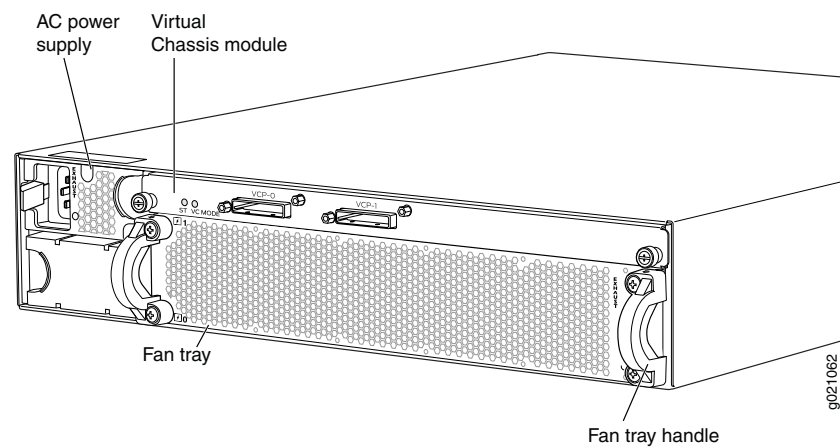


Figure 2: J-EX4500 Switch Rear with Virtual Chassis Module Installed



J-EX4500 switches are available in models with either front-to back airflow or back-to-front airflow and hardware that is Converged Enhanced Ethernet (CEE) capable or not. All models provide 40 wire-speed 10-gigabit small form-factor pluggable (SFP+) network ports that can house either 1-Gigabit Ethernet connectors or 10-Gigabit Ethernet connectors. All models support two optional high-speed uplink modules. See “J-EX4500 Switch Models” on page 34.



**NOTE:** The network ports are located on the front of the switch.

To provide carrier-class reliability, J-EX4500 switches include:

- Dual redundant, load-sharing power supplies that are field-replaceable, hot-removable, and hot-insertable.
- A field-replaceable fan tray with five fans. The switch remains operational if a single fan fails.

- Redundant Routing Engines in a Virtual Chassis configuration. This redundancy enables graceful Routing Engine switchover (GRES).
- Junos OS with its modular design that enables failed system processes to gracefully restart.

## Virtual Chassis Module

J-EX4500 switches ship with the Virtual Chassis module preinstalled horizontally on the rear of the switch chassis. The Virtual Chassis module is an offline field-replaceable unit (FRU).

The Virtual Chassis module has two dedicated Virtual Chassis ports (VCPs) that can be used to interconnect the J-EX4500 switch with J-EX4200 switches or another J-EX4500 switch to form a Virtual Chassis. The Virtual Chassis module must be installed in a J-EX4500 switch to form a Virtual Chassis.

Only two J-EX4500 switches can be interconnected into a Virtual Chassis composed exclusively of J-EX4500 switches.

J-EX4200 and J-EX4500 switches can be connected together into the same Virtual Chassis to form a mixed J-EX4200 and J-EX4500 Virtual Chassis. A mixed J-EX4200 and J-EX4500 Virtual Chassis supports up to two J-EX4500 switches and up to eight J-EX4200 switches. You can interconnect J-EX4200 and J-EX4500 switches through the dedicated Virtual Chassis ports (VCPs) to form a mixed Virtual Chassis.

You can also interconnect J-EX4500 switches through SFP+ uplink module ports or SFP+ network ports configured as VCPs to form a Virtual Chassis.



**NOTE:** Operating a J-EX4500 switch without the Virtual Chassis module is not supported. J-EX4500 switches will not boot if the Virtual Chassis module is not installed in the switch chassis.

## Uplink Modules

Optional uplink modules are available for J-EX4500 switches. Two uplink modules can be installed in a J-EX4500 switch. Each uplink module provides four SFP+ ports for connecting to core devices in a data center. You can install SFP or SFP+ transceivers in these ports. You can also configure the uplink module ports as VCPs to form a Virtual Chassis.

## Power Supplies

J-EX4500 switches support AC power supplies. J-EX4500 switches ship with one AC power supply installed. You can install a second AC power supply in your J-EX4500 switch. For slot numbering and line-card details, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.



**CAUTION:** Mixing power supplies with front-to-back and back-to-front airflow in the same chassis is not supported.

**Related Documentation**

- J-EX4500 Switch Models on page 34
- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709

## J-EX4500 Switch Models

The J-EX4500 switch is available in two models. Table 25 on page 34 lists the models for a J-EX4500 switch and the components included in each model.



**NOTE:** The network ports are located on the front of the switch.

**Table 25: J-EX4500 Switch Models and Their Components**

Model	Access Port Configuration	Direction of Airflow	Switch Components
GYTPN	40-port GbE/10GbE SFP/SFP+	Front-to-back	<ul style="list-style-type: none"> <li>• Chassis</li> <li>• One fan tray—displaying an <b>EXHAUST</b> label and arrow icons pointing towards you</li> <li>• One AC power supply—displaying an <b>EXHAUST</b> label and an arrow icon pointing towards you</li> <li>• One jumper cable</li> <li>• One power supply cover panel</li> <li>• Two uplink module cover panels</li> <li>• One Virtual Chassis module</li> </ul>
TX9CD	40-port GbE/10GbE SFP/SFP+	Back-to-front	<ul style="list-style-type: none"> <li>• Chassis</li> <li>• One fan tray—displaying an <b>INTAKE</b> label and arrow icons pointing away from you</li> <li>• One AC power supply—displaying an <b>INTAKE</b> label and an arrow icon pointing away from you)</li> <li>• One jumper cable</li> <li>• One power supply cover panel</li> <li>• Two uplink module cover panels</li> <li>• One Virtual Chassis module</li> </ul>



**NOTE:** Uplink modules, transceivers, Virtual Chassis cables, and Virtual Chassis cable connector retainers are not part of the J-EX4500 switch's shipping configuration. If you want to purchase any of these, or additional power supplies for your switch, you must order them separately.



**CAUTION:** Mixing power supplies with front-to-back and back-to-front airflow in the same chassis is not supported.

**Related Documentation**

- For chassis specifications and front and rear panel details, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
- J-EX4500 Switches Hardware Overview on page 31

## J-EX8208 Switch Hardware Overview

Dell PowerConnect J-EX Series J-EX8208 Ethernet Switches provide high performance, scalable connectivity, and carrier-class reliability for high-density environments such as campus-aggregation and data-center networks. The J-EX8208 switch is a modular system that provides high availability and redundancy for all major hardware components, including Routing Engines, switch fabric, fan tray, and power supplies.

You can manage J-EX8208 switches using the same interfaces that you use for managing other devices running the Junos operating system (Junos OS)—the command-line interface (CLI) and , the J-Web graphical interface.

- Software on page 35
- Chassis Physical Specifications on page 35
- Routing Engines and Switch Fabric on page 36
- Line Cards on page 37
- Cooling System on page 37
- Power Supplies on page 37

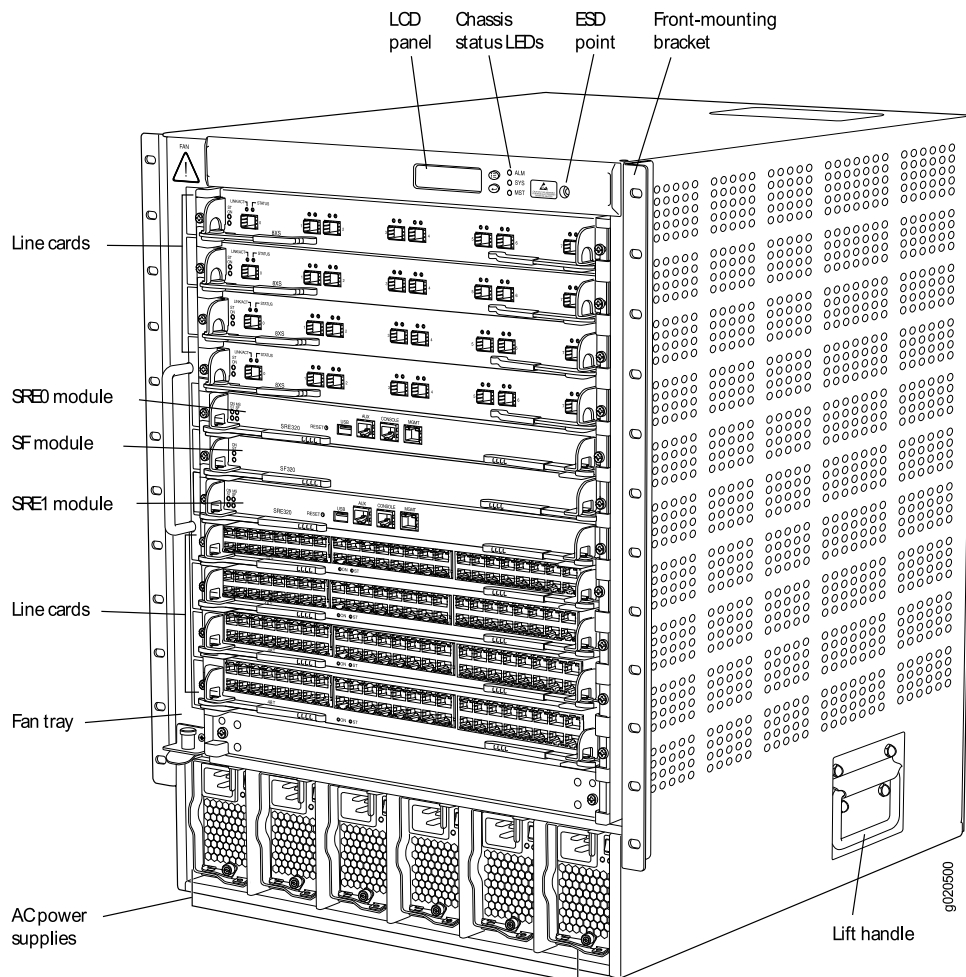
### Software

The J-EX Series Switches run the Juniper Networks Junos OS, which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on J-EX Series switches also runs on all Dell PowerConnect J-SRX Series Services Gateways.

### Chassis Physical Specifications

The J-EX8208 switch is 14 rack units (14 U) in size (1/3 rack); three J-EX8208 switches can fit in a standard 42 U rack. Each J-EX8208 switch is designed to optimize rack space and cabling. See Figure 3 on page 36.

Figure 3: J-EX8208 Switch



The J-EX8208 switch has a chassis-level LCD panel that displays Routing Engine and switch fabric status as well as chassis components' alarm information for rapid problem identification. The LCD panel provides a user-friendly interface for performing initial switch configuration, rolling back a configuration, or restoring the switch to its default settings.

The J-EX8208 chassis backplane distributes the data, control, and management signals to various system components along with distributing power throughout the system.

For LCD panel and chassis backplane details, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Routing Engines and Switch Fabric

Switching functionality, system management, and system control functions of a J-EX8208 switch are performed by a Switch Fabric and Routing Engine (SRE) module. An SRE module contains a Routing Engine and switch fabric. The SRE modules are installed in the front of the chassis in the slots labeled SRE0 and SRE1. A redundant configuration J-EX8208 switch has a second SRE module.



The Switch Fabric (SF) module, working with the SRE module, provides the necessary switching functionality to a J-EX8208 switch. The SF module is installed in the front of the chassis in the slot labeled SF. In a redundant configuration the SF module provides a redundant switch fabric. The additional switch fabric provides full 2+1 switch fabric redundancy to the switch.

For details about the SRE module, SF module, and slot numbering, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Line Cards

The J-EX8208 switch features eight horizontal line card slots and supports the line rate for each line card. The line cards in J-EX8208 switches combine a Packet Forwarding Engine and Ethernet interfaces on a single assembly. Line cards are field-replaceable units (FRUs) that can be installed in the line card slots labeled 0 through 7 on the front of the switch chassis. For slot numbering and line-card details, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

The following line cards are available for J-EX8208 switches:

- 8-port 10-Gigabit Ethernet SFP+ line card: This line card has eight 10-gigabit SFP+ ports on its faceplate in which you can install SFP+ transceivers.
- 40-port 10-Gigabit Ethernet SFP+ line card: This line card has 40 10-gigabit SFP+ ports on its faceplate in which you can install either SFP+ or SFP transceivers.
- 48-port 100/1000 SFP line card: This line card has 48 1-gigabit SFP ports on its faceplate in which you can install SFP transceivers.
- 48-port 10/100/1000 RJ-45 line card: This line card has 48 10/100/1000 Gigabit Ethernet ports with RJ-45 connectors on its faceplate.

## Cooling System

The cooling system in a J-EX8208 switch consists of a hot-removable and hot-insertable fan tray. The fan tray contains 12 fans. The fan tray installs vertically on the left front of the chassis and provides side-to-side chassis cooling. For details, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Power Supplies

Power supplies for the J-EX8208 switch are fully redundant, load-sharing, and hot-removable and hot-insertable field-replaceable units (FRUs). Each J-EX8208 switch chassis can hold up to six 2000 W AC power supplies.

The 2000 W AC power supplies support both low-voltage line (100–120 VAC) and high-voltage line (200–240 VAC) AC power configurations on a J-EX8208 switch. Each 2000 W AC power supply delivers 2000 W of power at high-voltage line (200–240 VAC) or 1200 W at low-voltage line (100–120 VAC) to the J-EX8208 chassis.

Only two AC power supplies are required for the base AC configuration and switch powerup. The redundant AC configuration ships with six AC power supplies to provide the capacity to power the system using N+1 or N+N power redundancy.



**CAUTION:** Mixing different types of power supplies in the same chassis is not supported.

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**Related Documentation**

- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
- For details about switch FRUs and line cards, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

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## J-EX8216 Switch Hardware Overview

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The Dell PowerConnect J-EX Series J-EX8216 Ethernet Switch is a half-rack, midplane architecture, modular Ethernet switch that is designed for ultra high-density environments such as campus aggregation, data center, or high performance core switching environments. J-EX8216 switches provide high-availability and redundancy for all major hardware components, including Routing Engine (RE) modules, Switch Fabric (SF) modules, fan trays (with redundant fans), and load-sharing 2000 W AC and 3000 W AC power supplies. Like other Dell PowerConnect J-EX Series J-EX8200 Ethernet Switches, J-EX8216 switches provide high performance, scalable connectivity, and carrier-class reliability.

You can manage J-EX8216 switches using the same interfaces that you use for managing other devices running the Junos operating system (Junos OS)—the command-line interface (CLI) and the J-Web graphical interface.

- Software on page 38
- Chassis Physical Specifications, LCD Panel, and Midplane on page 38
- Routing Engines and Switch Fabric on page 40
- Line Cards on page 41
- Cooling System on page 41
- Power Supplies on page 42

### Software

The J-EX Series Switches run Junos OS, which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on J-EX Series switches also runs on all Dell PowerConnect J-SRX Series Services Gateways.

### Chassis Physical Specifications, LCD Panel, and Midplane

J-EX8216 switches are designed to optimize rack space and cabling. The J-EX8216 switch is 21 rack units (21 U) in size (1/2 rack); two J-EX8216 switches can fit in a standard 42 U rack. See Figure 4 on page 39 and Figure 5 on page 40. For chassis physical specification

details, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

Figure 4: J-EX8216 Switch Front

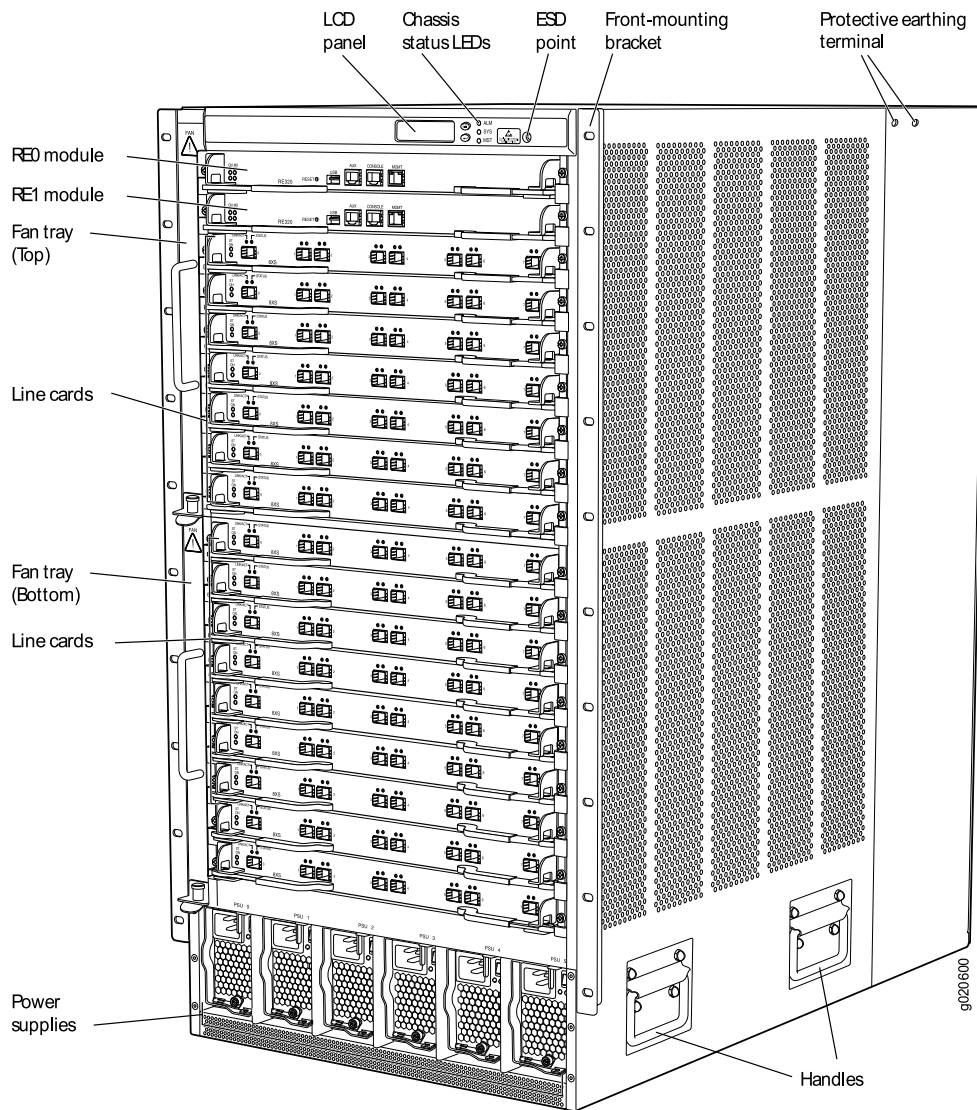
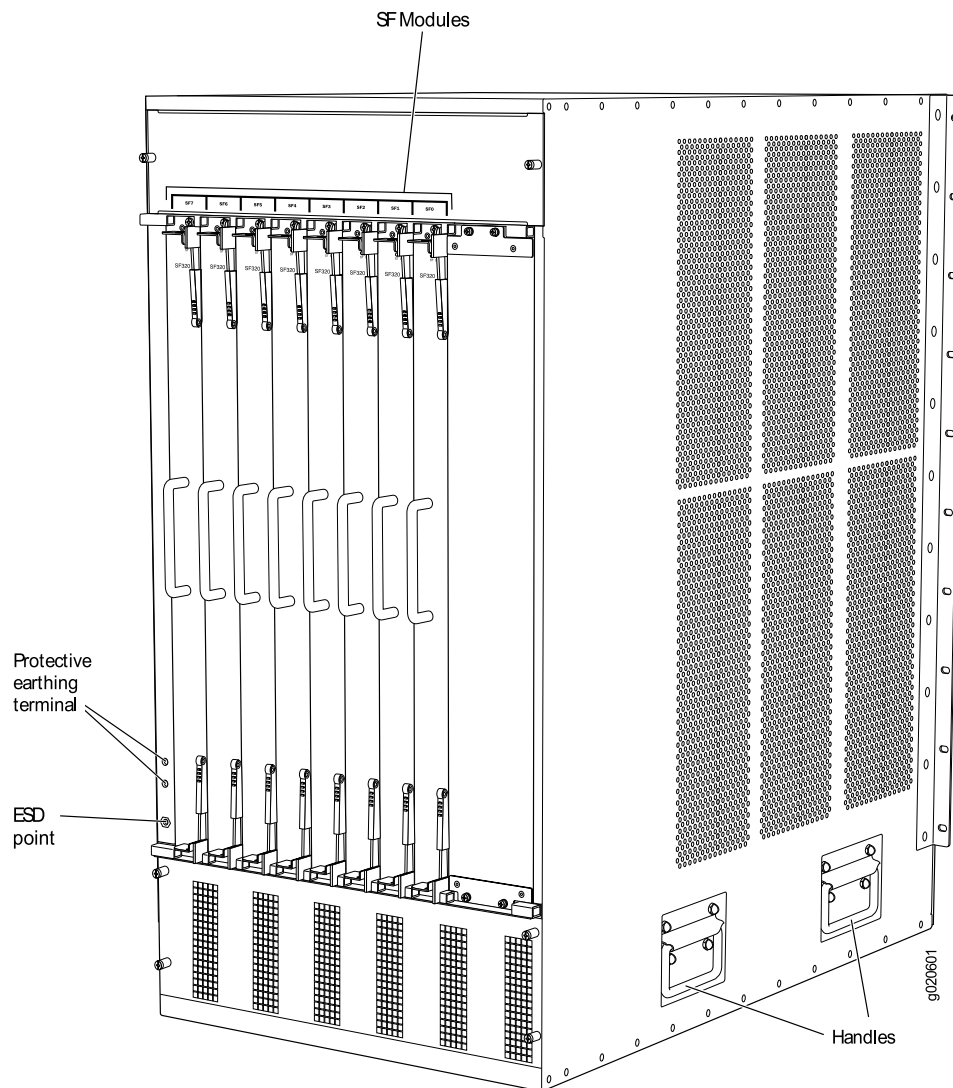


Figure 5: J-EX8216 Switch Rear



The J-EX8216 switch has a chassis-level LCD panel that displays Routing Engine and switch fabric status as well as chassis components' alarm information for rapid problem identification. The LCD panel provides a user-friendly interface for performing initial switch configuration, rolling back a configuration, or restoring the switch to the factory default configuration.

The J-EX8216 chassis midplane distributes the data, control, and management signals to system components and distributes power throughout the system.

For details about the LCD panel and midplane, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Routing Engines and Switch Fabric

System management and system control functions of a J-EX8216 switch are performed by the Routing Engine (RE) module. An RE module contains a Routing Engine. The RE

modules are hot-insertable and hot-removable field-replaceable units (FRUs) that are installed in the front of the chassis in the slots labeled RE0 and RE1. A redundant configuration J-EX8216 switch has a second RE module for redundancy.

The Switch Fabric (SF) modules provide the switching functionality to a J-EX8216 switch. The SF modules are hot-insertable and hot-removable field-replaceable units (FRUs). All eight SF modules are installed in the rear of the chassis in the slots labeled SF7 through SF0. In a J-EX8216 switch, all eight SF modules are active and must be installed in the switch for normal operation. If a single SF module fails, the input/output traffic for that module is load-balanced among the remaining SF modules, providing graceful degradation in midplane performance. The impact of an SF module failure on the performance of a J-EX8216 switch varies based on the type of line cards installed in the switch and the traffic mix flowing through them. In a J-EX8216 switch configuration that is fully loaded with 8-port 10-Gigabit Ethernet SFP+ line cards, if one SF module fails, the remaining seven SF modules still have sufficient switching capacity to maintain continuous switch operation at full wire-rate performance.

For details about the RE and SF modules, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Line Cards

The J-EX8216 switch features 16 horizontal line card slots and supports wire-rate performance for all packet sizes for the installed line cards. The line cards in J-EX8200 switches combine a Packet Forwarding Engine and Ethernet interfaces on a single assembly. They are field-replaceable units (FRUs), and you can install them in the slots labeled 0 through 15 on the front of the switch chassis. All line cards are hot-insertable and hot-removable. For line-card details, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

The following line cards are available for J-EX8216 switches:

- 8-port 10-Gigabit Ethernet SFP+ line card: This line card has eight 10-gigabit SFP+ ports on its faceplate in which you can install SFP+ transceivers.
- 40-port 10-Gigabit Ethernet SFP+ line card: This line card has 40 10-gigabit SFP+ ports on its faceplate in which you can install either SFP+ or SFP transceivers.
- 48-port 100/1000 SFP line card: This line card has 48 1-gigabit SFP ports on its faceplate in which you can install SFP transceivers.
- 48-port 10/100/1000 RJ-45 line card: This line card has 48 10/100/1000 Gigabit Ethernet ports with RJ-45 connectors on its faceplate.

## Cooling System

The cooling system in a J-EX8216 switch consists of two hot-insertable and hot-removable, field-replaceable unit (FRU) fan trays. Each fan tray contains nine fans. Both fan trays install vertically on the left front of the chassis and provide side-to-side chassis cooling and front-to-side cooling. The top and bottom fan trays are identical and interchangeable. However, only the top fan tray cools the SF modules installed in the

rear of the chassis. For details, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Power Supplies

Power supplies for the J-EX8216 switch are fully redundant, load-sharing, and hot-insertable and hot-removable field-replaceable units (FRUs). Each J-EX8216 switch chassis can hold up to six 2000 W AC or six 3000 W AC power supplies.

The 2000 W AC power supplies support both low-voltage line (100–120 VAC) and high-voltage line (200–240 VAC) AC power configurations on a J-EX8216 switch.

Each 3000 W AC power supply delivers 3000 W of power at high-voltage line (200–240 VAC) to the J-EX8216 chassis. Low-voltage line input is not supported for the 3000 W AC power supplies on the J-EX8216 switch.

The redundant AC configuration ships with six AC power supplies to provide the capacity to power the system using N+1 or N+N power redundancy.

For details about the power supplies, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.



**CAUTION:** Mixing different types of power supplies in the same chassis is not a supported configuration.

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### Related Documentation

- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
- For details about switch FRUs, slot numbering, and line cards, see the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## PART 2

# Complete Software Configuration Statement Hierarchy

- Complete Software Configuration Statement Hierarchy on page 45





## CHAPTER 3

# Complete Software Configuration Statement Hierarchy

- [edit access] Configuration Statement Hierarchy on page 45
- [edit chassis] Configuration Statement Hierarchy on page 46
- [edit class-of-service] Configuration Statement Hierarchy on page 47
- [edit ethernet-switching-options] Configuration Statement Hierarchy on page 48
- [edit firewall] Configuration Statement Hierarchy on page 51
- [edit forwarding-options] Configuration Statement Hierarchy on page 51
- [edit interfaces] Configuration Statement Hierarchy on page 52
- [edit poe] Configuration Statement Hierarchy on page 57
- [edit protocols] Configuration Statement Hierarchy on page 57
- [edit routing-instances] Configuration Hierarchy on page 63
- [edit snmp] Configuration Statement Hierarchy on page 64
- [edit virtual-chassis] Configuration Statement Hierarchy on page 64
- [edit vlans] Configuration Statement Hierarchy on page 65

## [edit access] Configuration Statement Hierarchy

---

```
access {
  profile profile-name {
    accounting {
      order [ radius | none ];
      accounting-stop-on-access-deny;
      accounting-stop-on-failure;
    }
    authentication-order [ authentication-method ];
    radius {
      accounting-server [ server-address ];
      authentication-server [ server-address ];
    }
  }
}
```

- Related Documentation**
- For information about connecting a RADIUS server to a switch and configuring 802.1 RADIUS accounting, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [edit chassis] Configuration Statement Hierarchy

---

```
chassis {
  aggregated-devices {
    ethernet {
      device-count number;
    }
  }
  auto-image-upgrade;
  fpc slot {
    pic pic-number {
      sfplusplus {
        pic-modemode;
      }
    }
    power-budget-priority priority;
  }
  lcd-menu fpc slot-number {
    menu-item (menu-name | menu-option);
  }
  nssu {
    upgrade-group group-name {
      fpcs (slot-number | [list-of-slot-numbers]);
      member member-id {
        fpcs (slot-number | [list-of-slot-numbers]);
      }
    }
  }
  psu {
    redundancy {
      n-plus-n;
    }
  }
  redundancy {
    graceful-switchover;
  }
}
```

- Related Documentation**
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
  - Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94
  - Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
  - Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856
  - Configuring Power Supply Redundancy (CLI Procedure) on page 952
  - Configuring the Power Priority of Line Cards (CLI Procedure) on page 953

- Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951

## [edit class-of-service] Configuration Statement Hierarchy

```

class-of-service {
  classifiers {
    (dscp | ieee-802.1 | inet-precedence) classifier-name {
      import (classifier-name | default);
      forwarding-class class-name {
        loss-priority loss-priority {
          code-points [ aliases ] [ 6 bit-patterns ];
        }
      }
    }
  }
  code-point-aliases {
    (dscp | ieee-802.1 | inet-precedence) {
      alias-name bits;
    }
  }
  congestion-notification-profile profile-name {
    input {
      ieee-802.1 {
        code-point up-bits pfc;
      }
    }
  }
  forwarding-classes {
    class class-name queue-num queue-number priority ( high | low );
  }
  interfaces {
    interface-name {
      congestion-notification-profile profile-name {
        input {
          ieee-802.1 {
            code-point up-bits pfc;
          }
        }
      }
    }
    scheduler-map map-name;
    unit logical-unit-number {
      forwarding-class class-name;
      classifiers {
        (dscp | ieee-802.1 | inet-precedence) (classifier-name | default);
      }
    }
  }
  multi-destination {
    family {
      ethernet {
        broadcast forwarding-class-name;
      }
    }
  }
}

```

```

inet {
  classifiers {
    (dscp | inet-precedence) classifier-name;
  }
}
scheduler-map map-name;
}
rewrite-rules {
  (dscp | ieee-802.1 | inet-precedence) rewrite-name {
    import (rewrite-name | default);
    forwarding-class class-name {
      loss-priority loss-priority code-point (alias | bits);
    }
  }
}
scheduler-maps {
  map-name {
    forwarding-class class-name scheduler scheduler-name;
  }
}
schedulers {
  scheduler-name {
    buffer-size (percent percentage | remainder);
    drop-profile-map loss-priority loss-priority protocol protocol drop-profile profile-name;
    priority priority;
    shaping-rate (rate | percent percentage);
    transmit-rate (rate | percent percentage | remainder);
  }
}
}

```

- Related Documentation**
- For CoS configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [\[edit ethernet-switching-options\]](#) Configuration Statement Hierarchy

```

ethernet-switching-options {
  analyzer {
    name {
      loss-priority priority;
      ratio number;
    }
    input {
      ingress {
        interface (all | interface-name);
        vlan (vlan-id | vlan-name);
      }
      egress {
        interface (all | interface-name);
      }
    }
    output {
      interface interface-name;
    }
  }
}

```



```

dhcp-option82 {
  circuit-id {
    prefix hostname;
    use-interface-description;
    use-vlan-id;
  }
  remote-id {
    prefix hostname | mac | none;
    use-interface-description;
    use-string string;
  }
  vendor-id [string];
}
(examine-dhcp | no-examine-dhcp );
examine-fip {
  fc-map fc-map-value;
}
(ip-source-guard | no-ip-source-guard);
mac-move-limit limit action action;
}
}
storm-control {
  action-shutdown;
  interface (all | interface-name) {
    bandwidth bandwidth;
    no-broadcast;
    no-multicast;
    no-registered-multicast;
    no-unknown-unicast;
    no-unregistered-multicast;
  }
}
traceoptions {
  file filename <files number> <no-stamp> <replace> <size size> <world-readable |
no-world-readable>;
  flag flag <disable>;
}
unknown-unicast-forwarding {
  vlan (all | vlan-name) {
    interface interface-name;
  }
}
}
voip {
  interface (all | [interface-name | access-ports]) {
    vlan vlan-name ;
    forwarding-class (assured-forwarding | best-effort | expedited-forwarding |
network-control);
  }
}
}
}

```

**Related Documentation**

- For configuration examples, instructions, and concepts for port mirroring, port security, BPDU protection for spanning-tree protocols, redundant trunk links, storm control, 802.1X and VoIP, Q-in-Q tunneling, unicast forwarding, MAC notification, and FIP

snooping, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

- DHCP Services for J-EX Series Switches Overview on page 457

## [edit firewall] Configuration Statement Hierarchy

```

firewall {
  family family-name {
    filter filter-name {
      interface-specific;
      term term-name {
        from {
          match-conditions;
        }
        then {
          action;
          action-modifiers;
        }
      }
    }
  }
  policer policer-name {
    filter-specific;
    if-exceeding {
      bandwidth-limit bps;
      burst-size-limit bytes;
    }
    then {
      policer-action;
    }
  }
}

```

- Related Documentation**
- For firewall filters (packet filtering) configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [edit forwarding-options] Configuration Statement Hierarchy

```

helpers {
  bootp {
    dhcp-option82 {
      circuit-id {
        prefix hostname;
        use-interface-description;
        use-vlan-id;
      }
      remote-id {
        prefix hostname | mac | none;
        use-interface-description;
        use-string string;
      }
    }
  }
}

```

```
    }
    vendor-id <string>;
  }
  interface interface-name {
    dhcp-option82 {
      circuit-id {
        prefix hostname;
        use-interface-description;
        use-vlan-id;
      }
      remote-id {
        prefix hostname | mac | none;
        use-interface-description;
        use-string string;
      }
      vendor-id <string>;
    }
    source-address-giaddr;
  }
  source-address-giaddr;
}
```

**Related Documentation**

- DHCP Services for J-EX Series Switches Overview on page 457
- For DHCP and port security configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.
- For more information about the **[edit forwarding-options]** hierarchy and its options, see the *Junos OS Policy Framework Configuration Guide*.

## **[edit interfaces] Configuration Statement Hierarchy**

---

```
interfaces {
  aex {
    accounting-profile name;
    aggregated-ether-options {
      (flow-control | no-flow-control);
      lacp {
        (active | passive);
        admin-key key;
        periodic interval;
        system-id mac-address;
      }
      (link-protection | no-link-protection);
      link-speed speed;
      (loopback | no-loopback);
      minimum-links number;
    }
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
  }
}
```



```

    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}
ge-fpc/pic/port {
    accounting-profile name;
    description text;
    disable;
    ether-options {
        802.3ad {
            aex;
            (backup | primary);
            lacp {
                force-up;
            }
        }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
    speed (auto-negotiation | speed);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
    flag flag;
}
(traps | no-traps);
unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
}
vlan-tagging;
}
interface-range name {
    accounting-profile name;
    description text;

```

```
disable;
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lACP {
      force-up;
    }
  }
  (auto-negotiation | no-auto-negotiation);
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
  speed (auto-negotiation | speed);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
member interface-name;
member-range starting-interface name to ending-interface name;
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...}
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
vlan-tagging;
}
lo0 {
  accounting-profile name;
  description text;
  disable;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    (traps | no-traps);
  }
}
me0 {
  accounting-profile name;
  description text;
```

```

disable;
(gratuitous-arp-reply | no-gratuitous-arp-reply);
no-gratuitous-arp-request;
traceoptions {
    flag flag;
}
(traps | no-traps);
unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    (traps | no-traps);
    vlan-id vlan-id-number;
}
vlan-tagging;
}
vlan {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
    }
}
traceoptions {
    file <filename> <files number> <match regular-expression> <size size>
        <world-readable | no-world-readable>;
    flag flag <disable>;
    no-remote-trace;
}
vme {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
}

```

```

    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}
xe-fpc/pic/port {
    accounting-profile name;
    description text;
    disable;
    ether-options {
        802.3ad {
            aex;
            (backup | primary);
            lacp {
                force-up;
            }
        }
        (flow-control | no-flow-control);
        link-mode mode;
        (loopback | no-loopback);
    }
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}
}

```

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Aggregated Ethernet Interfaces \(CLI Procedure\) on page 1081](#)
- [Configuring a Layer 3 Subinterface \(CLI Procedure\) on page 1089](#)
- [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#)

- Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852
- J-EX Series Switches Interfaces Overview on page 999
- *Junos OS Network Interfaces Configuration Guide*

## [edit poe] Configuration Statement Hierarchy

```

poe {
  guard-band watts;
  interface (all | interface-name) {
    disable;
    maximum-power watts;
    priority (high | low);
    telemetries {
      disable;
      duration hours;
      interval minutes;
    }
  }
  management (class | static);
  notification-control {
    fpc slot-number {
      disable;
    }
  }
}

```

### Related Documentation

- For Power over Ethernet (PoE) configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [edit protocols] Configuration Statement Hierarchy

```

protocols {
  connections {
    remote-interface-switch connection-name {
      interface interface-name.unit-number;
      transmit-lsp label-switched-path;
      receive-lsp label-switched-path;
    }
  }
  dot1x {
    authenticator {
      authentication-profile-name profile-name;
      interface (all | [ interface-names ]) {
        disable;
        guest-vlan ( vlan-id | vlan-name );
        mac-radius <restrict>;
        maximum-requests number;
        no-reauthentication;
        quiet-period seconds;
      }
    }
  }
}

```

```
    reauthentication {
        interval seconds;
    }
    retries number;
    server-fail (deny | permit | use-cache | vlan-id | vlan-name);
    server-reject-vlan (vlan-id | vlan-name);
    server-timeout seconds;
    supplicant (multiple | single | single-secure);
    supplicant-timeout seconds;
    transmit-period seconds;
}
static mac-address {
    interface interface-name;
    vlan-assignment (vlan-id | vlan-name);
}
}
igmp-snooping {
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable>
        <match regex>;
        flag flag (detail | disable | receive | send);
    }
    vlan (vlan-id | vlan-number) {
        data-forwarding {
            source {
                groups group-prefix;
            }
            receiver {
                source-vlans vlan-list;
                install ;
            }
        }
        disable {
            interface interface-name
        }
        immediate-leave;
        interface interface-name {
            group-limit limit;
            multicast-router-interface;
            static (IGMP Snooping) {
                group ip-address;
            }
        }
        proxy ;
        query-interval seconds;
        query-last-member-interval seconds;
        query-response-interval seconds;
        robust-count number;
    }
}
lldp {
    disable;
    advertisement-interval seconds;
    hold-multiplier number;
    interface (all | interface-name) {
        disable;
```

```

}
lldp-configuration-notification-interval seconds;
management-address ip-management-address;
netbios-snooping;
ptopo-configuration-maximum-hold-time seconds;
ptopo-configuration-trap-interval seconds;
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable>
    <no-stamp> <replace>;
    flag flag <disable>;
}
transmit-delay seconds;
}
lldp-med {
    disable;
    fast-start number;
    interface (all | interface-name) {
        disable;
        location {
            elin number;
            civic-based {
                what number;
                country-code code;
                ca-type {
                    number {
                        ca-value value;
                    }
                }
            }
        }
    }
}
}
}
mpls {
    interface ( all | interface-name );
    label-switched-path lsp-name to remote-provider-edge-switch;
    path destination {
        <address | hostname> <strict | loose>
    }
}
mstp {
    disable;
    bpdu-block-on-edge;
    bridge-priority priority;
    configuration-name name;
    forward-delay seconds;
    hello-time seconds;
    interface (all | interface-name) {
        disable;
        bpdu-timeout-action {
            block;
            log;
        }
        cost cost;
        edge;
        mode mode;
        no-root-port;
        priority priority;
    }
}

```

```

}
max-age seconds;
max-hops hops;
msti msti-id {
  vlan (vlan-id | vlan-name);
  interface interface-name {
    disable;
    cost cost;
    edge;
    mode mode;
    priority priority;
  }
}
revision-level revision-level;
traceoptions {
  file filename <files number > <size size > <no-stamp | world-readable |
  no-world-readable>;
  flag flag;
}
}
mvrp {
  disable
  interface (all | interface-name) {
    disable;
    join-timer milliseconds;
    leave-timer milliseconds;
    leaveall-timer milliseconds;
    registration (forbidden | normal);
  }
  no-dynamic-vlan;
  traceoptions {
    file filename <files number > <size size > <no-stamp | world-readable |
    no-world-readable>;
    flag flag;
  }
}
oam {
  ethernet{
    connectivity-fault-management {
      action-profile profile-name {
        default-actions {
          interface-down;
        }
      }
    }
    linktrace {
      age (30m | 10m | 1m | 30s | 10s);
      path-database-size path-database-size;
    }
    maintenance-domain domain-name {
      level number;
      mip-half-function (none | default | explicit);
      name-format (character-string | none | dns | mac+2oct);
      maintenance-association ma-name {
        continuity-check {
          hold-interval minutes;
          interval (10m | 10s | 1m | 1s | 100ms);
        }
      }
    }
  }
}

```



```

        loss-threshold number;
    }
    mep mep-id {
        auto-discovery;
        direction down;
        interface interface-name;
        remote-mep mep-id {
            action-profile profile-name;
        }
    }
}
}
}
link-fault-management {
    action-profile profile-name;
    action {
        syslog;
        link-down;
    }
    event {
        link-adjacency-loss;
        link-event-rate;
        frame-error count;
        frame-period count;
        frame-period-summary count;
        symbol-period count;
    }
    interface interface-name {
        link-discovery (active | passive);
        pdu-interval interval;
        event-thresholds threshold-value;
        remote-loopback;
        event-thresholds {
            frame-error count;
            frame-period count;
            frame-period-summary count;
            symbol-period count;
        }
    }
    negotiation-options {
        allow-remote-loopback;
        no-allow-link-events;
    }
}
}
}
rstp {
    disable;
    bpdu-block-on-edge;
    bridge-priority priority;
    forward-delay seconds;
    hello-time seconds;
    interface (all | interface-name) {
        disable;
        bpdu-timeout-action {
            block;
        }
    }
}
}
}

```

```
        log;
    }
    cost cost;
    edge;
    mode mode;
    no-root-port;
    priority priority;
}
max-age seconds;
}
traceoptions {
    file filename <files number > <size size > <no-stamp | world-readable |
        no-world-readable>;
    flag flag;
}
}
sflow {
    agent-id;
    collector {
        ip-address;
        udp-port port-number;
    }
    disable;
    interfaces interface-name {
        disable;
        polling-interval seconds;
        sample-rate {
            egress number;
            ingress number;
        }
    }
    polling-interval seconds;
    sample-rate {
        egress number;
        ingress number;
    }
    source-ip;
}
stp {
    disable;
    bridge-priority priority;
    forward-delay seconds;
    hello-time seconds;
    interface (all | interface-name) {
        disable;
        bpdu-timeout-action {
            block;
            log;
        }
        cost cost;
        edge;
        mode mode;
        no-root-port;
        priority priority;
    }
    max-age seconds;
```

```

}
  traceoptions {
    file filename <files number > <size size> <no-stamp | world-readable |
      no-world-readable>;
    flag flag;
  }
  uplink-failure-detection {
    group group-name {
      link-to-monitor interface-name;
      link-to-disable interface-name;
    }
  }
  vstp {
    bpdu-block-on-edge;
    disable;
    force-version stp;
    vlan (all | vlan-id | vlan-name) {
      bridge-priority priority;
      forward-delay seconds;
      hello-time seconds;
      interface (all | interface-name) {
        bpdu-timeout-action {
          log;
          block;
        }
        cost cost;
        disable;
        edge;
        mode mode;
        no-root-port;
        priority priority;
      }
      max-age seconds;
      traceoptions {
        file filename <files number > <size size> <no-stamp | world-readable |
          no-world-readable>;
        flag flag;
      }
    }
  }
}

```

- Related Documentation**
- For protocol configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [edit routing-instances] Configuration Hierarchy

```

routing-instances routing-instance-name {
  instance-type virtual-router
  interface interface-name
}

```

- Related Documentation**
- For routing configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

## [\[edit snmp\]](#) Configuration Statement Hierarchy

---

```
snmp {
  rmon {
    history index {
      bucket-size number;
      interface interface-name;
      interval seconds;
      owner owner-name;
    }
  }
}
```

- Related Documentation**
- For SNMP configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.
  - *Junos OS Network Management Configuration Guide*

## [\[edit virtual-chassis\]](#) Configuration Statement Hierarchy

---

```
virtual-chassis {
  auto-sw-update {
    package-name package-name;
  }
  fast-failover (ge | vcp disable | xe);
  id id;
  mac-persistence-timer seconds;
  member member-id {
    location location
    mastership-priority number;
    no-management-vlan;
    serial-number;
    role;
  }
  no-split-detection;
  preprovisioned;
  traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable> <match regex>;
    flag flag ;
  }
}
```

- Related Documentation**
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736

- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709

## [edit vlans] Configuration Statement Hierarchy

```

vlans {
  vlan-name {
    description text-description;
    dot1q-tunneling {
      customer-vlans (id | native | range);
      layer2-protocol-tunneling all | protocol-name {
        drop-threshold number;
        shutdown-threshold number;
      }
    }
    filter input filter-name;
    filter output filter-name;
    interface interface-name {
      mapping (native (push | swap) | policy | tag (push | swap));
      pvlan-trunk;
    }
    isolation-id id-number;
    l3-interface vlan.logical-interface-number;
    mac-limit number;
    mac-table-aging-time seconds;
    no-local-switching;
    no-mac-learning;
    primary-vlan vlan-name;
    vlan-id number;
    vlan-range vlan-id-low-vlan-id-high;
  }
}

```

### Related Documentation

- For VLAN configuration examples, instructions, and concepts, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.



## PART 3

# Software Installation

- Software Installation Overview on page 69
- Installing Junos OS on page 79
- Booting the Switch, Upgrading Software, and Managing Licenses on page 91
- Verifying Software Installation on page 99
- Troubleshooting Software Installation on page 107
- Configuration Statements for Software Installation on page 117
- Operational Commands for Software Installation on page 119





## CHAPTER 4

# Software Installation Overview

- Installation Overview on page 69
- Licenses Overview on page 75

## Installation Overview

---

- Understanding Software Installation on J-EX Series Switches on page 69
- Junos OS Package Names on page 72
- Understanding System Snapshot on J-EX Series Switches on page 72
- Understanding Resilient Dual-Root Partitions on Switches on page 74

## Understanding Software Installation on J-EX Series Switches

A J-EX Series Switch is delivered with the Junos operating system (Junos OS) preinstalled. As new features and software fixes become available, you must upgrade your software to use them. You can also downgrade Junos OS to a previous release.

This topic covers:

- Overview of the Software Installation Process on page 69
- Software Package Security on page 70
- Installing Software on a Virtual Chassis on page 70
- Installing Software on J-EX8200 Switches with Redundant Routing Engines on page 71
- Installing Software Using Automatic Software Download on page 71
- Troubleshooting Software Installation on page 71

## Overview of the Software Installation Process

---

A J-EX Series switch is delivered with Junos OS preinstalled. When you connect power to the switch, it starts (boots) up from the installed software.

You upgrade Junos OS on a J-EX Series switch by copying a software package to your switch or another system on your local network, then use either the J-Web interface or the CLI to install the new software package on the switch. Finally, you reboot the switch; it boots from the upgraded software. After a successful upgrade, you should back up the new current configuration to a secondary device.

**NOTE:**

To access the J-Web interface, your management device must have the following software installed:

- Operating system: Microsoft Windows XP Service Pack 3
- Browser version: One of the following. Other browsers might work but are not supported by J-Series platforms.
  - Microsoft Internet Explorer version 7.0
  - Mozilla Firefox version 3.0
- Additional requirements:
  - Only English-language browsers are supported.
  - The browser and the network must be able to receive and process HTTP/1.1 gzip compressed data.

---

During a successful upgrade, the upgrade package removes all files from `/var/tmp` and completely reinstalls the existing software. It retains configuration files, and similar information, such as secure shell and host keys, from the previous version. If the software installation fails for any reason, such as loss of power during the installation process, the system returns to the originally active installation when you reboot. At the completion of a successful software upgrade, we recommend that you use the **request system snapshot** command to copy the contents of the primary root partition to the alternate root partition.

### Software Package Security

---

All Junos OS releases are delivered in signed packages that contain digital signatures to ensure official Juniper Networks software. For more information about signed software packages, see the *Junos OS Installation and Upgrade Guide*.

### Installing Software on a Virtual Chassis

---

You can connect individual J-EX Series switches together to form one unit and manage the unit as a single device, called a Virtual Chassis. The Virtual Chassis operates as a single network entity composed of members. Each member of a Virtual Chassis runs a Junos OS package. Supported Virtual Chassis include J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, and mixed J-EX4200 and J-EX4500 Virtual Chassis.

For ease of management, a Virtual Chassis provides flexible methods to upgrade software releases. You can deploy a new software release to all members of a Virtual Chassis or to only a particular member.

### Installing Software on J-EX8200 Switches with Redundant Routing Engines

You can install software on a J-EX8200 switch with redundant Routing Engines in one of two ways:

- Perform a nonstop software upgrade (NSSU)—An NSSU upgrades both Routing Engines with a single command and with a minimum of network disruption. An NSSU takes advantage of graceful Routing Engine switchover (GRES) and nonstop active routing (NSR) to ensure no disruption to the control plane. You can minimize disruption to network traffic by defining link aggregation groups (LAGs) such that the member links of each LAG reside on different line cards. The line cards are upgraded one at a time, so that traffic continues to flow through the other line cards while a line card is being upgraded.

You cannot use NSSU to downgrade the software running on a switch.

For more information about NSSU, see “Understanding Nonstop Software Upgrade on J-EX Series Switches” on page 932.

- Upgrade each Routing Engine manually—You can perform a Junos OS installation on each Routing Engine separately, starting with the backup Routing Engine. You can use this procedure to downgrade the software running on a switch. See “Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)” on page 81.

### Installing Software Using Automatic Software Download

The automatic software download feature uses the DHCP message exchange process to download and install software packages. Users can define a path to a software package on the DHCP server, and then the DHCP server communicates this path to J-EX Series switches acting as DHCP clients as part of the DHCP message exchange process. The DHCP clients that have been configured for automatic software download receive these messages and, when the software package name in the DHCP server message is different from that of the software package that booted the DHCP client switch, download and install the software package. See “Upgrading Software Using Automatic Software Download on J-EX Series Switches” on page 94.

### Troubleshooting Software Installation

If the Junos OS loads but the CLI is not working for any reason, or if the switch has no software installed, you can use the recovery installation procedure to install the software on the switch. See “Troubleshooting Software Installation” on page 107.



**NOTE:** You can also use this procedure to load two versions of Junos OS in separate partitions on the switch.

#### Related Documentation

- Downloading Software Packages from Juniper Networks on page 79
- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80

- Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure) on page 81
- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932
- Understanding Resilient Dual-Root Partitions on Switches on page 74

## Junos OS Package Names

You upgrade Junos OS on a J-EX Series Switch by copying a software package to your switch or another system on your local network, then install the new software package on the switch.

A software package name is in the following format:

***package-name-m.nZx.y-domestic-signed.tgz***

where:

- ***package-name*** is the name of the package—for example, ***jinstall-ex-4200***.
- ***m.n*** is the software release, with ***m*** representing the major release number and ***n*** representing the minor release number—for example, ***10.2***.
- ***Z*** indicates the type of software release, where ***R*** indicates released software and ***B*** indicates beta-level software.
- ***x.y*** represents the version of the major software release (***x***) and an internal tracking number (***y***)—for example, ***1.6***.
- ***domestic-signed*** is appended to all J-EX Series package names. For most Junos OS packages, ***domestic*** is used for the United States and Canada and ***export*** for worldwide distribution. However, for J-EX Series software, ***domestic*** is used for worldwide distribution as well.

A sample J-EX Series software package name is:

***jinstall-ex-4200-10.2R1.6-domestic-signed.tgz***

### Related Documentation

- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure) on page 81
- Downloading Software Packages from Juniper Networks on page 79
- Understanding Software Installation on J-EX Series Switches on page 69

## Understanding System Snapshot on J-EX Series Switches

You can create copies of the software running a J-EX Series Switch using the system snapshot feature. The system snapshot feature takes a “snapshot” of the files currently used to run the switch—the complete contents of the ***/config*** and ***/var*** directories, which

include the running Junos OS, the active configuration, and the rescue configuration—and copies all these files into an alternate (internal, meaning internal flash, or an external, meaning USB flash) memory source. You can then use this snapshot to boot the switch at the next bootup or as a backup boot option.

You can only use snapshots to move files to external memory if the switch was booted from internal memory, or to move files to internal memory if the switch was booted from external memory. You cannot create a snapshot in the memory source that booted the switch even if the snapshot is being created on a different partition in the same memory source.

Snapshots are particularly useful for moving files onto USB flash drives. You cannot use the **copy** command or any other file-moving technique to move files from an internal memory source to USB memory on the switch.

System snapshots on J-EX Series switches have the following limitations:

- You cannot use snapshots to move files to any destination outside of the switch other than an installed external USB flash drive or to move files between switches that are members of the same Virtual Chassis.
- Snapshot commands, like other Virtual Chassis commands, are always executed on a local switch. In cases where a different member switches of the same Virtual Chassis requests the snapshot, the snapshot command is pushed to the Virtual Chassis member creating the snapshot and then executed. The output is then returned to the switch that initiated the process. For instance, if the command to create an external snapshot on Virtual Chassis member 3 is entered from Virtual Chassis member 1, the snapshot of internal memory on Virtual Chassis member 3 is taken on external memory on Virtual Chassis member 3. The output of the process is seen from Virtual Chassis member 1. No files move between the switches.

**Related  
Documentation**

- Understanding Software Installation on J-EX Series Switches on page 69
- Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92

## Understanding Resilient Dual-Root Partitions on Switches

Resilient dual-root partitioning, introduced on J-EX Series Ethernet Switches in Junos operating system (Junos OS) Release 10.4R3, provides additional resiliency to switches in the following ways:

- Allows the switch to boot transparently from the second root partition if the system fails to boot from the primary root partition.
- Provides separation of the root Junos OS file system from the `/var` file system. If corruption occurs in the `/var` file system (a higher probability than in the root file system due to the greater frequency in `/var` of reads and writes), the root file system is insulated from the corruption.

This topic covers:

- Resilient Dual-Root Partition Scheme (Junos OS Release 10.4R3 and Later) on page 74
- Earlier Partition Scheme (Junos OS Release 10.4R2 and Earlier) on page 74
- Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases on page 75

### Resilient Dual-Root Partition Scheme (Junos OS Release 10.4R3 and Later)

J-EX Series switches that ship with Junos OS Release 10.4R3 or later are configured with a root partition scheme that is optimized for resiliency, as shown in Table 26 on page 74.

**Table 26: Resilient Dual-Root Partition Scheme**

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
/	/	/var	/var/tmp	/config
(root Junos OS )	(root Junos OS )			

In the resilient dual-root partition scheme, the `/var` file system is contained in a separate slice from the root file systems, the `/config` directory is contained in its own slice, and switches ship from the factory with identical Junos OS images in slice 1 and slice 2. The `/var` file system, which has a greater frequency of reads and writes than the root file systems and is therefore more likely to have corruption issues, is isolated from the root directories and the `/config` directory. If the switch fails to boot, the system automatically boots from the alternate root partition. (If the switch fails to boot from the active root partition and instead boots from the alternate root partition, an alarm is triggered.)

### Earlier Partition Scheme (Junos OS Release 10.4R2 and Earlier)

The earlier partition scheme is shown in Table 27 on page 75.

Table 27: Earlier Partition Scheme

Slice 1		Slice 2		Slice 3	
s1a	s1f	s2a	s2f	s3d	s3e
/	/var	(empty until initial software upgrade)	(empty until initial software upgrade)	/var/tmp	/config
(root Junos OS)					

This is the partitioning scheme for a switch shipped with Release 10.4R2 or earlier (or after you reformat the disk during a downgrade from Release 10.4R3 or later to Release 10.4R2 or earlier). In this partitioning scheme, the switch comes from the factory with only one Junos OS image installed in the root Junos OS partition of slice 1. The first time that you perform a software upgrade, the new Junos OS image is installed in slice 2. If the switch fails to boot, you must manually trigger it to boot from the alternate partition (rebooting from the alternate partition does not occur automatically).

### Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases

Upgrading from Release 10.4R2 or earlier to Release 10.4R3 or later differs from other upgrades in two important ways:

- You must install a new loader software package in addition to installing the new Junos OS image.
- Rebooting after the upgrade reformats the disk from three partitions to four partitions.

You can perform all operations for this special software upgrade from the CLI.



**CAUTION:** Back up any important log files because the /var/log files are not saved or restored during an upgrade from a nonresilient dual-root partitions release to a release that supports resilient dual-root partitions.

We recommend that you also save your /config files and any important log files to an external medium because if there is a power interruption during the upgrade process, they could be lost.

#### Related Documentation

- Resilient Dual-Root Partitions Frequently Asked Questions on page 111
- Upgrading EX Series Switches to Support Resilient Dual-Root Partitions

### Licenses Overview

- Understanding Software Licenses for J-EX Series Switches on page 76
- License Key Components for the J-EX Series Switch on page 77

## Understanding Software Licenses for J-EX Series Switches

To enable and use some Junos OS features, you must purchase, install, and manage separate software licenses. If the switch has the appropriate software license, you can configure and use these features.



**NOTE:** The advanced feature license (AFL) software license is not currently available for J-EX4500 switches.

The Junos OS feature license (the purchased authorization code) is universal. However, to conform to Junos OS feature licensing requirements, you must install a unique license key (a combination of the authorization code and the switch's serial number) on each switch.

For a Virtual Chassis deployment, two license keys are recommended for redundancy: one for the master switch and the other for the backup switch. You do not need additional license keys for the other member switches that you include within a Virtual Chassis.

This topic describes:

- Features Requiring a License on page 76
- License Warning Messages on page 76

### Features Requiring a License

---

The following Junos OS features require an Advanced Feature License (AFL):

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- Intermediate System-to-Intermediate System (IS-IS)
- IPv6 protocols: OSPFv3, RIPng, IS-IS for IPv6, IPv6 BGP
- MPLS with RSVP-based label-switched paths (LSPs) and MPLS-based circuit cross-connects (CCCs)

You can purchase a license for your J-EX Series switch model. The license allows you to run all the advanced software features on your switch.

For information about how to purchase a software license, contact Dell.



**NOTE:** The AFL software license is not currently available for J-EX4500 switches.

### License Warning Messages

---

For using features that require a license, you must install and configure a license key. To obtain a license key, use the contact information provided in your certificate.

If you have not purchased the AFL and installed the license key, you receive warnings when you try to commit the configuration:



```
[edit protocols]
user@switch# bgp
warning: requires 'bgp' license

error: commit failed: (statements constraint check failed)
```

The system generates system log (**syslog**) alarm messages notifying you that the feature requires a license—for example:

```
Sep 3 05:59:11 craftd[806]: Minor alarm set, BGP Routing Protocol usage
requires a license
Sep 3 05:59:11 alarmd[805]: Alarm set: License color=YELLOW, class=CHASSIS,
reason=BGP Routing Protocol usage requires a license
Sep 3 05:59:11 alarmd[805]: LICENSE_EXPIRED: License for feature bgp(47) expired
```

Output of the **show system alarms** command displays the active alarms:

```
user@switch> show system alarms
1 alarm currently active
Alarm time          Class  Description
2009-09-03 06:00:11 UTC  Minor  BGP Routing Protocol usage requires a license
```

#### Related Documentation

- Managing Licenses for the J-EX Series Switch (CLI Procedure) on page 95
- Managing Licenses for the J-EX Series Switch (J-Web Procedure) on page 96
- Monitoring Licenses for the J-EX Series Switch on page 104
- License Key Components for the J-EX Series Switch on page 77
- J-EX Series Switch Software Features Overview on page 3

## License Key Components for the J-EX Series Switch

When you purchase a license for a Junos OS feature that requires a separate license, you receive a license key.

A license key consists of two parts:

- License ID—Alphanumeric string that uniquely identifies the license key. When a license is generated, it is given a license ID.
- License data—Block of binary data that defines and stores all license key objects.

For example, in the following typical license key, the string **Junos204558** is the license ID, and the trailing block of data is the license data:

```
Junos204558 aeaqea qmijhd amrqha ztfmbu gqzama uqceds
ra32zr lsevik ftvjed o4jy5u fynzzj mgviyl
kgioyf ardb5g sj7wnt rsfked wbjf5a sg
```

The license data defines the device ID for which the license is valid and the version of the license.

#### Related Documentation

- Managing Licenses for the J-EX Series Switch (CLI Procedure) on page 95
- Managing Licenses for the J-EX Series Switch (J-Web Procedure) on page 96
- Software Licenses for the J-EX Series Switch Overview on page 76



## CHAPTER 5

# Installing Junos OS

- Downloading Software Packages on page 79
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure) on page 81
- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Rebooting or Halting the J-EX Series Switch (J-Web Procedure) on page 88

## Downloading Software Packages

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To upgrade Junos OS on your Dell PowerConnect J-EX Series switch, you can download software packages from the Dell PowerConnect J-Series—Juniper Networks partner website.

Before you can begin to download software upgrades, ensure that you have registered your J-EX Series switch and obtained an account. To register for an account:

1. Locate the chassis serial number (*not* the Dell Service Tag) on your J-EX Series switch.
2. Go to <http://www.juniper.net/partners/dell/> and click **Register for an Account**.
3. Fill out the registration information required.

When your user registration is approved, you receive login information and credentials at the e-mail address you used for registration. If your registration is delayed or additional information is required, you receive a message with further instructions.

4. Save the login information and credentials you receive to use for software download.

To download software upgrades from the Dell PowerConnect J-Series—Juniper Networks partner website:

1. Go to <http://www.juniper.net/partners/dell/>.
2. Select **J-EX**.
3. Select the appropriate software package for your application. See “Junos OS Package Names” on page 72.
4. Download the software to a local host or to an internal software distribution site.

If you have questions, contact Dell Customer Support at <http://www.support.dell.com>.

#### Related Documentation

- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Understanding Software Installation on J-EX Series Switches on page 69

## Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure)

You can use this procedure to upgrade Junos OS on a J-EX Series switch with a single Routing Engine, including an individual member of a J-EX4200 Virtual Chassis or all members of a J-EX4200 Virtual Chassis, or a J-EX8200 switch using a single Routing Engine. To upgrade software on a J-EX8200 switch running two Routing Engines, see “Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)” on page 81.



**NOTE:** Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later requires that you also upgrade the loader software. See the release notes for instructions on how to upgrade from Release 10.4R2 or earlier to Release 10.4R3 or later.

To install software upgrades on a switch with a single Routing Engine:

1. Download the software package as described in “Downloading Software Packages” on page 79.
2. (Optional) Back up the current software configuration to a second storage option. See the *Junos OS Installation and Upgrade Guide* for instructions on performing this task.
3. (Optional) Copy the software package to the switch. We recommend that you use FTP to copy the file to the `/var/tmp` directory.

This step is optional because Junos OS can also be upgraded when the software image is stored at a remote location. These instructions describe the software upgrade process for both scenarios.

4. Install the new package on the switch:

```
user@switch> request system software addpackage
```

Replace **package** with one of the following paths:

- For a software package in a local directory on the switch—`/var/tmp/package.tgz`.
- For a software package on a remote server:
  - `ftp://hostname/pathname/package.tgz`
  - `http://hostname/pathname/package.tgz`

where *package.tgz* is, for example, `jinstall-ex-4200-10.2R1.8-domestic-signed.tgz`.

Include the optional **member** option to install the software package on only one member of a Virtual Chassis:

```
user@switch> request system software add source member member-id reboot
```

Other members of the Virtual Chassis are not affected. To install the software on all members of the Virtual Chassis, do not include the **member** option.



**NOTE:** To abort the installation, do not reboot your device; instead, finish the installation and then issue the `request system software delete package.tgz` command, where *package.tgz* is, for example, `jinstall-ex-4200-10.2R1.8-domestic-signed.tgz`. This is your last chance to stop the installation.

5. Reboot to start the new software:

```
user@switch> request system reboot
```

6. After the reboot has completed, log in and verify that the new version of the software is properly installed:

```
user@switch> show version
```

#### Related Documentation

- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Troubleshooting Software Installation on page 107
- Junos OS Package Names on page 72
- Understanding Software Installation on J-EX Series Switches on page 69

## Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)

For a J-EX8200 switch with redundant Routing Engines, you can minimize disruption to network operation during a Junos OS upgrade by upgrading the Routing Engines separately, starting with the backup Routing Engine.



**NOTE:** Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later requires that you also upgrade the loader software. See the release notes for instructions on how to upgrade from Release 10.4R2 or earlier to Release 10.4R3 or later.



**NOTE:** If your switch is running Junos OS Release 10.4 or later, you can upgrade the software packages on both Routing Engines with a single command and with minimal network disruption by using nonstop software upgrade (NSSU) instead of this procedure. See “Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure)” on page 955.



**WARNING:** If graceful routing engine switchover (GRES) or nonstop active routing (NSR) is enabled when you initiate a software installation, the software does not install properly. Make sure you issue the CLI command `delete chassis redundancy` when prompted. If GRES is enabled, it will be removed with the `redundancy` command. By default, NSR is disabled. If NSR is enabled, remove the `nonstop-routing` statement from the `[edit routing-options]` hierarchy level to disable it.

To upgrade the software package on a J-EX8200 switch with one installed Routing Engine, see “Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure)” on page 80.

To upgrade redundant Routing Engines, you first install the new Junos OS release on the backup Routing Engine while keeping the currently running software version on the master Routing Engine. After making sure that the new software version is running correctly on the backup Routing Engine, you switch device control to the backup Routing Engine. Finally, you install the new software on the new backup Routing Engine.

To upgrade Junos OS on the switch, perform the following tasks:

1. Preparing the Switch for the Software Installation on page 82
2. Installing Software on the Backup Routing Engine on page 83
3. Installing Software on the Default Master Routing Engine on page 84
4. Returning Routing Control to the Default Master Routing Engine (Optional) on page 85

## Preparing the Switch for the Software Installation

Perform the following steps before installing the software:

1. Log in to the master Routing Engine’s console.

For information on logging in to the Routing Engine through the console port, see “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185.

2. Enter the Junos OS CLI configuration mode:
  - a. Start the CLI from the shell prompt:

```
user@switch:RE% cli
```

You will see:

```
{master}  
user@switch>
```

- b. Enter configuration mode:

```
user@switch> configure
```

You will see:

```
{master}[edit]
```

```
user@switch#
```

3. Disable nonstop active routing (NSR) (supported on switches running Junos OS Release 10.4 or later):

```
{master}[edit]
user@switch# delete routing-options nonstop-routing
```

4. Disable graceful Routing Engine switchover (GRES):

```
{master}[edit]
user@switch# deactivate chassis redundancy graceful-switchover
```

5. Save the configuration change on both Routing Engines:

```
{master}[edit]
user@switch# commit synchronize
```



**NOTE:** To ensure the most recent configuration changes are committed before the software upgrade, perform this step even if nonstop active routing and graceful Routing Engine switchover (GRES) were previously disabled.

6. Exit the CLI configuration mode:

```
[edit]
user@switch# exit
```

7. (Optional) Back up the current software configuration to a second storage option. See the *Junos OS Installation and Upgrade Guide* for instructions on performing this task.

## Installing Software on the Backup Routing Engine

After you have prepared the switch for software installation, install the software on the backup Routing Engine. During the installation, the master Routing Engine continues operations, minimizing the disruption to network traffic.

1. Download the software by following the procedures in “Downloading Software Packages from Juniper Networks” on page 79.
2. Copy the software package to the switch. We recommend that you use FTP to copy the file to the `/var/tmp` directory.
3. Log in to the console of the backup Routing Engine.
4. Install the new software package:

```
user@switch> request system software add /var/tmp/package.tgz
```

where *package.tgz* is, for example, `jinstall-ex-8200-10.2R1.5-domestic-signed.tgz`.



**NOTE:** To abort the installation, do not reboot your device; instead, finish the installation and then issue the `request system software delete package.tgz` command, where `package.tgz` is, for example, `jinstall-ex-8200-10.2R1.8-domestic-signed.tgz`. This is your last chance to stop the installation.

5. Reboot to start the new software:

```
user@switch> request system reboot
Reboot the system? [yes, no] (no) yes
```



**NOTE:** You must reboot the switch to load the new installation of the Junos OS.

6. After the reboot has completed, log in and verify the new version of the software is properly installed:

```
user@switch> show version
```

## Installing Software on the Default Master Routing Engine

To transfer control to the backup Routing Engine and then upgrade or downgrade the master Routing Engine software:

1. Log in to the master Routing Engine console port.
2. Transfer control to the backup Routing Engine:



**CAUTION:** Because graceful Routing Engine switchover is disabled, this switchover causes all line cards in the switch to reload. All network traffic passing through these line cards is lost during the line card reloads.

```
user@switch> request chassis routing-engine master switch
```

3. Verify that the default backup Routing Engine (shown as slot 1 in the command output) is now the master Routing Engine:

```
user@switch> show chassis routing-engine
```

You will see:

```
Routing Engine status:
Slot 0:
  Current state      Backup
  Election priority  Master (default)
Routing Engine status:
Slot 1:
  Current state      Master
  Election priority  Backup (default)
```

4. Install the new software package:



```
user@switch> request system software add package.tgz
```

5. Reboot the Routing Engine:

```
user@switch> request system reboot
Reboot the system? [yes, no] (no) yes
```

When the reboot completes, the prompt will reappear. Wait for this prompt to reappear before proceeding to the next step.

6. Log in to the default backup Routing Engine (slot 1) through the console port.
7. Re-enable graceful Routing Engine switchover:

```
[edit]
user@switch# activate chassis redundancy graceful-switchover
```

Re-enabling graceful Routing Engine switchover allows any future Routing Engine switchovers to occur without loss of any network traffic.

8. Re-enable nonstop active routing:

```
[edit]
user@switch# set routing-options nonstop-routing
```



**NOTE:** Automatic commit synchronization is a requirement for nonstop active routing. If you have not yet enabled it, do so with the `set system commit synchronize` command.

9. Save the configuration change:

```
[edit]
user@switch# commit synchronize
```

10. Log in and verify the version of the software installed.

If you want to return routing control to the Routing Engine that was the master Routing Engine at the beginning of the procedure (the default master Routing Engine), perform the next task.

## Returning Routing Control to the Default Master Routing Engine (Optional)

The switch can maintain normal operations with the Routing Engine in slot 1 acting as the master Routing Engine after the software upgrade, so only perform this task if you want to return routing control to the default master Routing Engine in slot 0.

1. Transfer routing control back to the default master Routing Engine:

```
user@switch> request chassis routing-engine master switch
```

2. Verify that the default master Routing Engine (slot 0) is indeed the master Routing Engine:

```
user@switch> show chassis routing-engine
```

You will see:

```
Routing Engine status:
Slot 0:
```

Current state	Master
Election priority	Master (default)
Routing Engine status:	
Slot 1:	
Current state	Backup
Election priority	Backup (default)

**Related Documentation**

- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure) on page 955
- Troubleshooting Software Installation on page 107
- Junos OS Package Names on page 72
- Understanding Software Installation on J-EX Series Switches on page 69
- For more information about J-EX8208 switch component and functionality redundancy, see the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Installing Software on J-EX Series Switches (J-Web Procedure)

---

You can upgrade software packages on a single fixed-configuration switch, on an individual member of a Virtual Chassis, or for all members of a Virtual Chassis.

You can use the J-Web interface to install software upgrades from a server using FTP or HTTP, or by copying the file to the J-EX Series switch.

**NOTE:**

To access the J-Web interface, your management device must have the following software installed:

- Operating system: Microsoft Windows XP Service Pack 3
- Browser version: One of the following. Other browsers might work but are not supported by J-Series platforms.
  - Microsoft Internet Explorer version 7.0
  - Mozilla Firefox version 3.0
- Additional requirements:
  - Only English-language browsers are supported.
  - The browser and the network must be able to receive and process HTTP/1.1 gzip compressed data.

This topic describes:

1. Installing Software Upgrades from a Server on page 87
2. Installing Software Upgrades by Uploading Files on page 88

## Installing Software Upgrades from a Server

To install software upgrades from a remote server by using FTP or HTTP:

1. Download the software package as described in “Downloading Software Packages from Juniper Networks” on page 79.
2. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by Juniper Networks representatives.
3. In the J-Web interface, select **Maintain > Software > Install Package**.
4. On the Install Remote page, enter information into the fields described in Table 28 on page 87.
5. Click **Fetch and Install Package**. The software is activated after the switch has rebooted.

**Table 28: Install Remote Summary**

Field	Function	Your Action
Package Location (required)	Specifies the FTP or HTTP server, file path, and software package name.	Type the full address of the software package location on the FTP or HTTP server—one of the following:  <pre>ftp://hostname/pathname/package-name</pre> <pre>http://hostname/pathname/package-name</pre>

Table 28: Install Remote Summary (*continued*)

Field	Function	Your Action
User	Specifies the username, if the server requires one.	Type the username.
Password	Specifies the password, if the server requires one.	Type the password.
Reboot If Required	If this box is checked, the switching platform is automatically rebooted when the upgrade is complete.	Check the box if you want the switching platform to reboot automatically when the upgrade is complete.

### Installing Software Upgrades by Uploading Files

To install software upgrades by uploading files:

1. Download the software package.
2. In the J-Web interface, select **Maintain>Software>Upload Package**.
3. On the Upload Package page, enter information into the fields described in Table 29 on page 88.
4. Click **Upload and Install Package**. The software is activated after the switching platform has rebooted.

Table 29: Upload Package Summary

Field	Function	Your Action
File to Upload (required)	Specifies the location of the software package.	Type the location of the software package, or click <b>Browse</b> to navigate to the location.
Reboot If Required	Specifies that the switching platform is automatically rebooted when the upgrade is complete.	Select the check box if you want the switching platform to reboot automatically when the upgrade is complete.

#### Related Documentation

- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Understanding Software Installation on J-EX Series Switches on page 69
- Troubleshooting Software Installation on page 107

### Rebooting or Halting the J-EX Series Switch (J-Web Procedure)

You can use the J-Web interface to schedule a reboot or to halt the switching platform.

To reboot or halt the switching platform by using the J-Web interface:

1. In the J-Web interface, select **Maintain > Reboot**.
2. Select one:
  - **Reboot Immediately**—Reboots the switching platform immediately.
  - **Reboot in *number of minutes***—Reboots the switch in the number of minutes from now that you specify.
  - **Reboot when the system time is *hour:minute*** —Reboots the switch at the absolute time that you specify, on the current day. You must select a 2-digit hour in 24-hour format and a 2-digit minute.
  - **Halt Immediately**— Stops the switching platform software immediately. After the switching platform software has stopped, you can access the switching platform through the console port only.
3. (Optional) In the Message box, type a message to be displayed to any users on the switching platform before the reboot occurs.
4. Click **Schedule**. The J-Web interface requests confirmation to perform the reboot or halt.
5. Click **OK** to confirm the operation.
  - If the reboot is scheduled to occur immediately, the switch reboots. You cannot access the J-Web interface until the switch has restarted and the boot sequence is complete. After the reboot is complete, refresh the browser window to display the J-Web interface login page.
  - If the reboot is scheduled to occur in the future, the Reboot page displays the time until reboot. You have the option to cancel the request by clicking **Cancel Reboot** on the J-Web interface Reboot page.
  - If the switch is halted, all software processes stop and you can access the switching platform through the console port only. Reboot the switch by pressing any key on the keyboard.

**Related  
Documentation**

- Starting the J-Web Interface on page 160



## CHAPTER 6

# Booting the Switch, Upgrading Software, and Managing Licenses

- Registering the Switch on page 91
- Booting the Switch on page 91
- Upgrading Software on page 94
- Managing Licenses on page 95

## Registering the Switch

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## Booting the Switch

---

- Booting a J-EX Series Switch Using a Software Package Stored on a USB Flash Drive on page 91
- Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92

### Booting a J-EX Series Switch Using a Software Package Stored on a USB Flash Drive

There are two methods of getting Junos OS onto a USB flash drive before using the software to boot the switch. You can pre-install the software onto the USB flash drive before inserting the USB flash drive into the USB port, or you can use the system snapshot feature to copy files from internal switch memory to the USB flash drive.

To move files into USB flash memory using a system snapshot and use those files to boot the switch, see “Creating a Snapshot and Using It to Boot a J-EX Series Switch” on page 92. We recommend that you use this method to boot the switch from a USB flash drive if your switch is running properly.

If you need to pre-install the software onto the USB flash drive, you can use the method described in this topic. Pre-installing the Junos OS onto a USB flash drive to boot the switch can be done at any time and is particularly useful when the switch boots to the loader prompt because the switch cannot locate the Junos OS in internal flash memory.

Ensure that you have the following tools and parts available to boot the switch from a USB flash drive:

- A USB flash drive that meets the J-EX Series switch USB port specifications. For information, see the Dell PowerConnect J-Series Ethernet Switch hardware guides at <http://www.support.dell.com/manuals>.
- A computer or other device that you can use to download the software package from the Internet and copy it to the USB flash drive.

To download a Junos OS package onto a USB flash drive before inserting the USB flash drive:

1. Download the Junos OS package that you would like to place onto the J-EX Series switch from the Internet onto the USB flash drive using your computer or other device. See “Downloading Software Packages from Juniper Networks” on page 79.
2. Remove the USB flash drive from the computer or other device.
3. Insert the USB flash drive into the USB port on the switch.
4. This step can only be performed when the prompt for the loader script (**loader>**) is displayed. The loader script starts when the Junos OS loads but the CLI is not working for any reason or if the switch has no software installed.

Install the software package onto the switch:

```
loader> install source
```

where *source* represents the name and location of the Junos OS package on the USB flash drive. The Junos OS package on a flash drive is commonly stored in the root drive as the only file—for example, **file:///jinstall-ex-4200-10.2R1.5-domestic-signed.tgz**.

#### Related Documentation

- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- For the location of the USB port on your switch, see the Dell PowerConnect J-Series Ethernet Switch hardware guides at <http://www.support.dell.com/manuals>.
- Understanding Software Installation on J-EX Series Switches on page 69

## Creating a Snapshot and Using It to Boot a J-EX Series Switch

The system snapshot feature takes a “snapshot” of the files currently used to run the J-EX Series switch—the complete contents of the **/config** and **/var** directories, which include the running Junos OS, the active configuration, and the rescue configuration—and copies all of these files into an alternate (internal, meaning internal flash, or an external, meaning USB flash) memory source. You can then use these snapshots to boot the switch at the next bootup or as a backup boot option.

This topic includes the following tasks:

1. Creating a Snapshot on a USB Flash Drive and Using It to Boot the Switch on page 93
2. Creating a Snapshot on an Internal Flash Drive and Using it to Boot the Switch on page 93



### Creating a Snapshot on a USB Flash Drive and Using It to Boot the Switch

A snapshot can be created on USB flash memory after a switch is booted using files stored in internal memory.

Ensure that you have the following tools and parts available before creating a snapshot on a USB flash drive:

- A USB flash drive that meets the J-EX Series switch USB port specifications. For information, see the Dell PowerConnect J-Series Ethernet Switch hardware guides at <http://www.support.dell.com/manuals>.

To create a snapshot on USB flash memory and use it to boot the switch:

1. Place the snapshot into USB flash memory:

```
user@switch> request system snapshot partition media external slice 1
```



**NOTE:** This example uses the **partition** option. If you have already created a partition for the snapshot, you don't need to use the **partition** option.

2. (Optional) Perform this step if you want to boot the switch now using the snapshot stored on the USB flash drive. If you created the snapshot as a backup, do not perform this step.

- To reboot the switch using the most recently created snapshot:

```
user@switch> request system reboot media external
```

- To reboot the switch using a snapshot in a specific partition on the USB flash drive:

```
user@switch> request system reboot media external slice 1
```

### Creating a Snapshot on an Internal Flash Drive and Using it to Boot the Switch

A snapshot can be created on internal memory after a switch is booted using files stored in external memory.

To create a snapshot in internal memory and use it to boot the switch:

1. Place the snapshot files in internal memory:

```
user@switch> request system snapshot partition media internal slice 1
```



**NOTE:** This example uses the **partition** option. If you have already created a partition for the snapshot, you don't need to use the **partition** option.

2. (Optional) Perform this step if you want to boot the switch now using the newly created snapshot. If you created the snapshot as a backup, do not perform this step.

- To reboot the switch using the most recently created snapshot:

```
user@switch> request system reboot media internal
```

- To reboot the switch using a snapshot in a specific partition in internal memory:

```
user@switch> request system reboot media internal slice 1
```

**Related Documentation**

- Verifying That a System Snapshot Was Created on a J-EX Series Switch on page 100
- Understanding System Snapshot on J-EX Series Switches on page 72

## Upgrading Software

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- Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94

### Upgrading Software Using Automatic Software Download on J-EX Series Switches

The automatic software download feature uses the DHCP message exchange process to download and install software packages. You configure the automatic software download feature on J-EX Series switches acting as DHCP clients. You must enable automatic software download on the J-EX Series switch before the software upgrade can occur.



**NOTE:** Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later is a special upgrade. Automatic software update and automatic software download are supported for this special upgrade. However, after an automatic installation you must take the extra step of upgrading the loader software. See the release notes for instructions on how to upgrade the loader software.

You configure a path to a software package file on the DHCP server. The server communicates the path to the software package file through DHCP server messages.

If you enable automatic software download, the DHCP client J-EX Series switch compares the software package name in the DHCP server message to the name of the software package that booted the switch. If the software packages are different, the DHCP client J-EX Series switch downloads and installs the software package specified in the DHCP server message.

Before you upgrade software using automatic software download, ensure that you have configured DHCP services for the switch, including configuring a path to a boot server and a boot file. See the *Junos OS System Basics Configuration Guide* for information about using the CLI to configure DHCP services and settings. See “Configuring DHCP Services (J-Web Procedure)” on page 463 for information about using the J-Web interface to configure DHCP services and settings.

To enable automatic software download on a J-EX Series switch acting as a DHCP client:

```
[edit chassis]  
user@switch# set auto-image-upgrade
```

Once automatic software download is enabled on your DHCP client J-EX Series switch and once DHCP services are enabled on your network, an automatic software download can occur at any time as part of the DHCP message exchange process.

If an automatic software download occurs, you see the following message on the switch:

```
Auto-image upgrade started
On successful installation system will reboot automatically
```

The switch reboots automatically to complete the upgrade.

**Related  
Documentation**

- Verifying That Automatic Software Download Is Working Correctly on page 99
- Understanding Software Installation on J-EX Series Switches on page 69
- DHCP Services for J-EX Series Switches Overview on page 457

## Managing Licenses

---

- Managing Licenses for the J-EX Series Switch (CLI Procedure) on page 95
- Managing Licenses for the J-EX Series Switch (J-Web Procedure) on page 96

### Managing Licenses for the J-EX Series Switch (CLI Procedure)

To enable and use some Junos OS features on a J-EX Series switch, you must purchase, install, and manage separate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy. After you have configured the features, you see a warning message if the switch does not have a license for the feature.

The AFL software license is not currently available for J-EX4500 switches.

Before you begin managing licenses, be sure that you have:

- Obtained the needed licenses. For information about how to purchase software licenses, contact Dell.
- Understand what makes up a license key. For more information, see “License Key Components for the J-EX Series Switch” on page 77.

This topic includes the following tasks:

- Adding New Licenses on page 95
- Deleting Licenses on page 96
- Saving License Keys on page 96

#### Adding New Licenses

---

To add one or more new license keys on the switch, with the CLI:

1. Add the license key or keys:
  - To add one or more license keys from a file or URL, specify the filename of the file or the URL where the key is located:

```
user@switch> request system license add filename | url
```

- To add a license key from the terminal:

```
user@switch> request system license add terminal
```

2. When prompted, enter the license key, separating multiple license keys with a blank line.

If the license key you enter is invalid, an error appears in the CLI output when you press Ctrl+d to exit the license entry mode.

---

### Deleting Licenses

To delete one or more license keys from the switch with the CLI, specify the license ID:

```
user@switch> request system license delete license-id
```

You can delete only one license at a time.

---

### Saving License Keys

To save the installed license keys to a file (which can be a URL) or to the terminal:

```
user@switch> request system license save filename | url
```

For example, the following command saves the installed license keys to a file named **license.conf**:

```
user@switch> request system license save ftp://user@switch/license.conf
```

#### Related Documentation

- Managing Licenses for the J-EX Series Switch (J-Web Procedure) on page 96
- Monitoring Licenses for the J-EX Series Switch on page 104
- Understanding Software Licenses J-EX Series Switches on page 76

## Managing Licenses for the J-EX Series Switch (J-Web Procedure)

To enable and use some Junos OS features on a J-EX Series switch, you must purchase, install, and manage separate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy. After you have configured the features, you see a warning message if the switch does not have a license for the feature.

The AFL software license is not currently available for J-EX4500 switches.

Before you begin managing licenses, be sure that you have:

- Obtained the needed licenses. For information about how to purchase software licenses, contact Dell.
- Understand what makes up a license key. For more information, see “License Key Components for the J-EX Series Switch” on page 77.

**NOTE:**

To access the J-Web interface, your management device must have the following software installed:

- Operating system: Microsoft Windows XP Service Pack 3
- Browser version: One of the following. Other browsers might work but are not supported by J-Series platforms.
  - Microsoft Internet Explorer version 7.0
  - Mozilla Firefox version 3.0
- Additional requirements:
  - Only English-language browsers are supported.
  - The browser and the network must be able to receive and process HTTP/1.1 gzip compressed data.

This topic includes the following tasks:

- Adding New Licenses on page 97
- Deleting Licenses on page 97
- Displaying License Keys on page 98
- Downloading Licenses on page 98

### [Adding New Licenses](#)

---

To add one or more new license keys on the switch, with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Add** to add a new license key or keys.
3. Do *one* of the following, using a blank line to separate multiple license keys:
  - In the License File URL box, type the full URL to the destination file containing the license key or keys to be added.
  - In the License Key Text box, paste the license key text, in plain-text format, for the license to be added.
4. Click **OK** to add the license key or keys.

A list of features that use the license key is displayed. The table also lists the ID, state, and version of the license key.

### [Deleting Licenses](#)

---

To delete one or more license keys from a switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Select the check box of the license or licenses you want to delete.

3. Click **Delete**.

### Displaying License Keys

---

To display the license keys installed on a switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Display Keys** to display all the license keys installed on the switch.

A screen displaying the license keys in text format appears. Multiple licenses are separated by a blank line.

### Downloading Licenses

---

To download the license keys installed on the switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Download Keys** to download all the license keys installed on the switch to a single file.
3. Select **Save it to disk** and specify the file to which the license keys are to be written. You can also download the license file to your system.

#### Related Documentation

- Managing Licenses for the J-EX Series Switch (CLI Procedure) on page 95
- Monitoring Licenses for the J-EX Series Switch on page 104
- Understanding Software Licenses for J-EX Series Switches on page 76

## CHAPTER 7

# Verifying Software Installation

- Routine Monitoring on page 99
- Monitoring Licenses on page 104

## Routine Monitoring

---

- Verifying That Automatic Software Download Is Working Correctly on page 99
- Verifying That a System Snapshot Was Created on a J-EX Series Switch on page 100
- Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 100

### Verifying That Automatic Software Download Is Working Correctly

**Purpose** Verify that the automatic software download feature is working correctly.

**Action** Use the `show system services dhcp client interface-name` command to verify that the automatic software download feature has been used to install a software package.

```
user@switch> show system services dhcp client ge-0/0/1.0
Logical Interface Name      ge-0/0/1.0
Hardware address           00:0a:12:00:12:12
Client Status              bound
Vendor Identifier          ether
Server Address             10.1.1.1
Address obtained           10.1.1.89
Lease Obtained at         2009-08-20 18:13:04 PST
Lease Expires at          2009-08-22 18:13:04 PST

DHCP Options :
Name: name-server, Value: [ 10.209.194.131, 2.2.2.2, 3.3.3.3 ]
Name: server-identifier, Value: 10.1.1.1
Name: router, Value: [ 10.1.1.80 ]
Name: boot-image,
Value: jinstall-ex-4200-10.2R1.5-domestic-signed.tgz
Name: boot-image-location,
Value: 10.1.1.25:/bootfiles/
```

**Meaning** The output from this command shows the name and location of the software package under **DHCP options** when automatic software download was last used to install a software package. The sample output in **DHCP options** shows that the last DHCP server message to arrive on the DHCP client had a boot server address of **192.168.1.165** and a

boot file named **jinstall-ex-4200-10.2R1.5-domestic-signed.tgz**. If automatic software download was enabled on this client switch during the last DHCP message exchange, these values were used by the switch to upgrade the software.

- Related Documentation**
- Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94
  - DHCP Services for J-EX Series Switches Overview on page 457

## Verifying That a System Snapshot Was Created on a J-EX Series Switch

**Purpose** Verify that a system snapshot was created with the proper files on a J-EX Series switch.

**Action** View the snapshot:

```
user@switch> show system snapshot media external
Information for snapshot on external (da1s1)
Creation date: Oct 1320:23:23 2009
Junos version on snapshot:
jbase : 10.0I20090726_0011_user
jcrypto-ex: 10.0I20090726_0011_user
jdocs-ex: 10.0I20090726_0011_user
jkernel-ex: 10.0I20090726_0011_user
jroute-ex: 10.0I20090726_0011_user
jswitch-ex: 10.0I20090726_0011_user
jweb-ex: 10.0I20090726_0011_user
jpfe-ex42x: 10.0I20090726_0011_user
```

**Meaning** The output shows the date and time when the snapshot was created and the packages that are part of the snapshot. The date and time match the time when you created the snapshot.

You can compare the output of this command to the output of the **show system software** command to ensure that the snapshot contains the same packages as the software currently running the switch.

- Related Documentation**
- Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92

## Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch

Before or after upgrading or downgrading Junos OS, you might need to verify the Junos OS version. You might also need to verify the boot loader software version if you are upgrading to or downgrading from a release that supports resilient dual-root partitions (Junos OS Release 10.4R3 and later).

This topic includes:

- Verifying the Number of Partitions and File System Mountings on page 101
- Verifying the Loader Software Version on page 102



- Verifying Which Root Partition Is Active on page 102
- Verifying the Junos OS Version in Each Root Partition on page 103

### Verifying the Number of Partitions and File System Mountings

**Purpose** Between Junos OS Release 10.4R2 and Release 10.4R3, upgrades were made to further increase resiliency of root partitions, which required reformatting the disk from three partitions to four partitions. Generally, if your switch is running Release 10.4R2 or earlier, it has three partitions, and if it is running Release 10.4R3 or later, it has four partitions.

**Action** Verify how many partitions the disk has, as well as where each file system is mounted, by using the following command:

```
user@switch> show system storage
fpc0:
```

```
-----
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/da0s1a    184M    124M    45M    73% /
devfs          1.0K      1.0K      0B     100% /dev
/dev/md0        37M      37M      0B     100% /packages/mnt/jbase
/dev/md1        18M      18M      0B     100%
/packages/mnt/jcrypto-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md2        6.1M     6.1M     0B     100%
/packages/mnt/jdocs-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md3       154M     154M     0B     100%
/packages/mnt/jkernel-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md4        23M      23M      0B     100%
/packages/mnt/jpfe-ex42x-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md5        46M      46M      0B     100%
/packages/mnt/jroute-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md6        28M      28M      0B     100%
/packages/mnt/jswitch-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md7        22M      22M      0B     100%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md8       126M     10.0K    116M     0% /tmp
/dev/da0s3e    123M    632K    112M     1% /var
/dev/da0s3d    369M     20K    339M     0% /var/tmp
/dev/da0s4d     62M     62K     57M     0% /config
/dev/md9       118M      12M     96M     11% /var/rundb
procfs         4.0K      4.0K      0B     100% /proc
/var/jail/etc  123M     632K    112M     1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/etc
/var/jail/run  123M     632K    112M     1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/run
/var/jail/tmp  123M     632K    112M     1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/tmp
/var/tmp       369M     20K    339M     0%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/tmp/uploads
devfs          1.0K      1.0K      0B     100%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/dev
```

**Meaning** The presence of the partition name containing **s4d** indicates the fourth slice. If this were a three-slice partition scheme, in place of **s1a**, **s3e**, **s3d**, and **s4d**, you would see **s1a**, **s1f**, **s2a**, **s2f**, **s3d**, and **s3e** and you would not see **s4d**.

### Verifying the Loader Software Version

**Purpose** For the special case of upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later, you must upgrade the loader software.

**Action** For J-EX switches, except J-EX8200 switches:

```
user@switch> show chassis firmware
Part                Type      Version
FPC 0               uboot    U-Boot 1.1.6 (Jan  3 2011 - 16:14:58) 1.0.0

                Loader   FreeBSD/PowerPC U-Boot bootstrap loader 2.4
```

For J-EX8200 switches:

```
user@switch> show chassis firmware
Part                Type      Version
FPC 0               uboot    U-Boot 1.1.6 (Jan  3 2011 - 16:14:58) 3.5.0

                Loader   FreeBSD/PowerPC U-Boot bootstrap loader 2.4
```

**Meaning** For J-EX switches other than J-EX8200 switches, if there is version information following the timestamp for **U-Boot** (1.0.0 in the example above), then the loader software does not require upgrading. If there is no version information following the timestamp for **U-boot**, then the loader software requires upgrading.

For J-EX8200 switches, the version number following the timestamp for **U-Boot** that is lower than **3.5.0**.

### Verifying Which Root Partition Is Active

**Purpose** Switches running Release 10.4R3 or later have resilient dual-root partition functionality, which includes the ability to boot transparently from the inactive partition if the system fails to boot from the primary root partition.

You can verify which root partition is active using the following command:

**Action** user@switch> show system storage partitions  
fpc0:

```
-----
Boot Media: internal (da0)
Active Partition: da0s1a
Backup Partition: da0s2a
Currently booted from: active (da0s1a)
```

Partitions information:

Partition	Size	Mountpoint
s1a	184M	/
s2a	184M	altroot
s3d	369M	/var/tmp
s3e	123M	/var
s4d	62M	/config
s4e		unused (backup config)

## Verifying the Junos OS Version in Each Root Partition

**Purpose** Each switch contains two root partitions. We recommend that you copy the same Junos OS version in each partition when you upgrade. In Junos OS Release 10.4R2 and earlier, you might choose to have different Junos OS release versions in each partition. You might have different versions during a software upgrade and before you have finished verifying the new software installation. To enable a smooth reboot if corruption is found in the primary root file system, ensure that the identical Junos OS images are in each root partition. For Release 10.4R2 and earlier, you must manually reboot the switch from the backup root partition. However, for Release 10.4R3 and later, the switch reboots automatically from the backup root partition if it fails to reboot from the active partition.

**Action** Verify whether both root partitions contain the same image by using the following commands:

```
user@switch> show system snapshot media internal slice 1
```

```
Information for snapshot on internal (da0s1)
```

```
Creation date: Jan 21 05:48:34 2011
```

```
JUNOS version on snapshot:
```

```
  jbase : 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jcrypto-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jdocs-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jkernel-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jroute-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jswitch-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jweb-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jpfe-ex42x: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
user@switch# run show system snapshot media internal slice 2
```

```
Information for snapshot on internal (da0s2)
```

```
Creation date: Jan 21 05:47:54 2011
```

```
JUNOS version on snapshot:
```

```
  jbase : 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jcrypto-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jdocs-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jkernel-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jroute-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jswitch-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jweb-ex: 10.4I20110121_0509_hbRPSRLI15184421081
```

```
  jpfe-ex42x: 10.4I20110121_0509_hbRPSRLI15184421081
```

### Related Documentation

- [Upgrading J-EX Series Switches to Support Resilient Dual-Root Partitions](#)
- [Verifying Junos OS and Boot Loader Software Versions on a J-EX Series Switch on page 100](#)
- [Troubleshooting Software Installation on page 107](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 110](#)
- [Understanding Resilient Dual-Root Partitions on Switches on page 74](#)
- [Resilient Dual-Root Partitions Frequently Asked Questions on page 111](#)
- [show system storage partitions \(J-EX Series Switches Only\) on page 146](#)

## Monitoring Licenses

- Monitoring Licenses for the J-EX Series Switch on page 104

### Monitoring Licenses for the J-EX Series Switch

To enable and use some Junos OS features on the J-EX Series switch, you must purchase, install, and manage the appropriate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy.

To monitor your installed licenses, perform the following tasks:

- Displaying Installed Licenses and License Usage Details on page 104
- Displaying Installed License Keys on page 105

#### Displaying Installed Licenses and License Usage Details

**Purpose** Verify that the expected license is installed and active on the switch and fully covers the switch configuration.

**Action** From the CLI, enter the `show system license` command. (To display only the **License usage** list, enter the `show system license usage` command. To display only the **Licenses installed** output, enter `show system license installed`.)

```
user@switch> show system license
License usage:
```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
bgp	1	1	0	permanent
isis	0	1	0	permanent
ospf3	0	1	0	permanent
ripng	0	1	0	permanent
mpls	0	1	0	permanent

```
Licenses installed:
```

```
License identifier: JUNOS204558
```

```
License version: 2
```

```
Valid for device: BN0208380000
```

```
Features:
```

```
ex-series - Licensed routing protocols in ex-series
permanent
```

**Meaning** The output shows the license or licenses (for Virtual Chassis deployments) installed on the switch and license usage. Verify the following information:

- If a feature that requires a license is configured (used), a license is installed on the switch. The **Licenses needed** column must show that no licenses are required.
- The appropriate number of licenses is installed. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy.
- The expected license is installed.

### Displaying Installed License Keys

---

**Purpose** Verify that the expected license keys are installed on the switch.

**Action** From the CLI, enter the **show system license keys** command.

```
user@switch> show system license keys
JUNOS204558 aeaqea qmijhd amrqha ztfmbu gqzama uqceds

ra32zr lsevik ftvjed o4jy5u fynzzj mgviy1

kgioyf ardb5g sj7wnf rsdked wbjf5a sg
```

**Meaning** The output shows the license key or keys (for Virtual Chassis deployments) installed on the switch. Verify that each expected license key is present.

- Related Documentation**
- Managing Licenses for the J-EX Series Switch (CLI Procedure) on page 95
  - Managing Licenses for the J-EX Series Switch (J-Web Procedure) on page 96
  - Understanding Software Licenses for J-EX Series Switches on page 76



## CHAPTER 8

# Troubleshooting Software Installation

- Troubleshooting Software Installation on page 107
- Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 110
- Resilient Dual-Root Partitions Frequently Asked Questions on page 111

## Troubleshooting Software Installation

---

- Recovering from a Failed Software Upgrade on a J-EX Series Switch on page 107
- Rebooting from the Inactive Partition on page 108
- Freeing Disk Space for Software Installation on page 109
- Installation from the Boot Loader Generates 'cannot open package' Error on page 109

## Recovering from a Failed Software Upgrade on a J-EX Series Switch

**Problem** If Junos OS loads but the CLI is not working for any reason, or if the switch has no software installed, you can use this recovery installation procedure to install Junos OS.

**Solution** If there is already a Junos OS image on the system, you can either install the new Junos OS package in a separate partition and have both Junos OS images remain on the system, or you can wipe the disk clean before the new installation proceeds.

If there is no Junos OS image on the system, follow the instructions in “Booting a J-EX Series Switch Using a Software Package Stored on a USB Flash Drive” on page 91 to get an image on the system and boot the switch.

To perform a recovery installation:

1. Power on the switch. The loader script starts.

After the message **Loading /boot/defaults/loader.conf** appears, you are prompted with:

**Hit [Enter] to boot immediately, or space bar for command prompt.**

2. Press the space bar to enter the manual loader. The **loader>** prompt appears.
3. Enter the following command:

```
loader> install [--format] [--external] source
```

where:

- **format**—Use this option to wipe the installation media before installing the software package. If you do not include this option, the system installs the new Junos OS package in a different partition from the partition used by the most recently installed Junos OS package.
- **external**—Use this option to install the software package on an external medium.
- **source**—Represents the name and location of the Junos OS package either on a server on the network or as a file on the USB flash drive:
  - Network address of the server and the path on the server; for example, `ftp://192.171.28/junos/jinstall-ex-4200-10.2R1.5-domestic-signed.tgz`
  - The Junos OS package on a USB device is commonly stored in the root drive as the only file; for example, `file:///jinstall-ex-4200-10.2R1.5-domestic-signed.tgz`

The boot process proceeds normally and ends with a login prompt.

## Rebooting from the Inactive Partition

**Problem** J-EX Series switches shipped with Junos OS Release 10.4R2 or earlier have Junos OS loaded on the system disk in partition 1. The first time you upgrade, the new software package is installed in partition 2. When you finish the installation and reboot, partition 2 becomes the active partition. Similarly, subsequent software packages are installed in the inactive partition, which becomes the active partition when you reboot at the end of the installation process.

On switches shipped with Release 10.4R3 and later, the same Junos OS image is loaded in each of the two root partitions, and you should copy the new software image to the alternate partition each time you upgrade.

If you performed an upgrade and rebooted, the system resets the active partition. You can use this procedure to manually boot from the inactive partition.



.....  
**NOTE:** If you have completed the installation of the software image but have not yet rebooted, you can issue the `request system software rollback` command to return to the original software installation package.  
.....

**Solution** Reboot from the inactive partition:

```
user@switch> request system reboot partition alternate
```





**NOTE:** If you cannot access the CLI, you can reboot from the inactive partition using the following procedure from the loader script prompt:

1. Unload and clear the interrupted boot from the active partition:

```
loader> unload
loader> unset vfs.root.mountfrom
```

2. Select the new (inactive) partition to boot from:

```
loader> set currdev=disk[0|1]s[1|2]:
```

where the first value is either 0 (internal) or 1 (external) and the second value indicates the number of the inactive partition, either 1 or 2.

You must include the colon (:) at the end of this command.

3. Boot Junos OS from the inactive partition:

```
loader> boot
```

## Freeing Disk Space for Software Installation

**Problem** The software installation process requires a certain amount of unused disk space. If there is not enough space, you might receive an error message such as:

```
fetch: /var/tmp/incoming-package.tgz: No space left on device
```

**Solution** Identify and delete unnecessary files by using the **request system storage cleanup** command.

## Installation from the Boot Loader Generates 'cannot open package' Error

**Problem** When you are installing a Junos OS software image from the loader prompt, a "cannot open package error" is generated:

```
loader> install - -format
tftp://10.204.33.248/images/Flash_corr/official/jinstall-ex-4200-10.4I2011012-domestic-signed.tgz
Speed: 1000, full duplex
bootp: no reply
No response for RARP request
net_open: RARP failed
cannot open package (error 5)
```

**Solution** This problem might result from the IP address, gateway IP address, netmask address, or server IP address not being properly set. You can set these values either from the shell or from the u-boot prompt.

To set these values from the shell:

```
% nvramp setenv ipaddr 10.204.35.235
% nvramp setenv netmask 255.255.240.0
% nvramp setenv gatewayip 10.204.47.254
% nvramp setenv serverip 10.204.33.248
```

To set these values from the u-boot prompt, log in to a console connection, reboot, and stop at the u-boot prompt (Cntrl-C):

```
=> setenv ipaddr 10.204.35.235
=> setenv gatewayip 10.204.47.254
=> setenv serverip 10.204.33.248
=> setenv netmask 255.255.240.0
=> saveenv
=> printenv Verify whether variables are set properly or not
=> boot
```

**Related Documentation**

- Upgrading EX Series Switches to Support Resilient Dual-Root Partitions
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Upgrading Software Using Nonstop Software Upgrade (CLI Procedure) on page 955
- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86
- Understanding Software Installation on J-EX Series Switches on page 69
- **show system storage partitions (J-EX Series Switches Only) on page 146**

---

## Troubleshooting a Switch That Has Booted from the Backup Junos OS Image

---

**Problem** The switch boots from the backup root file partition. This event is flagged in two ways:

- Upon login through the console or management port, the following warning message is displayed:

```
WARNING: THIS DEVICE HAS BOOTED FROM THE BACKUP JUNOS IMAGE
```

```
It is possible that the primary copy of JUNOS failed to boot up properly,
and so this device has booted from the backup copy.
```

```
Please re-install JUNOS to recover the primary copy in case it has been
corrupted.
```

- The following alarm message is generated:

```
user@switch> show chassis alarms
```

```
1 alarms currently active
```

```
Alarm time           Class  Description
2011-02-17 05:48:49 PST  Minor  Host 0 Boot from backup root
```

**Solution** Install a new Junos OS image on the partition that had the corruption, or take a snapshot of the currently active partition and use it to replace the image in the backup partition:

```
user@switch# request system snapshot media internal slice alternate
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

**Related Documentation**

- Verifying Junos OS and Boot Loader Software Versions on a J-EX Series Switch on page 100
- Troubleshooting Software Installation on page 107
- **show system storage partitions (J-EX Series Switches Only) on page 146**

---

## Resilient Dual-Root Partitions Frequently Asked Questions

---

This FAQ addresses questions regarding resilient dual-root partitions on J-EX Series switches and upgrading to resilient dual-root partition releases. This feature was introduced on J-EX Series switches at Junos OS Release 10.4R3. It provides additional resiliency for J-EX Series switches.

This FAQ covers the following questions:

- How Does Upgrading to Junos OS Release 10.4R3 and Later Differ from Normal Upgrades? on page 111
- What Happens If I Do Not Upgrade Both the Loader Software and Junos OS at the Same Time? on page 111
- Can I Downgrade Junos OS Without Downgrading the Loader Software? on page 112
- Can I Upgrade to a Resilient Dual-Root Partition Release by Using the CLI? on page 113
- Will I Lose My Configuration During an Upgrade? on page 113
- How Long Will the Upgrade Process Take? on page 113
- What Happens to My Files If the System Detects a File System Corruption? on page 113
- How Will I Be Informed If My Switch Boots from the Alternate Slice Due to Corruption in the Root File System? on page 114
- Can I Use Automatic Software Update and Download to Upgrade to a Resilient Dual-Root Partition Release? on page 114
- Why Is the Message "At least one package installed on this device has limited support" Displayed When Users Log In to the Switch? on page 114

### How Does Upgrading to Junos OS Release 10.4R3 and Later Differ from Normal Upgrades?

Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later differs from other upgrades in these ways:

- You must upgrade the loader software in addition to installing the new Junos OS image.
- Rebooting after the upgrade reformats the disk from three partitions to four partitions.
- The upgrade process and the reboot take longer due to the additional time required to upgrade the loader software and additional time for the first reboot after the Junos OS installation (longer than normal because it reformats the disk from three partitions to four). Also, J-EX8200 switches require an additional reboot per Routing Engine as part of the loader software upgrade.

### What Happens If I Do Not Upgrade Both the Loader Software and Junos OS at the Same Time?

You must install a new loader software package if you are upgrading to a release that supports resilient dual-root partitions (Release 10.4R3 and later) from an earlier release (Release 10.4R2 and earlier). Table 30 on page 112 describes the combinations of Junos OS and loader software versions.

Table 30: Combinations of Junos OS Versions and Loader Software Versions

Junos OS Release	Loader Software	Notes
Release 10.4R3 and later	<p>New loader software</p> <p>For all J-EX Series switches except EX8200 switches: <b>U-Boot 1.1.6 (Mar 11 2011 - 04:39:06) 1.0.0</b> (Contains version 1.0.0 after the timestamp.)</p> <p>For J-EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 3.5.0</b> (Contains version 3.5.0.)</p>	Recommended
Release 10.4R2 and earlier	<p>Old loader software</p> <p>For all J-EX Series switches except EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35)</b> (Does not contain a version number after the timestamp.)</p> <p>For J-EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 2.3.0</b> (Contains a version earlier than 3.5.0.)</p>	Recommended
Release 10.4R3 and later	<p>Old loader software</p> <p>For all J-EX Series switches except EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35)</b> (Does not contain a version number after the timestamp.)</p> <p>For J-EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 2.3.0</b> (Contains a version earlier than 3.5.0.)</p>	The switch will come up and function normally. However, if the switch cannot boot from the active root partition, it cannot transparently boot up from the alternate root partition.
Release 10.4R2 and earlier	<p>New loader software</p> <p>For all J-EX Series switches except EX8200 switches: <b>U-Boot 1.1.6 (Mar 11 2011 - 04:39:06) 1.0.0</b> (Contains version 1.0.0 after the timestamp.)</p> <p>For J-EX8200 switches: <b>U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 3.5.0</b> (Contains version 3.5.0.)</p>	The switch will come up and function normally. However, on each reboot the switch boots from the alternate root partition. This might cause your switch to unexpectedly boot with a previous Junos OS version (if a different version is installed in the alternate partition). See "Can I Downgrade Junos OS Without Downgrading the Loader Software?" on page 112.

### Can I Downgrade Junos OS Without Downgrading the Loader Software?

To downgrade to Release 10.4R2 or earlier without downgrading the loader software, you must disable the boot-sequencing function. Because earlier Junos OS releases do not contain the newer settings, the switch will boot on each subsequent reboot from the alternate root partition rather than from the active partition. If you disable the boot-sequencing function, you can run Release 10.4R2 or earlier with the new loader software and have no adverse effects.

Disable the boot-sequencing function in one of two ways:

- From the shell as user root:
 

```
% nvram setenv boot.btsq.disable 1
```
- From a console connection, reboot and stop at the u-boot prompt (Ctrl-C):
 

```
=> setenv boot.btsq.disable 1
=> savenv
```

## Can I Upgrade to a Resilient Dual-Root Partition Release by Using the CLI?

Yes, you can perform the entire upgrade to resilient dual-root partitions from the CLI. You download both the new loader software and Junos OS packages and install them from the CLI. During the final reboot, the disk is automatically reformatted from three partitions to four partitions.

## Will I Lose My Configuration During an Upgrade?

Configuration files are preserved and restored during the reformatting of the disk. We recommend that you save your configuration before upgrading because if there is a power interruption during the installation process, files might be lost.

## How Long Will the Upgrade Process Take?

The process of upgrading to a resilient dual-root partitions release takes longer than other upgrades due to the additional step of upgrading the loader software and a longer reboot time while the disk is reformatted to four partitions during the reboot of the switch that completes the Junos OS upgrade. The reformat increases the reboot time for J-EX4200, and J-EX4500 switches by 5 to 10 minutes. For J-EX8200 switches, the reboot time increases by 10 to 25 minutes per Routing Engine, and additional reboots are required.

## What Happens to My Files If the System Detects a File System Corruption?

During a reboot, the system checks each file system partition for corruption. Table 31 on page 113 shows the action the system takes if corruption is detected and the corrective action that you can take.

Table 31: Actions If Corrupt Files Are Found

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
/	/	/var	/var/tmp	/config
(root Junos OS)	(root Junos OS)			
If a root directory (/) is corrupted, the corrupted file system is not mounted and the switch boots from the alternate slice.		During early boot, the integrity of /var, /var/tmp, and /config files are verified. If they are corrupted, the corrupted slice is reformatted and the file directory in that slice is lost.		

Table 31: Actions If Corrupt Files Are Found (*continued*)

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
Corrective action: Issue a <b>request system snapshot</b> command from the good root directory to the corrupted slice.		Corrective action: Restore the <b>/var</b> or <b>/config</b> files from the external backup.		

## How Will I Be Informed If My Switch Boots from the Alternate Slice Due to Corruption in the Root File System?

If the switch detects corruption in the primary root file system, it boots from the alternate root partition. When this occurs, you are notified in two ways:

- If you are logged in through the console port or the management port:

```
WARNING: THIS DEVICE HAS BOOTED FROM THE BACKUP JUNOS IMAGE
```

```
It is possible that the primary copy of JUNOS failed to boot up properly, and so this device has booted from the backup copy.
```

```
Please re-install JUNOS to recover the primary copy in case it has been corrupted.
```

- The following alarm message is generated:

```
user@switch> show chassis alarms

1 alarms currently active
Alarm time          Class  Description
2011-02-17 05:48:49 PST  Minor  Host 0 Boot from backup root
```

## Can I Use Automatic Software Update and Download to Upgrade to a Resilient Dual-Root Partition Release?

Automatic software update and automatic software download are both supported with upgrading to resilient dual-root partition releases. However, after an automatic installation, you must take the extra step of upgrading the loader software.

Automatic software update is for new members added to a Virtual Chassis that do not have the same software as the master. Once this feature is configured on the Virtual Chassis, any new member added with a different software version will be upgraded automatically.

Automatic software download uses the DHCP message exchange process to download and install software packages.

## Why Is the Message "At least one package installed on this device has limited support" Displayed When Users Log In to the Switch?

The following message might be displayed when you log in to a J-EX8200 switch:

```
Logging to master
..Password:
--- JUNOS 10.4R3.4 built 2011-03-19 22:06:32 UTC
At least one package installed on this device has limited support.
Run 'file show /etc/notices/unsupported.txt' for details.
```

This message can be safely ignored or you can permanently remove it. It appears because of the jloader package file detected on system, and only appears when the Junos OS software is installed before upgrading the loader software.

You can permanently remove this message by removing the jloader package and rebooting the system:

```
request system software delete jloader-ex-8200
request system reboot
```

**Related  
Documentation**

- [Upgrading J-EX Series Switches to Support Resilient Dual-Root Partitions](#)
- [Verifying Junos OS and Boot Loader Software Versions on a J-EX Series Switch on page 100](#)
- [Troubleshooting Software Installation on page 107](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 110](#)
- [Verifying Junos OS and Boot Loader Software Versions on a J-EX Series Switch on page 100](#)





# Configuration Statements for Software Installation

- [\[edit chassis\] Configuration Statement Hierarchy](#) on page 117

## [\[edit chassis\] Configuration Statement Hierarchy](#)

---

```
chassis {
  aggregated-devices {
    ethernet {
      device-count number;
    }
  }
  auto-image-upgrade;
  fpc slot {
    pic pic-number {
      sfppplus {
        pic-modemode;
      }
    }
    power-budget-priority priority;
  }
  lcd-menu fpc slot-number {
    menu-item (menu-name | menu-option);
  }
  nssu {
    upgrade-group group-name {
      fpcs (slot-number | [list-of-slot-numbers]);
      member member-id {
        fpcs (slot-number | [list-of-slot-numbers]);
      }
    }
  }
  psu {
    redundancy {
      n-plus-n;
    }
  }
  redundancy {
    graceful-switchover;
  }
}
```

- Related Documentation**
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
  - Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94
  - Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
  - Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856
  - Configuring Power Supply Redundancy (CLI Procedure) on page 952
  - Configuring the Power Priority of Line Cards (CLI Procedure) on page 953
  - Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951

## auto-image-upgrade

---

<b>Syntax</b>	auto-image-upgrade;
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Enable automatic software download on a J-EX Series switch acting as a DHCP client.</p> <p>The DHCP client J-EX Series switch compares the software package name in the DHCP server message to the name of the software package that booted the switch. If the software packages are different, the DHCP client J-EX Series switch downloads and installs the software package specified in the DHCP server message.</p> <p>Before you upgrade software using automatic software download, ensure that you have configured DHCP services for the switch, including configuring a path to a boot server and a boot file. See the <i>Junos OS System Basics Configuration Guide</i> for information about using the CLI to configure DHCP services and settings. See “Configuring DHCP Services (J-Web Procedure)” on page 463 for information about using the J-Web interface to configure DHCP services and settings.</p>
<b>Default</b>	Automatic software download is disabled.
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94</li> <li>• Understanding Software Installation on J-EX Series Switches on page 69</li> <li>• DHCP Services for J-EX Series Switches Overview on page 457</li> </ul>

CHAPTER 10

# Operational Commands for Software Installation

## request system license add

---

<b>Syntax</b>	request system license add ( <i>filename</i>   terminal)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Add a license key.
<b>Options</b>	<i>filename</i> —License key from a file or URL. Specify the filename or the URL where the key is located.  terminal—License key from the terminal.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Adding New Licenses</li></ul>
<b>List of Sample Output</b>	request system license add on page 120
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request system license user@host> request system license add terminal
add
```

---

## request system license delete

---

<b>Syntax</b>	<code>request system license delete <i>license-id</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Delete a license key. You can delete only one license at a time.
<b>Options</b>	<i>license-id</i> —License ID that uniquely identifies a license key.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Deleting a License</li></ul>
<b>List of Sample Output</b>	<a href="#">request system license delete on page 121</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request system license delete user@host> request system license delete G03000002223
delete
```

## request system license save

---

<b>Syntax</b>	request system license save ( <i>filename</i>   terminal)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Save installed license keys to a file or URL.
<b>Options</b>	<i>filename</i> —License key from a file or URL. Specify the filename or the URL where the key is located.  terminal—License key from the terminal.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Saving License Keys</li></ul>
<b>List of Sample Output</b>	request system license save on page 122
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request system license save user@host> request system license save ftp://user@host/license.conf
```

## request system reboot

<b>Syntax</b>	<pre>request system reboot &lt;all-members   local   member <i>member-id</i>&gt; &lt;at <i>time</i>&gt; &lt;in <i>minutes</i>&gt; &lt;media (external   internal)&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt; &lt;slice (1   2   alternate)&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Reboot the Junos OS.</p> <p>Reboot requests are recorded in the system log files, which you can view with the <b>show log</b> command. You can view the process names with the <b>show system processes</b> command.</p>
<b>Options</b>	<p>none—Reboots the software immediately.</p> <p><b>all-members   local   member <i>member-id</i></b>—(J-EX4200 switch only) (Optional) Specify which member of the Virtual Chassis to reboot:</p> <ul style="list-style-type: none"> <li>• <b>all-members</b>—Reboots each switch that is a member of the Virtual Chassis.</li> <li>• <b>local</b>—Reboots the local switch, meaning the switch you are logged into, only.</li> <li>• <b>member <i>member-id</i></b>—Reboots the specified member switch of the Virtual Chassis.</li> </ul> <p><b>at <i>time</i></b>—(Optional) Time at which to reboot the software, specified in one of the following ways:</p> <ul style="list-style-type: none"> <li>• <b>+<i>minutes</i></b>—Number of minutes from now to reboot the software.</li> <li>• <b><i>hh:mm</i></b>—Absolute time on the current day at which to reboot the software, specified in 24-hour time.</li> <li>• <b>now</b>—Stop or reboot the software immediately. This is the default.</li> <li>• <b><i>yymmddhhmm</i></b>—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute.</li> </ul> <p><b>in <i>minutes</i></b>—(Optional) Number of minutes from now to reboot the software. This option is an alias for the <b>at +<i>minutes</i></b> option.</p> <p><b>media (external   internal)</b>—(Optional) Boot medium for the next boot. The external option reboots the switch using a software package stored on an external boot source, such as a USB flash drive. The internal option reboots the switch using a software package stored in an internal memory source.</p> <p><b>message "<i>text</i>"</b>—(Optional) Message to display to all system users before rebooting the software.</p>

`other-routing-engine`—(Optional) Reboot the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is rebooted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is rebooted.

`slice (1 | 2 | alternate)`—(Optional) Reboot using the specified partition on the boot media. This option has the following suboptions:

- `1`—Reboot from partition 1.
- `2`—Reboot from partition 2.
- `alternate`—Reboot from the alternate partition, which is the partition that did not boot the switch at the last bootup.

**Required Privilege Level** maintenance

**Related Documentation**

- [clear system reboot on page 230](#)
- [request system halt on page 239](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

**request system reboot** user@host> `request system reboot`  
Reboot the system ? [yes,no] (no)

**request system reboot (at 2300)** user@host> `request system reboot at 2300 message ?Maintenance time!?`  
Reboot the system ? [yes,no] (no) yes

```
shutdown: [pid 186]
*** System shutdown message from root@berry.network.net ***
System going down at 23:00
```

**request system reboot (in 2 Hours)** The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
user@host> request system reboot in 120
user@host> request system reboot at 19:00
```

**request system reboot (Immediately)** user@host> `request system reboot at now`

**request system reboot (at 1:20 AM)** To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120
request system reboot at 120
Reboot the system at 120? [yes,no] (no) yes
```



## request system snapshot

**Syntax** request system snapshot  
 <as-primary>  
 <all-members | local | member *member-id*>  
 <media (external | internal)>  
 <partition>  
 <re0 | re1 | routing-engine *routing-engine-id*>  
 <slice (1 | 2 | alternate)>

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Take a snapshot of the files currently used to run the switch—the complete contents of the `/config` and `/var` directories, which include the running Juniper Networks Junos OS, the active configuration, and the rescue configuration—and copy all of these files into an alternate (internal, meaning internal flash, or an external, meaning USB flash) memory source.

**Options** none—Create a snapshot on the alternate media, meaning the external media if you booted the switch using software stored on internal media or internal media if you booted the switch using software stored on external media.

**all-members | local | member *member-id***—(J-EX4200 switch only) (Optional) Specify where to place the snapshot in Virtual Chassis configurations:

- **all-members**—Create a snapshot for each switch that is a member of the Virtual Chassis.
- **local**—Create a snapshot on the local switch only.
- **member *member-id***—Create a snapshot for the specified member or member switches of the Virtual Chassis.

**as-primary**—(Optional) Create a bootable snapshot.



**NOTE:** The snapshot is always bootable on J-EX Series switches. The **as-primary** option has no effect on snapshots on J-EX Series switches.

**media (external | internal)**—(Optional) Specify the destination media location for the snapshot. The **external** option copies the snapshot to an external mass storage device, such as a USB flash drive. The **internal** option copies the snapshot to an internal memory source, such as internal flash memory.

**partition**—(Optional) Partition the destination media before copying over the snapshot.

**re0 | re1 | routing-engine *routing-engine-id***—(J-EX8200 switch only) Specify where to place the snapshot in dual Routing Engine configurations.

- **re0**—Create a snapshot on Routing Engine 0.
- **re1**—Create a snapshot on Routing Engine 1.

- **routing-engine***routing-engine-id*—Create a snapshot on the specified Routing Engine.

**slice** ( 1 | 2 | **alternate**)—(Optional) Specify the destination partition for the snapshot:

- 1—Copy the snapshot to partition 1.
- 2—Copy the snapshot to partition 2.
- **alternate**—Copy the snapshot to the alternate partition, which is the partition that did not boot the switch at the last bootup.

**Required Privilege Level** view

**Related Documentation**

- [show system snapshot on page 144](#)
- [Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system snapshot media external slice 1
user@switch> request system snapshot media external slice 1
```

## request system software add

<b>Syntax</b>	<pre>request system software add <i>package-name</i> &lt;best-effort-load&gt; &lt;delay-restart&gt; &lt;force&gt; &lt;no-copy&gt; &lt;no-validate&gt; &lt;re0   re1&gt; &lt;reboot&gt; &lt;unlink&gt; &lt;validate&gt;</pre>
<b>Syntax (J-EX Series Switches)</b>	<pre>request system software add <i>package-name</i> &lt;best-effort-load&gt; &lt;delay-restart&gt; &lt;force&gt; &lt;no-copy&gt; &lt;no-validate&gt; &lt;re0   re1&gt; &lt;reboot&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;unlink&gt; &lt;validate&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 10.2 for J-EX Series switches. The <b>set [<i>package-name package-name</i>]</b> option added in Junos OS Release 11.1 for J-EX Series switches.</p>
<b>Description</b>	<p>Install a software package or bundle on the router or switch.</p>
<b>Options</b>	<p><i>package-name</i>—Location from which the software package or bundle is to be installed. For example:</p> <ul style="list-style-type: none"> <li>• <b><i>/var/tmp/package-name</i></b>—For a software package or bundle that is being installed from a local directory on the router or switch.</li> <li>• <b><i>protocol://hostname/pathname/package-name</i></b>—For a software package or bundle that is to be downloaded and installed from a remote location. Replace <i>protocol</i> with one of the following: <ul style="list-style-type: none"> <li>• <b>ftp</b>—File Transfer Protocol. Use <b><i>ftp://hostname/pathname/package-name</i></b>. To specify authentication credentials, use <b><i>ftp://&lt;username&gt;:&lt;password&gt;@hostname/pathname/package-name</i></b>. To have the system prompt you for the password, specify <b>prompt</b> in place of the password. If a password is required, and you do not specify the password or <b>prompt</b>, an error message is displayed.</li> <li>• <b>http</b>—Hypertext Transfer Protocol. Use <b><i>http://hostname/pathname/package-name</i></b>. To specify authentication credentials, use</li> </ul> </li> </ul>

`http://<username>:<password>@hostname/pathname/package-name`. If a password is required and you omit it, you are prompted for it.

- **scp**—Secure copy (available only for Canada and U.S. version). Use `scp://hostname/pathname/package-name`. To specify authentication credentials, use `scp://<username>:<password>@hostname/pathname/package-name`.



---

**NOTE:**

- The *pathname* in the protocol is the relative path to the user's home directory on the remote system and not the root directory.
- Do not use the `scp` protocol in the `request system software add` command to download and install a software package or bundle from a remote location. The software upgrade is handled by the MGD process which does not support `scp`. Use the `file copy` command to copy the software package or bundle from the remote location to the `/var/tmp` directory on the hard disk:  
`file copy scp://source/package-name /var/tmp`  
Then install the software package or bundle using the `request system software add` command:  
`request system software add /var/tmp/package-name`

---

`best-effort-load`—(Optional) Activate a partial load and treat parsing errors as warnings instead of errors.

`delay-restart`—(Optional) Install software package or bundle, but do not restart software processes.

`force`—(Optional) Force the addition of the software package or bundle (ignore warnings).

`no-copy`—(Optional) Install a software package or bundle, but do not save copies of package or bundle files.

`no-validate`—(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the `validate` option.

`re0 | re1`—(Optional) On routers that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (`re0`) or Routing Engine in slot 1 (`re1`).

`reboot`—(Optional) After adding the software package or bundle, reboot the system.

`set [package-name package-name]`—(Mixed J-EX4200 and J-EX4500 Virtual Chassis only)  
(Optional) Install two software packages—a package for a J-EX4200 switch and the same release of the package for a J-EX4500 switch—to upgrade all member switches in a mixed J-EX4200 and J-EX4500 Virtual Chassis.

**validate**—(Optional) Validate the software package or bundle against the current configuration as a prerequisite to adding the software package or bundle. This is the default behavior when the software package or bundle being added is a different release.

**Additional Information** Before upgrading the software on the router or switch, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the **/altroot** and **/altconfig** file systems. After you have upgraded the software on the router or switch and are satisfied that the new package or bundle is successfully installed and running, issue the **request system snapshot** command again to back up the new software to the **/altroot** and **/altconfig** file systems.

After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

If you are upgrading more than one package at the same time, delete the operating system package, **jkernl**, last. Add the operating system package, **jkernl**, first and the routing software package, **jroute**, last. If you are upgrading all packages at once, delete and add them in the following order:

```
user@host> request system software add /var/tmp/jbase
user@host> request system software add /var/tmp/jkernel
user@host> request system software add /var/tmp/jpfe
user@host> request system software add /var/tmp/jdocs
user@host> request system software add /var/tmp/jroute
user@host> request system software add /var/tmp/jcrypto
```

**Required Privilege Level** maintenance

**Related Documentation**

- [request system software delete on page 131](#)
- [request system software rollback on page 133](#)
- [request system storage cleanup on page 251](#)
- [Upgrading Software](#)

**List of Sample Output** [request system software add validate on page 129](#)  
[request system software add \(Mixed J-EX4200 and J-EX4500 Virtual Chassis\) on page 130](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system software add validate user@host> request system software add validate /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Checking compatibility with configuration
Initializing...
Using jbase-7.1R2.2
Using /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Using /var/validate/tmp/jinstall-signed/jinstall-7.2R1.7-domestic.tgz
```

```

Using /var/validate/tmp/jinstall/jbundle-7.2R1.7-domestic.tgz
Checking jbundle requirements on /
Using /var/validate/tmp/jbundle/jbase-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jkernel-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jcrypto-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jpfe-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jdocs-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jroute-7.2R1.7.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete
Validation succeeded
Validating against /config/rescue.conf.gz
mgd: commit complete
Validation succeeded
Installing package '/var/tmp/jinstall-7.2R1.7-domestic-signed.tgz' ...
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Adding jinstall...

```

```

WARNING: This package will load JUNOS 7.2R1.7 software.
WARNING: It will save JUNOS configuration files, and SSH keys
WARNING: (if configured), but erase all other files and information
WARNING: stored on this machine. It will attempt to preserve dumps
WARNING: and log files, but this can not be guaranteed. This is the
WARNING: pre-installation stage and all the software is loaded when
WARNING: you reboot the system.

```

```

Saving the config files ...
Installing the bootstrap installer ...

```

```

WARNING: A REBOOT IS REQUIRED TO LOAD THIS SOFTWARE CORRECTLY. Use the
WARNING: 'request system reboot' command when software installation is
WARNING: complete. To abort the installation, do not reboot your system,
WARNING: instead use the 'request system software delete jinstall'
WARNING: command as soon as this operation completes.

```

```

Saving package file in /var/sw/pkg/jinstall-7.2R1.7-domestic-signed.tgz ...
Saving state for rollback ...

```


## Sample Output

```

request system software add (Mixed J-EX4200 and J-EX4500 Virtual Chassis)
user@switch> request system software add set
[/var/tmp/jinstall-ex4200-11.1R2.1-domestic-signed.tgz
/var/tmp/jinstall-ex-4500-11.1R2.1-domestic-signed.tgz]
...

```

## request system software delete

<b>Syntax</b>	<code>request system software delete <i>software-package</i> &lt;force&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Remove a software package or bundle from the router or switch.
	<p> <b>CAUTION:</b> Before removing a software package or bundle, make sure that you have already placed the new software package or bundle that you intend to load onto the router or switch.</p>
<b>Options</b>	<p><i>software-package</i>—Software package or bundle name. You can delete any or all of the following software bundles or packages:</p> <ul style="list-style-type: none"> <li>• <b>jbase</b>—(Optional) Junos base software suite</li> <li>• <b>jcrypto</b>—(Optional, in domestic version only) Junos security software</li> <li>• <b>jdocs</b>—(Optional) Junos online documentation file</li> <li>• <b>jkernel</b>—(Optional) Junos kernel software suite</li> <li>• <b>jpfe</b>—(Optional) Junos Packet Forwarding Engine support</li> <li>• <b>jroute</b>—(Optional) Junos routing software suite</li> <li>• <b>junos</b>—(Optional) Junos base software</li> </ul> <p><i>force</i>—(Optional) Ignore warnings and force removal of the software.</p>
<b>Additional Information</b>	Before upgrading the software on the router or switch, when you have a known stable system, issue the <b>request system snapshot</b> command to back up the software, including the configuration, to the <b>/altroot</b> and <b>/altconfig</b> file systems. After you have upgraded the software on the router or switch and are satisfied that the new packages are successfully installed and running, issue the <b>request system snapshot</b> command again to back up the new software to the <b>/altroot</b> and <b>/altconfig</b> file systems. After you run the <b>request system snapshot</b> command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request system software add on page 127</a></li> <li>• <a href="#">request system software rollback on page 133</a></li> <li>• <a href="#">request system software validate on page 135</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request system software delete jdocs on page 132</a>

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

**request system software delete jdocs** The following example displays the system software packages before and after the **jdocs** package is deleted through the **request system software delete** command:

```
user@host> show system software
Information for jbase:

Comment:
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [7.2R1.7]

Information for jdocs:

Comment:
JUNOS Online Documentation [7.2R1.7]

Information for jkernel:

Comment:
JUNOS Kernel Software Suite [7.2R1.7]

...

user@host> request system software delete jdocs
Removing package 'jdocs' ...

user@host> show system software
Information for jbase:

Comment:
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [7.2R1.7]

Information for jkernel:

Comment:
JUNOS Kernel Software Suite [7.2R1.7]

...
```



## request system software rollback

<b>Syntax</b>	request system software rollback
<b>Syntax (J-EX Series Switch)</b>	request system software rollback <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Revert to the software that was loaded at the last successful <b>request system software add</b> command.
<b>Options</b>	<p>none—Revert to the set of software as of the last successful <b>request system software add</b>.</p> <p>all-members—(J-EX4200 switches only) (Optional) Attempt to roll back to the previous set of packages on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Attempt to roll back to the previous set of packages on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Attempt to roll back to the previous set of packages on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Additional Information</b>	A software rollback fails if any required package (or a <b>jbundle</b> package containing the required package) cannot be found in <b>/var/sw/pkg</b> .
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• request system software abort</li> <li>• request system software add on page 127</li> <li>• request system software delete on page 131</li> <li>• request system software validate on page 135</li> <li>• request system configuration rescue delete on page 388</li> <li>• request system configuration rescue save on page 389</li> </ul>
<b>List of Sample Output</b>	request system software rollback on page 134
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system software rollback
user@host> request system software rollback
Verified SHA1 checksum of ./jbase-7.2R1.7.tgz
Verified SHA1 checksum of ./jdocs-7.2R1.7.tgz
Verified SHA1 checksum of ./jroute-7.2R1.7.tgz
Installing package './jbase-7.2R1.7.tgz' ...
Available space: 35495 require: 7335
Installing package './jdocs-7.2R1.7.tgz' ...
Available space: 35339 require: 3497
Installing package './jroute-7.2R1.7.tgz' ...
Available space: 35238 require: 6976
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Reloading /config/juniper.conf.gz ...
Activating /config/juniper.conf.gz ...
mgd: commit complete
Restarting mgd ...
Restarting aprobed ...
Restarting apsd ...
Restarting cosd ...
Restarting fsad ...
Restarting fud ...
Restarting gcdrd ...
Restarting ilmid ...
Restarting irsd ...
Restarting l2tpd ...
Restarting mib2d ...
Restarting nasd ...
Restarting pppoed ...
Restarting rdd ...
Restarting rmopd ...
Restarting rtspd ...
Restarting sampled ...
Restarting serviced ...
Restarting snmpd ...
Restarting spd ...
Restarting vrrpd ...

WARNING: cli has been replaced by an updated version:
CLI release 7.2R1.7 built by builder on 2005-04-22 02:03:44 UTC
Restart cli using the new version ? [yes,no] (yes) yes

Restarting cli ...
user@host
```

## request system software validate

---

<b>Syntax</b>	request system software validate <i>package-name</i>
<b>Syntax (J-EX Series Switch)</b>	request system software validate <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Validate candidate software against the current configuration of the router or switch.
<b>Options</b>	<p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Validate the software bundle or package on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p> <p><i>package-name</i>—Name of the software bundle or package to test.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• request system software abort</li> <li>• request system software add on page 127</li> <li>• request system software delete on page 131</li> <li>• request system software rollback on page 133</li> </ul>
<b>List of Sample Output</b>	<p>request system software validate (Successful Case) on page 136</p> <p>request system software validate (Failure Case) on page 136</p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system software validate (Successful Case) user@host> request system software validate /var/sw/pkg/jbundle-5.3I20020124_0520_sjg.tgz
Checking compatibility with configuration
Initializing...
Using /packages/jbase-5.3I20020122_1901_sjg
Using /var/sw/pkg/jbundle-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jbase-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jkernel-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jcrypto-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jpfe-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jdocs-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jroute-5.3I20020124_0520_sjg.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete

WARNING: cli has been replaced by an updated version:
CLI release 5.3I0 built by sjg on 2002-01-24 05:23:53 UTC
Restart cli using the new version ? [yes,no] (yes)
```

```
request system software validate (Failure Case) user@host> request system software validate 6.3/
Pushing bundle to lcc0-re0
error: Failed to transfer package to lcc0-re0

user@host> request system software validate test
Pushing bundle to lcc0-re0
Pushing bundle to lcc2-re0

lcc0-re0:
gzip: stdin: not in gzip format
tar: child returned status 1
ERROR: Not a valid package: /var/tmp/test
```

## show system autoinstallation status

<b>Syntax</b>	show system autoinstallation status
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Display autoinstallation status information.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>show system autoinstallation status on page 137</b>
<b>Output Fields</b>	Table 32 on page 137 describes the output fields for the <b>show system autoinstallation status</b> command. Output fields are listed in the approximate order in which they appear.

Table 32: show system autoinstallation status Output Fields

Field Name	Field Description
<b>Autoinstallation status</b>	Display autoinstallation status information: <ul style="list-style-type: none"> <li>• <b>Last committed file</b>—File last committed for autoinstallation configuration.</li> <li>• <b>Configuration server of last committed file</b>—IP address or URL of server configured to retrieve configuration information for the last committed configuration file.</li> <li>• <b>Interface</b>—Interface configured for autoinstallation.               <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of interface.</li> <li>• <b>State</b>—Interface state.</li> </ul> </li> <li>• <b>Address acquisition</b>—Display IP address acquired and protocol used for acquisition upon bootup.               <ul style="list-style-type: none"> <li>• <b>Protocol</b>—Protocol used for acquisition: BOOTP/DHCP or RARP.</li> <li>• <b>Acquired address</b>—IP address acquired from the DHCPserver.</li> </ul> </li> </ul>

## Sample Output

```

show system autoinstallation status user@host> show system autoinstallation status
Autoinstallation status:
Master state: Active
Last committed file: None
Configuration server of last committed file: 0.0.0.0
Interface:
  Name: fe-0/0/1
  State: None
Address acquisition:
  Protocol: DHCP Client
  Acquired address: None
  Protocol: RARP Client
  Acquired address: None

```

## show system boot-messages

<b>Syntax</b>	show system boot-messages
<b>Syntax (J-EX Series Switch)</b>	show system boot-messages <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display initial messages generated by the system kernel upon startup. These messages are the contents of <code>/var/run/dmesg.boot</code> .
<b>Options</b>	<p>none—Display all boot time messages.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display boot time messages on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Display boot time messages on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display boot time messages on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show system boot-messages (QFX Series) on page 138

### Sample Output

```

user@switch> show system boot-messages
getmemsize: msgbufp[size=32768] = 0x81d07fe4

System physical memory distribution:
-----
Total physical memory: 4160749568 (3968 MB)
Physical memory used: 3472883712 (3312 MB)
Physical memory allocated to kernel: 2130706432 (2032 MB)
Physical memory allocated to user BTLB: 1342177280 (1280 MB)
-----

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The Regents of the University of California. All rights reserved.
JUNOS 11.1I #0: 2010-09-17 19:18:07 UTC

ssiano@sv1-junos-pool125.juniper.net:/c/ssiano/DEV_QFX_SI_BRANCH/03/20100917.399988/
obj-xlr/bsd/sys/compile/JUNIPER-DCTOR
WARNING: debug.mpsafenet forced to 0 as ipsec requires Giant
JUNOS 11.1I #0: 2010-09-17 19:18:07 UTC

```

```

ssiano@svl-junos-pool125.juniper.net:/c/ssiano/DEV_QFX_SI_BRANCH/03/20100917.399988/
obj-xlr/bsd/sys/compile/JUNIPER-DCTOR
real memory = 3472883712 (3312MB)
avail memory = 1708171264 (1629MB)
cpuid: 0, btlb_cpumap:0xffffffff8
FreeBSD/SMP: Multiprocessor System Detected: 12 CPUs
ETHERNET SOCKET BRIDGE initialising
Initializing QFX platform properties ..
cpu0 on motherboard
: RMI's XLR CPU Rev. 0.3 with no FPU implemented
  L1 Cache: I size 32kb(32 line), D size 32kb(32 line), eight way.
  L2 Cache: Size 1024kb, eight way
pic_lbus0: <XLR Local Bus>
pic_lbus0: <XLR Local Bus> on motherboard
Enter qfx control ethernet probe addr:0xc5eeec00
gmac4: <XLR GMAC GE Ethernet> on pic_lbus0
me0: Ethernet address 00:1d:b5:f7:68:40
Enter qfx control ethernet probe addr:0xc5eeeb40
gmac5: <XLR GMAC GE Ethernet> on pic_lbus0
me1: Ethernet address 00:1d:b5:f7:68:41
Enter qfx control ethernet probe addr:0xc5eeea80
gmac6: <XLR GMAC GE Ethernet> on pic_lbus0
me1: Ethernet address 00:1d:b5:f7:68:42
sio0 on pic_lbus0
Entering sioattach
sio0: type 16550A, console
xls_setup_intr: skip irq 3, xlr regs are set up somewhere else.
gblmem0 on pic_lbus0
ehci0: <RMI XLS USB 2.0 controller> on pic_lbus0
ehci_bus_attach: allocated resource. tag=1, base=bef24000
xls_ehci_init: endian hardware swapping NOT enabled.
usb0: EHCI version 1.0
usb0 on ehci0
usb0: USB revision 2.0
uhub0: vendor 0x0000 EHCI root hub, class 9/0, rev 2.00/1.00, addr 1
uhub0: 2 ports with 2 removable, self powered
umass0: USB USBFlashDrive, rev 2.00/11.00, addr 2
pcib0: PCIe link 0 up
pcib0: PCIe link 2 up
pcib0: PCIe link 3 up
pcib0: <XLS PCI Host Controller> on pic_lbus0
pci0: <PCI bus> on pcib0
pcib1: <PCI-PCI bridge> at device 0.0 on pci0
pci1: <PCI bus> on pcib1
pci1: <network, ethernet> at device 0.0 (no driver attached)
pcib2: <PCI-PCI bridge> at device 1.0 on pci0
pcib3: <PCI-PCI bridge> at device 2.0 on pci0
pci2: <PCI bus> on pcib3
pci2: <network, ethernet> at device 0.0 (no driver attached)
pcib4: <PCI-PCI bridge> at device 3.0 on pci0
pci3: <PCI bus> on pcib4
pci3: <network, ethernet> at device 0.0 (no driver attached)
cfi device address space at 0xbc000000
cfi0: <AMD/Fujitsu - 8MB> on pic_lbus0
cfi device address space at 0xbc000000
i2c0: <I2C bus controller> on pic_lbus0
i2c1: <I2C bus controller> on pic_lbus0
qfx_fmn0 on pic_lbus0
pool offset 1503776768
xlr_lbus0: <XLR Local Bus Controller> on motherboard

```

```
qfx_bcpld_probe[124]
qfx_bcpld_probe[138]: dev_type=0x0
qfx_bcpld_probe[124]
qfx_bcpld0: QFX BCPLD probe success
qfx_bcpld0qfx_bcpld_attach[174]
qfx_bcpld_attach[207] : bus_space_tag=0x0, bus_space_handle=0xbd900000
qfx_bcpld_probe[124]
qfx_bcpld1: QFX BCPLD probe success
qfx_bcpld1qfx_bcpld_attach[174]
tor_bcpld_slave_attach[1245] : bus_space_tag=0x0, bus_space_handle=0xbda00000
Initializing product: 96 ..
bmeb: bmeb_lib_init done 0xc60a5000, addr 0x809c99a0
bme0:Virtual BME driver initializing
Timecounter "mips" frequency 1200000000 Hz quality 0
Timecounter "xlr_pic_timer" frequency 66666666 Hz quality 1
Timecounters tick every 1.000 msec
Loading the NETPFE fc module
IPsec: Initialized Security Association Processing.
SMP: AP CPU #3 Launched!
SMP: AP CPU #1 Launched!
SMP: AP CPU #2 Launched!
SMP: AP CPU #4 Launched!
SMP: AP CPU #5 Launched!
SMP: AP CPU #7 Launched!
SMP: AP CPU #6 Launched!
SMP: AP CPU #11 Launched!
SMP: AP CPU #10 Launched!
SMP: AP CPU #9 Launched!
SMP: AP CPU #8 Launched!
da0 at umass-sim0 bus 0 target 0 lun 0
da0: <USB USBFlashDrive 1100> Removable Direct Access SCSI-0 device
da0: 40.000MB/s transfers
da0: 3920MB (8028160 512 byte sectors: 255H 63S/T 499C)
Trying to mount root from ufs:/dev/da0s1a
```



## show system license

<b>Syntax</b>	show system license <installed   keys   usage>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display licenses and information about how they are used.
<b>Options</b>	<p>none—Display all license information.</p> <p>installed—(Optional) Display installed licenses only.</p> <p>keys—(Optional) Display a list of license keys. Use this information to verify that each expected license key is present.</p> <p>usage—(Optional) Display the state of licensed features.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p>show system license on page 142</p> <p>show system license installed on page 142</p> <p>show system license keys on page 143</p> <p>show system license usage on page 143</p>
<b>Output Fields</b>	Table 33 on page 141 lists the output fields for the <b>show system license</b> command. Output fields are listed in the approximate order in which they appear.

**Table 33: show system license Output Fields**

Field Name	Field Description
<b>Feature name</b>	Name assigned to the configured feature. You use this information to verify that all the features for which you installed licenses are present.
<b>Licenses used</b>	<p>Number of licenses used by a router or switch. You use this information to verify that the number of licenses used matches the number configured. If a licensed feature is configured, the feature is considered used.</p> <p><b>NOTE:</b> In Junos OS Release 10.1 and later, the <b>Licenses used</b> column displays the actual usage count based on the number of active sessions or connections as reported by the corresponding feature daemons. This is applicable for scalable license-based features such as Subscriber Access (<b>scale-subscriber</b>), L2TP (<b>scale-l2tp</b>), Mobile IP (<b>scale-mobile-ip</b>), and so on.</p>

Table 33: show system license Output Fields (*continued*)

Field Name	Field Description
Licenses installed	Information about the installed license key: <ul style="list-style-type: none"> <li><b>License identifier</b>—Identifier associated with a license key.</li> <li><b>State</b>—State of the license key:<b>valid</b> or <b>invalid</b>. An <b>invalid</b> state indicates that the key was entered incorrectly or is not valid for the specific device.</li> <li><b>License version</b>—Version of a license. The version indicates how the license is validated, the type of signature, and the signer of the license key.</li> <li><b>Valid for device</b>—Device that can use a license key.</li> <li><b>Group defined</b>—Group membership of a device.</li> <li><b>Features</b>—Feature associated with a license, such as data link switching (DLSw).</li> </ul>
Licenses needed	Number of licenses required for features being used but not yet properly licensed.
Expiry	Amount of time left within the grace period before a license is required for a feature being used.

## Sample Output

```

show system license user@host> show system license

License usage:

Feature name                Licenses used  Licenses installed  Licenses needed  Expiry
subscriber-accounting       2              2                   0                permanent
subscriber-authentication   1              2                   0                permanent
subscriber-address-assignment 2              2                   0                permanent
subscriber-vlan             2              2                   0                permanent
subscriber-ip               0              2                   0                permanent
scale-subscriber            2              3                   0                permanent
scale-l2tp                  4              5                   0                permanent
scale-mobile-ip             1              2                   0                permanent

Licenses installed:
License identifier: XXXXXXXXXXXX
License version: 2
Features:
subscriber-accounting - Per Subscriber Radius Accounting
permanent
subscriber-authentication - Per Subscriber Radius Authentication
permanent
subscriber-address-assignment - Radius/SRC Address Pool Assignment
permanent
subscriber-vlan - Dynamic Auto-sensed Vlan
permanent
subscriber-ip - Dynamic and Static IP
permanent

show system license installed user@host> show system license installed
License identifier: XXXXXXXXXXXX
License version: 2
Features:
subscriber-accounting - Per Subscriber Radius Accounting
permanent
subscriber-authentication - Per Subscriber Radius Authentication

```

```

permanent
subscriber-address-assignment - Radius/SRC Address Pool Assignment
permanent
subscriber-vlan - Dynamic Auto-sensed Vlan
permanent
subscriber-ip - Dynamic and Static IP
permanent

```

```

show system license keys user@host> show system license keys
XXXXXXXXXX xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
xxxxxxx xxxxxxx xxx

```

```

show system license usage user@host> show system license usage
License usage:

```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
subscriber-accounting	2	2	0	permanent
subscriber-authentication	1	2	0	permanent
subscriber-address-assignment	2	2	0	permanent
subscriber-vlan	2	2	0	permanent
subscriber-ip	0	2	0	permanent
scale-subscriber	2	3	0	permanent
scale-l2tp	4	5	0	permanent
scale-mobile-ip	1	2	0	permanent

## show system snapshot

<b>Syntax</b>	<pre>show system snapshot &lt;all-members   local   member <i>member-id</i>&gt; &lt;media (external   internal)&gt; &lt;slice (1   2   alternate)&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the complete collection of files in a snapshot.
<b>Options</b>	<p>none—Display the system snapshot on the alternate media, which is the media that does not have the software packages that last booted the switch.</p> <p>all-members   local   member <i>member-id</i>—(J-EX4200 switch only) Display the snapshot in a Virtual Chassis configuration:</p> <ul style="list-style-type: none"> <li>• <b>all-members</b>—Display the snapshot for each switch that is a member of the Virtual Chassis.</li> <li>• <b>local</b>—Display the snapshot on the switch that you are currently logged into.</li> <li>• <b>member <i>member-id</i></b>—Display the snapshot for the specified member switch of the Virtual Chassis.</li> </ul> <p>media (external   internal)—(Optional) Display the destination media location for the snapshot. The <b>external</b> option specifies the snapshot on an external mass storage device, such as a USB flash drive. The <b>internal</b> option specifies the snapshot on an internal memory source, such as internal flash memory.</p> <p>slice (1   2   alternate)—Display the snapshot in a partition:</p> <ul style="list-style-type: none"> <li>• <b>1</b>—Display the snapshot in partition 1.</li> <li>• <b>2</b>—Display the snapshot in partition 2.</li> <li>• <b>alternate</b>—Display the snapshot in the alternate partition, which is the partition that did not boot the switch at the last bootup.</li> </ul>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request system snapshot on page 125</a></li> <li>• <a href="#">Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92</a></li> <li>• <a href="#">Verifying That a System Snapshot Was Created on a J-EX Series Switch on page 100</a></li> </ul>

## show system snapshot media external

```
user@switch> show system snapshot media external
Information for snapshot on external (da1s1)
Creation date: Oct 13 20:23:23 2009
JUNOS version on snapshot:
```

```
jbase : 10.0I20090726_0011_user  
jcrypto-ex: 10.0I20090726_0011_user  
jdocs-ex: 10.0I20090726_0011_user  
jkernel-ex: 10.0I20090726_0011_user  
jroute-ex: 10.0I20090726_0011_user  
jswitch-ex: 10.0I20090726_0011_user  
jweb-ex: 10.0I20090726_0011_user  
jpfe-ex42x: 10.0I20090726_0011_user
```

## show system storage partitions (J-EX Series Switches Only)

<b>Syntax</b>	show system storage partitions <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Display information about the disk partitions on J-EX Series switches.
<b>Options</b>	<p>none—Display partition information.</p> <p><b>all-members</b>—(Optional) Display partition information for all members of the Virtual Chassis.</p> <p><b>local</b>—(Optional) Display partition information for the local Virtual Chassis member.</p> <p><b>member <i>member-id</i></b>—(Optional) Display partition information for the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Verifying Junos OS and Boot Loader Software Versions on a J-EX Series Switch on page 100</li> </ul>
<b>List of Sample Output</b>	<a href="#">show system storage partitions on page 147</a>
<b>Output Fields</b>	Table 34 on page 146 describes the output fields for the <b>show system storage partitions</b> command. Output fields are listed in the approximate order in which they appear.

**Table 34: show system storage partitions Output Fields**

Field Name	Field Description
Boot Media	Media (internal or external) from which the switch was booted.
Active Partition	Name of the active root partition.
Backup Partition	Name of the backup (alternative) root partition.
Currently booted from	Partition from which the switch was last booted.
Partitions information	Information about partitions on the boot media: <ul style="list-style-type: none"> <li>Partition—Partition identifier.</li> <li>Size—Size of partition.</li> <li>Mountpoint—Directory on which the partition is mounted.</li> </ul>

## Sample Output

```
show system storage partitions user@switch> show system storage partitions
fpc0:
-----
Boot Media: internal (da0)
Active Partition: da0s1a
Backup Partition: da0s2a
Currently booted from: active (da0s1a)

Partitions information:
Partition Size Mountpoint
s1a      184M /
s2a      184M altroot
s3d      369M /var/tmp
s3e      123M /var
s4d       62M /config
s4e      unused (backup config)
```





## PART 4

# User Interfaces

- User Interfaces Overview on page 151
- Using the Configuration Tools on page 159
- Operational Commands for User Interfaces on page 161



# User Interfaces Overview

- User Interfaces—Overview on page 151

## User Interfaces—Overview

---

- CLI User Interface Overview on page 151
- J-Web User Interface for J-EX Series Switches Overview on page 153
- Understanding J-Web Configuration Tools on page 155
- Understanding J-Web User Interface Sessions on page 157

## CLI User Interface Overview

You can use two interfaces to monitor, configure, troubleshoot, and manage a J-EX Series Switch: the J-Web graphical user interface and the Junos operating system (Junos OS) command-line interface (CLI). Both of these user interfaces are shipped with the switch. This topic describes the CLI. For information about the J-Web user interface, see “J-Web User Interface for J-EX Series Switches Overview” on page 153.

- CLI Overview on page 151
- CLI Help and Command Completion on page 151
- CLI Command Modes on page 152

### CLI Overview

---

The Junos OS CLI is a command shell that runs on top of a UNIX-based operating system kernel. The CLI provides command help and command completion.

The CLI also provides a variety of UNIX utilities, such as Emacs-style keyboard sequences that allow you to move around on a command line and scroll through recently executed commands, regular expression matching to locate and replace values and identifiers in a configuration, filter command output, or log file entries, store and archive router files on a UNIX-based file system, and exit from the CLI environment and create a UNIX C shell or Bourne shell to navigate the file system, manage switch processes, and so on.

### CLI Help and Command Completion

---

To access CLI Help, type a question mark (?) at any level of the hierarchy. The system displays a list of the available commands or statements and a short description of each.

To complete a command, statement, or option that you have partially typed, press the Tab key or the Spacebar. If the partially typed letters uniquely identify a command, the complete command name appears. Otherwise, a beep indicates that you have entered an ambiguous command and the possible completions are displayed. This completion feature also applies to other strings, such as filenames, interface names, usernames, and configuration statements.

## CLI Command Modes

---

The CLI has two modes, operational mode and configuration mode.

In operational mode, you enter commands to monitor and troubleshoot switch hardware and software and network connectivity. Operational mode is indicated by the > prompt—for example, `user@switch>`.

In configuration mode, you can define all properties of the Junos operating system (Junos OS), including interfaces, VLANs, Virtual Chassis information, routing protocols, user access, and several system hardware properties.

To enter configuration mode, enter the **configure** command:

```
user@switch> configure
```

Configuration mode is indicated by the # prompt, and includes the current location in the configuration hierarchy—for example:

```
[edit interfaces ge-0/0/12]
user@switch#
```

In configuration mode, you are actually viewing and changing the candidate configuration file. The candidate configuration allows you to make configuration changes without causing operational changes to the current operating configuration, called the active configuration. When you commit the changes you added to the candidate configuration, the system updates the active configuration. Candidate configurations enable you to alter your configuration without causing potential damage to your current network operations.

To activate your configuration changes, enter the **commit** command.

To return to operational mode, go to the top of the configuration hierarchy and then quit—for example:

```
[edit interfaces ge-0/0/12]
user@switch# top
[edit]
user@switch# exit
```

You can also activate your configuration changes and exit configuration mode with a single command, **commit and-quit**. This command succeeds only if there are no mistakes or syntax errors in the configuration.



**TIP:** When you commit the candidate configuration, you can require an explicit confirmation for the commit to become permanent by using the `commit`

confirmed command. This is useful for verifying that a configuration change works correctly and does not prevent management access to the switch. After you issue the `commit confirmed` command, you must issue another `commit` command within the defined period of time (10 minutes by default) or the system reverts to the previous configuration.

**Related Documentation**

- J-EX Series Switch Software Features Overview on page 3
- *Junos OS CLI User Guide*

## J-Web User Interface for J-EX Series Switches Overview

You can use two interfaces to monitor, configure, troubleshoot, and manage a J-EX Series Switch: the J-Web graphical user interface and the Junos OS command-line interface (CLI). Both user interfaces are shipped with the switch. This topic describes the J-Web interface. You can navigate the J-Web interface, scroll pages, and expand and collapse elements as you do in a typical Web browser interface. For information about the CLI user interface, see “CLI User Interface Overview” on page 151.



**NOTE:**

To access the J-Web interface, your management device must have the following software installed:

- Operating system: Microsoft Windows XP Service Pack 3
- Browser version: One of the following. Other browsers might work but are not supported by J-Series platforms.
  - Microsoft Internet Explorer version 7.0
  - Mozilla Firefox version 3.0
- Additional requirements:
  - Only English-language browsers are supported.
  - The browser and the network must be able to receive and process HTTP/1.1 gzip compressed data.

Each page of the J-Web interface is divided into panes.

- Top pane—Displays system identity information and links.
- Main pane—Location where you monitor, configure, diagnose (troubleshoot), and manage (maintain) the switch by entering information in text boxes, making selections, and clicking buttons.
- Side pane—Displays suboptions of the Monitor, Configure, Troubleshoot, or Maintain task currently displayed in the main pane. Click a suboption to access it in the main pane.

The layout of the panes allows you to quickly navigate through the interface. Table 35 on page 154 summarizes the elements of the J-Web interface.

The J-Web interface provides CLI tools that allow you to perform all of the tasks that you can perform from the Junos OS command-line interface (CLI), including a CLI Viewer to view the current configuration, a CLI Editor for viewing and modifying the configuration, and a Point & Click CLI editor that allows you to click through all of the available CLI statements.

**Table 35: J-Web Interface**

J-Web Interface Element	Description
<b>Top Pane</b>	
Host	The hostname of the switch.
Logged in as: username	The username you used to log in to the switch.
Commit Options	<p>A set of options using which you can configure committing multiple changes with a single commit.</p> <ul style="list-style-type: none"> <li>• <b>Commit</b>—Commits the candidate configuration of the current user session, along with changes from other user sessions.</li> <li>• <b>Compare</b>—Displays the XML log of pending configurations on the device.</li> <li>• <b>Discard</b>—Discards the candidate configuration of the current user session, along with changes from other user sessions.</li> <li>• <b>Preference</b>—Indicates your choice of committing all configurations changes together or committing each configuration change immediately. The two commit options are: <ul style="list-style-type: none"> <li>• <b>Commit changes immediately</b>—Sets the system to force an immediate commit on every page after every configuration change.</li> <li>• <b>Validate changes until explicit commit</b>—Loads all configuration changes for an accumulated single commit. If there are errors in loading the configuration, the errors are logged. This is the default mode.</li> </ul> </li> </ul> <p><b>NOTE:</b> There are some pages on which configuration changes must be committed immediately. For such pages, if you configure the commit options for a single commit, the system displays warning notifications that remind you to commit your changes immediately. An example for such a page is <b>Switching</b>.</p>
Help	<p>Displays links to information on help and the J-Web interface.</p> <ul style="list-style-type: none"> <li>• <b>Help Contents</b>—View context-sensitive help topics.</li> <li>• <b>About</b>—Displays information about the J-Web interface, such as the version number.</li> </ul>
Logout	Ends your current login session with the switch and returns you to the login page.

Table 35: J-Web Interface (*continued*)

J-Web Interface Element	Description
Taskbar	<p>Menu of J-Web main options. Click the tab to access an option.</p> <ul style="list-style-type: none"> <li>• Dashboard—Displays a high-level, graphical view of the chassis and status of the switch. It displays system health information, alarms, and system status.</li> <li>• Configure—Configure the switch, and view configuration history.</li> <li>• Monitor—View information about configuration and hardware on the switch.</li> <li>• Maintain—Manage files and licenses, upgrade software, and reboot the switch.</li> <li>• Troubleshoot—Run diagnostic tools to troubleshoot network issues.</li> </ul>
<b>Main Pane</b>	
Help (?) icon	Displays useful information—such as the definition, format, and valid range of an option—when you move the cursor over the question mark.
Red asterisk (*)	Indicates a required field.
Icon legend	<p>(Applies to the Point &amp; Click CLI editor only) Explains icons that appear in the user interface to provide information about configuration statements:</p> <ul style="list-style-type: none"> <li>• C—Comment. Move your cursor over the icon to view a comment about the configuration statement.</li> <li>• I—Inactive. The configuration statement does not apply for the switch.</li> <li>• M—Modified. The configuration statement has been added or modified.</li> <li>• *—Mandatory. The configuration statement must have a value.</li> </ul>
<b>Task Pane</b>	
Configuration hierarchy	<p>(Applies to the Junos OS CLI configuration editor only) Displays the hierarchy of committed statements in the switch configuration.</p> <ul style="list-style-type: none"> <li>• Click <b>Expand all</b> to display the entire hierarchy.</li> <li>• Click <b>Hide all</b> to display only the statements at the top level.</li> <li>• Click plus signs (+) to expand individual items.</li> <li>• Click minus signs (-) to hide individual items.</li> </ul>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Using the Commit Options to Commit Configuration Changes (J-Web Procedure) on page 346</li> <li>• J-EX Series Switch Software Features Overview on page 3</li> <li>• J-EX4200 Switches Hardware Overview on page 29</li> <li>• J-EX Series Switch Software Features Overview on page 3</li> <li>• Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187</li> <li>• CLI User Interface Overview on page 151</li> </ul>

## Understanding J-Web Configuration Tools

The J-Web graphical user interface (GUI) allows you to monitor, configure, troubleshoot, and manage the switching platform by means of a Web browser with Hypertext Transfer

Protocol (HTTP) or HTTP over Secure Sockets Layer (HTTPS) enabled. The J-Web interface provides access to all the configuration statements supported by the switch.

The J-Web interface provides three methods of configuring the switch:

- Configure menu
- Point & Click CLI Editor
- CLI Editor

Table 36 on page 156 gives a comparison of the three methods of configuration.

**Table 36: Switching Platform Configuration Interfaces**

Tool	Description	Function	Use
Configure menu	<p>Web browser pages for setting up the switch quickly and easily without configuring each statement individually.</p> <p>For example, use the Virtual Chassis Configuration page to configure the Virtual Chassis parameters on a J-EX4200 switch.</p> <p><b>NOTE:</b> You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration and management of a J-EX4500 Virtual Chassis.</p>	<p>Configure basic switch platform services:</p> <ul style="list-style-type: none"> <li>• Interfaces</li> <li>• Switching</li> <li>• Virtual Chassis</li> <li>• Security</li> <li>• Services</li> <li>• System Properties</li> <li>• Routing</li> </ul>	Use for basic configuration.
Point & Click CLI editor	<p>Web browser pages divided into panes in which you can do any of the following:</p> <ul style="list-style-type: none"> <li>• Expand the entire configuration hierarchy and click a configuration statement to view or edit. The main pane displays all the options for the statement, with a text box for each option.</li> <li>• Paste a complete configuration hierarchy into a scrollable text box, or edit individual lines.</li> <li>• Upload or download a complete configuration.</li> <li>• Roll back to a previous configuration.</li> <li>• Create or delete a rescue configuration.</li> </ul>	<p>Configure all switching platform services:</p> <ul style="list-style-type: none"> <li>• System parameters</li> <li>• User Accounting and Access</li> <li>• Interfaces</li> <li>• VLAN properties</li> <li>• Virtual Chassis properties</li> <li>• Secure Access</li> <li>• Services</li> <li>• Routing protocols</li> </ul>	Use for complete configuration if you are not familiar with the Junos OS CLI or prefer a graphical interface.
CLI editor	<p>Interface in which you do any of the following:</p> <ul style="list-style-type: none"> <li>• Type commands on a line and press <b>Enter</b> to create a hierarchy of configuration statements.</li> <li>• Create an ASCII text file that contains the statement hierarchy.</li> <li>• Upload a complete configuration, or roll back to a previous configuration.</li> <li>• Create or delete a rescue configuration.</li> </ul>	<p>Configure all switching platform services:</p> <ul style="list-style-type: none"> <li>• System parameters</li> <li>• User Accounting and Access</li> <li>• Interfaces</li> <li>• VLAN properties</li> <li>• Virtual Chassis properties</li> <li>• Secure Access</li> <li>• Services</li> <li>• Routing protocols</li> </ul>	Use for complete configuration if you know the Junos OS CLI or prefer a command interface.



- Related Documentation**
- Understanding J-Web User Interface Sessions on page 157
  - J-Web User Interface for J-EX Series Switches Overview on page 153
  - Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
  - Configuration Files Terms on page 328

## Understanding J-Web User Interface Sessions

You establish a J-Web session with the switch through an HTTP-enabled or HTTPS-enabled Web browser. The HTTPS protocol, which uses 128-bit encryption, is available only in domestic versions of the Junos operating system (Junos OS). To use HTTPS, you must have installed a certificate on the switch and enabled HTTPS. See “Generating SSL Certificates to Be Used for Secure Web Access” on page 410.

When you attempt to log in through the J-Web interface, the switch authenticates your username with the same methods used for Telnet and SSH.

If the switch does not detect any activity through the J-Web interface for 15 minutes, the session times out and is terminated. You must log in again to begin a new session.

To explicitly terminate a J-Web session at any time, click **Logout** in the top pane.

- Related Documentation**
- J-Web User Interface for J-EX Series Switches Overview on page 153
  - Configuring Management Access for the J-EX Series Switch (J-Web Procedure) on page 407



# Using the Configuration Tools

- Using the CLI Terminal on page 159
- Starting the J-Web Interface on page 160

## Using the CLI Terminal

---

The J-Web CLI terminal provides access to the Junos OS command-line interface (CLI) through the J-Web interface. The functionality and behavior of the CLI available through the CLI terminal page is the same as that of the Junos OS CLI available through the switch console. The CLI terminal supports all CLI commands and other features such as CLI help and autocompletion. Using the CLI terminal page you can fully configure, monitor, and manage the switch.

- Before you can use the CLI terminal, you must configure the domain name and hostname of the switch. See “Configuring System Identity for the J-EX Series Switch (J-Web Procedure)” on page 193 for more information.
- To access the CLI through the J-Web interface, your management device requires the following features:
  - SSH access—Enable Secure shell (SSH) on your system. SSH provides a secured method of logging in to the switch, to encrypt traffic so that it is not intercepted. If SSH is not enabled on the system, the CLI terminal page displays an error.
  - Java applet support—Make sure that your Web browser supports Java applets.
  - JRE installed on the client—Install Java Runtime Environment (JRE) version 1.4 or later on your system. JRE is a software package that must be installed on a system to run Java applications. Download the latest JRE version from the Java Software website <http://www.java.com/>. Installing JRE installs Java plug-ins, which once installed, load automatically and transparently to render Java applets.



**NOTE:** The CLI terminal is supported on JRE version 1.4 and later only.

To access the CLI terminal, select **Troubleshoot > CLI Terminal**.

**Related  
Documentation**

- CLI User Interface Overview on page 151

- Understanding J-Web Configuration Tools on page 155

## Starting the J-Web Interface

---

You can use the J-Web graphical interface to configure and manage the J-EX Series switch.

To start the J-Web interface:

1. Launch your HTTP-enabled or HTTPS-enabled Web browser.

To use HTTPS, you must have installed a certificate on the switch and enabled HTTPS.

2. After **http://** or **https://** in your Web browser, type the hostname or IP address of the switch and press **Enter**.

The J-Web login page appears.

3. On the login page, type your username and password, and click **Log In**.

To correct or change the username or password you typed, click **Reset**, type the new entry or entries, and click **Log In**.



**NOTE:** The default username is root with no password. You must change this during initial configuration or the system does not accept the configuration.

The Chassis Dashboard information page appears.

To explicitly terminate a J-Web session at any time, click **Logout** in the top pane.

### Related Documentation

- J-Web User Interface for J-EX Series Switches Overview on page 153
- Understanding How to Use the J-Web Interface to View System Information

CHAPTER 13

# Operational Commands for User Interfaces

## set cli complete-on-space

---

<b>Syntax</b>	set cli complete-on-space (off   on)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the command-line interface (CLI) to complete a partial command entry when you type a space or a tab. This is the default behavior of the CLI.
<b>Options</b>	off—Turn off command completion. on—Allow either a space or a tab to be used for command completion.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• show cli on page 171</li></ul>
<b>List of Sample Output</b>	set cli complete-on-space on page 162
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

<b>set cli complete-on-space</b>	In the following example, pressing the Spacebar changes the partial command entry from <b>com</b> to <b>complete-on-space</b> . The example shows how adding the keyword <b>off</b> at the end of the command disables command completion.  user@host> set cli com<Space> user@host>set cli complete-on-space off Disabling complete-on-space
----------------------------------	---

## set cli directory

---

<b>Syntax</b>	set cli directory <i>directory</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the current working directory.
<b>Options</b>	<i>directory</i> —Pathname of the working directory.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <a href="#">show cli directory on page 176</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli directory on page 163</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
set cli directory user@host> set cli directory /var/home/regress
Current directory: /var/home/regress
```

## set cli idle-timeout

---

<b>Syntax</b>	set cli idle-timeout <minutes>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the maximum time that an individual session can be idle before the user is logged off the router or switch.
<b>Options</b>	<i>minutes</i> —(Optional) Maximum idle time. The range of values, in minutes, is 0 through 100,000. If you do not issue this command, and the user's login class does not specify this value, the user is never forced off the system after extended idle times. Setting the value to 0 disables the timeout.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <a href="#">show cli on page 171</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli idle-timeout on page 164</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
set cli idle-timeout user@host> set cli idle-timeout 60
Idle timeout set to 60 minutes
```



## set cli prompt

---

<b>Syntax</b>	set cli prompt <i>string</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the prompt so that it is displayed within the CLI.
<b>Options</b>	<i>string</i> —CLI prompt string. To include spaces in the prompt, enclose the string in quotation marks. By default, the string is <i>username@hostname</i> .
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <a href="#">show cli on page 171</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli prompt on page 165</a>
<b>Output Fields</b>	When you enter this command, the new CLI prompt is displayed.

### Sample Output

```
set cli prompt user@host> set cli prompt lab1-router>
lab1-router>
```

## set cli restart-on-upgrade

---

<b>Syntax</b>	set cli restart-on-upgrade string (off   on)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For an individual session, set the CLI to prompt you to restart the router or switch after upgrading the software.
<b>Options</b>	off—Disables the prompt. on—Enables the prompt.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• show cli on page 171</li></ul>
<b>List of Sample Output</b>	set cli restart-on-upgrade on page 166
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

<b>set cli restart-on-upgrade</b>	user@host> set cli restart-on-upgrade on Enabling restart-on-upgrade
-----------------------------------	---

---

## set cli screen-length

---

<b>Syntax</b>	<code>set cli screen-length <i>length</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set terminal screen length.
<b>Options</b>	<i>length</i> —Number of lines of text that the terminal screen displays (0 through 10,000). The default is 24.
<b>Additional Information</b>	The point at which the <b>---(more)---</b> prompt appears on the screen is a function of this setting and the settings for the <b>set cli screen-width</b> and <b>set cli terminal</b> commands.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <b>set cli screen-width</b> on page 168</li><li>• <b>set cli terminal</b> on page 169</li><li>• <b>show cli</b> on page 171</li></ul>
<b>List of Sample Output</b>	<b>set cli screen-length</b> on page 167
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
set cli screen-length user@host> set cli screen-length 75
Screen length set to 75
```

## set cli screen-width

---

<b>Syntax</b>	set cli screen-width <i>width</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the terminal screen width.
<b>Options</b>	<i>width</i> —Number of characters ( <b>0</b> through <b>1024</b> ) in a line. The default is <b>80</b> .
<b>Additional Information</b>	The point at which the <b>---(more)---</b> prompt appears on the screen is a function of this setting and the settings for the <b>set cli screen-length</b> and <b>set cli terminal</b> commands.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <b>set cli screen-length</b> on page 167</li><li>• <b>set cli terminal</b> on page 169</li><li>• <b>show cli</b> on page 171</li></ul>
<b>List of Sample Output</b>	<b>set cli screen-width</b> on page 168
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
set cli screen-width user@host> set cli screen-width
Screen width set to 132
```

## set cli terminal

---

<b>Syntax</b>	set cli terminal <i>terminal-type</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the terminal type.
<b>Options</b>	<p><i>terminal-type</i>—Type of terminal that is connected to the Ethernet management port:</p> <ul style="list-style-type: none"> <li>• <b>ansi</b>—ANSI-compatible terminal (80 characters by 24 lines)</li> <li>• <b>small-xterm</b>—Small xterm window (80 characters by 24 lines)</li> <li>• <b>vt100</b>—VT100-compatible terminal (80 characters by 24 lines)</li> <li>• <b>xterm</b>—Large xterm window (80 characters by 65 lines)</li> </ul>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• CLI User Interface Overview</li> <li>• <a href="#">set cli screen-length on page 167</a></li> <li>• <a href="#">set cli screen-width on page 168</a></li> <li>• <a href="#">show cli on page 171</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">set cli terminal on page 169</a>
<b>Output Fields</b>	This command provides no output.

### Sample Output

```
set cli terminal user@host> set cli terminal xterm
```

## set cli timestamp

---

<b>Syntax</b>	set cli timestamp (format <i>timestamp-format</i>   disable)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set a timestamp for CLI output.
<b>Options</b>	<p>format <i>timestamp-format</i>—Set the date and time format for the timestamp. The timestamp format you specify can include the following placeholders in any order:</p> <ul style="list-style-type: none"><li>• <b>%m</b>—Two-digit month</li><li>• <b>%d</b>—Two-digit date</li><li>• <b>%T</b>—Six-digit hour, minute, and seconds</li></ul> <p>disable—Remove the timestamp from the CLI.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• CLI User Interface Overview</li><li>• <a href="#">show cli on page 171</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli timestamp on page 170</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
set cli timestamp user@host> set cli timestamp format '%m-%d-%T'
'04-21-17:39:13'
CLI timestamp set to: '%m-%d-%T'
```

## show cli

<b>Syntax</b>	show cli
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display configured CLI settings.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli on page 171</a>
<b>Output Fields</b>	Table 37 on page 171 lists the output fields for the <b>show cli</b> command. Output fields are listed in the approximate order in which they appear.

**Table 37: show cli Output Fields**

Field Name	Field Description
CLI complete-on-space	Capability to complete a partial command entry when you type a space or a tab: <b>on</b> or <b>off</b> .
CLI idle-timeout	Maximum time that an individual session can be idle before the user is logged off the router or switch. When this feature is enabled, the number of minutes is displayed. Otherwise, the state is <b>disabled</b> .
CLI restart-on-upgrade	CLI is set to prompt you to restart the router or switch after upgrading the software: <b>on</b> or <b>off</b> .
CLI screen-length	Number of lines of text that the terminal screen displays.
CLI screen-width	Number of characters in a line on the terminal screen.
CLI terminal	Terminal type.
CLI is operating in	Mode: <b>enhanced</b> .
CLI timestamp	Date and time format for the timestamp. If the timestamp is not set, the state is <b>disabled</b> .
CLI working directory	Pathname of the working directory.

## Sample Output

```
show cli user@host> show cli
CLI complete-on-space set to on
CLI idle-timeout disabled
CLI restart-on-upgrade set to on
CLI screen-length set to 47
CLI screen-width set to 132
CLI terminal is 'vt100'
CLI is operating in enhanced mode
```

```
CLI timestamp disabled  
CLI working directory is '/var/home/regress'
```



## show cli authorization

<b>Syntax</b>	show cli authorization
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the permissions for the current user.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli authorization on page 175</a>
<b>Output Fields</b>	Table 38 on page 173 lists the output fields for the <b>show cli authorization</b> command. In the table, all possible permissions are displayed and output fields are listed in alphabetical order.

**Table 38: show cli authorization Output Fields**

Field Name	Field Description
access	Can view access configuration information.
access-control	Can modify access configuration.
admin	Can view user account information.
admin-control	Can modify user account information.
clear	Can clear learned network information.
configure	Can enter configuration mode.
control	Can modify any configuration.
edit	Can edit configuration files.
field	Reserved for field (debugging) support.
firewall	Can view firewall configuration information.
firewall-control	Can modify firewall configuration information.
floppy	Can read from and write to removable media.
flow-tap	Can view flow-tap configuration information.
flow-tap-control	Can configure flow-tap configuration information.

Table 38: show cli authorization Output Fields (*continued*)

Field Name	Field Description
<b>idp-profiler-operation</b>	Can configure Profiler data.
<b>interface</b>	Can view interface configuration information.
<b>interface-control</b>	Can modify interface configuration information.
<b>maintenance</b>	Can perform system maintenance.
<b>network</b>	Can access the network by entering the <b>ping</b> , <b>ssh</b> , <b>telnet</b> , and <b>traceroute</b> commands.
<b>pgcp-session-mirroring</b>	Can view Packet Gateway Control Protocol (PGCP) session mirroring configuration.
<b>pgcp-session-mirroring-control</b>	Can modify PGCP session mirroring configuration all-control.
<b>reset</b>	Can reset or restart interfaces and system processes.
<b>rollback</b>	Can roll back to previous configurations.
<b>routing</b>	Can view routing configuration information.
<b>routing-control</b>	Can modify routing configuration information.
<b>secret</b>	Can view passwords and authentication keys in the configuration.
<b>secret-control</b>	Can modify passwords and authentication keys in the configuration.
<b>security</b>	Can view security configuration information.
<b>security-control</b>	Can modify security configuration information.
<b>shell</b>	Can start a local shell.
<b>snmp</b>	Can view SNMP configuration information.
<b>snmp-control</b>	Can modify SNMP configuration information.
<b>system</b>	Can view system configuration information.
<b>system-control</b>	Can modify system configuration information.
<b>trace</b>	Can view trace file settings information.
<b>trace-control</b>	Can modify trace file settings information.
<b>view</b>	Can view current values and statistics.

Table 38: show cli authorization Output Fields (*continued*)

Field Name	Field Description
view-configuration	Can view all configuration information (not including secrets).

## Sample Output

```

show cli authorization user@host> show cli authorization
Current user: 'remote' login: 'user' class ''
Permissions:
  admin          -- Can view user accounts
  admin-control -- Can modify user accounts
  clear          -- Can clear learned network information
  configure      -- Can enter configuration mode
  control        -- Can modify any configuration
  edit           -- Can edit full files
  field          -- Special for field (debug) support
  floppy         -- Can read and write from the floppy
  interface      -- Can view interface configuration
  interface-control -- Can modify interface configuration
  network        -- Can access the network
  reset          -- Can reset/restart interfaces and daemons
  routing        -- Can view routing configuration
  routing-control -- Can modify routing configuration
  shell          -- Can start a local shell
  snmp           -- Can view SNMP configuration
  snmp-control   -- Can modify SNMP configuration
  system         -- Can view system configuration
  system-control -- Can modify system configuration
  trace          -- Can view trace file settings
  trace-control  -- Can modify trace file settings
  view           -- Can view current values and statistics
  maintenance    -- Can become the super-user
  firewall       -- Can view firewall configuration
  firewall-control -- Can modify firewall configuration
  secret         -- Can view secret configuration
  secret-control -- Can modify secret configuration
  rollback       -- Can rollback to previous configurations
  security       -- Can view security configuration
  security-control -- Can modify security configuration
  access         -- Can view access configuration
  access-control -- Can modify access configuration
  view-configuration -- Can view all configuration (not including secrets)
  flow-tap       -- Can view flow-tap configuration
  flow-tap-control -- Can configure flow-tap service
Individual command authorization:
  Allow regular expression: none
  Deny regular expression: none
  Allow configuration regular expression: none
  Deny configuration regular expression: none

```

## show cli directory

---

<b>Syntax</b>	show cli directory
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the current working directory.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>show cli directory on page 176</b>
<b>Output Fields</b>	Table 39 on page 176 lists the output fields for the <b>show cli directory</b> command. Output fields are listed in the approximate order in which they appear.

**Table 39: show cli directory Output Fields**

Field Name	Field Description
Current directory	Pathname of the current working directory.

---

## Sample Output

```
show cli directory user@host> show cli directory
Current directory: /var/home/regress
```

## show cli history

---

<b>Syntax</b>	show cli history <count>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display a list of previous CLI commands.
<b>Options</b>	none—Display all previous CLI commands.  count—(Optional) Maximum number of commands to display.

**Required Privilege Level** view

**List of Sample Output** [show cli history on page 177](#)

**Output Fields** Table 40 on page 177 lists the output fields for the **show cli history** command. Output fields are listed in the approximate order in which they appear.

**Table 40: show cli history Output Fields**


Field Name	Field Description
<i>timestamp</i>	Time at which the command was entered.
<i>command-syntax</i>	Command that was entered.

## Sample Output

```
show cli history user@host> show cli history
11:14:14 -- show arp
11:22:10 -- show cli authorization
11:27:12 -- show cli history
```

## start shell

---

<b>Syntax</b>	start shell (csh   sh) <user <i>username</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Exit from the CLI environment and create a UNIX-level shell. To return to the CLI, type <b>exit</b> from the shell.
	<p> <b>NOTE:</b> To issue this command, the user must have the required login access privileges configured by including the <b>permissions</b> statement at the [edit <b>system login class <i>class-name</i></b>] hierarchy level.</p> <p>UNIX wheel group membership or permissions are no longer required to issue this command.</p>
<b>Options</b>	<p><b>csh</b>—Create a UNIX C shell.</p> <p><b>sh</b>—Create a UNIX Bourne shell.</p> <p><b>user <i>username</i></b>—(Optional) Start the shell as another user.</p>
<b>Additional Information</b>	<p>When you are in the shell, the shell prompt has the following format:</p> <p><i>username@hostname%</i></p> <p>An example of the prompt is:</p> <p><b>root@host%</b></p>
<b>Required Privilege Level</b>	shell and maintenance
<b>List of Sample Output</b>	<b>start shell csh on page 178</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

start shell csh  user@host> start shell csh
                  %
                  exit
                  %
                  username@hostname% start shell sh
                  %
                  exit
                  user@host>

```

## PART 5

# Junos OS for J-EX Series Switches System Setup

- System Setup Overview on page 181
- Initial Configuration on page 185
- Configuration Statements for System Setup on page 195
- Operational Commands for System Setup on page 227





# System Setup Overview

- Junos OS—Overview on page 181

## Junos OS—Overview

---

- J-EX Series Switch Software Features Overview on page 181
- Understanding Software Infrastructure and Processes on page 182

## J-EX Series Switch Software Features Overview

The following tables list the J-EX Series Switches software features, the Junos OS release in which they were introduced, and the first Junos OS release for each switch:

- Table 2 on page 4—First Junos OS Release for Each J-EX Series Switch
- Table 3 on page 4—Access Control Features
- Table 4 on page 5—Administration Features
- Table 5 on page 5—Class-of-Service (CoS) Features
- Table 6 on page 6—Device Security Features
- Table 7 on page 6—Fibre Channel over Ethernet Features
- Table 8 on page 7—High Availability and Resiliency Features
- Table 9 on page 8—Interfaces Features
- Table 10 on page 9—IP Address Management Features
- Table 11 on page 9—IPv6 Features
- Table 12 on page 10—Layer 2 Network Protocols Features
- Table 13 on page 10—Layer 3 Protocols Features
- Table 14 on page 12—MPLS Features
- Table 15 on page 12—Multicast Features
- Table 16 on page 13—Network Management and Monitoring Features
- Table 17 on page 14—Port Security Features
- Table 18 on page 15—Routing Policy and Packet Filtering Features

- Table 19 on page 15—Spanning-Tree Protocols Features
- Table 20 on page 16—System Management Features

The Junos OS release for software features on a switch cannot be earlier than the first Junos OS release for that switch.

**Related Documentation**

- J-EX4200 Switches Hardware Overview on page 29
- J-EX4500 Switches Hardware Overview on page 31
- J-EX8208 Switch Hardware Overview on page 35
- J-EX8216 Switch Hardware Overview on page 38
- Layer 3 Protocols Supported on J-EX Series Switches on page 17
- Layer 3 Protocols Not Supported on J-EX Series Switches on page 18

## Understanding Software Infrastructure and Processes

Each switch runs the Junos operating system (Junos OS) for J-EX Series Switches on its general-purpose processors. Junos OS includes processes for Internet Protocol (IP) routing and for managing interfaces, networks, and the chassis.

The Junos OS runs on the Routing Engine. The Routing Engine kernel coordinates communication among the Junos OS processes and provides a link to the Packet Forwarding Engine.

With the J-Web interface and the command-line interface (CLI) to the Junos OS, you configure switching features and routing protocols and set the properties of network interfaces on your switch. After activating a software configuration, use either the J-Web or CLI user interface to monitor the switch, manage operations, and diagnose protocol and network connectivity problems.

- Routing Engine and Packet Forwarding Engine on page 182
- Junos OS Processes on page 183

### Routing Engine and Packet Forwarding Engine

A switch has two primary software processing components:

- Packet Forwarding Engine—Processes packets; applies filters, routing policies, and other features; and forwards packets to the next hop along the route to their final destination.
- Routing Engine—Provides three main functions:
  - Creates the packet forwarding switch fabric for the switch, providing route lookup, filtering, and switching on incoming data packets, then directing outbound packets to the appropriate interface for transmission to the network
  - Maintains the routing tables used by the switch and controls the routing protocols that run on the switch.

- Provides control and monitoring functions for the switch, including controlling power and monitoring system status.

### Junos OS Processes

The Junos OS running on the Routing Engine and Packet Forwarding Engine consists of multiple processes that are responsible for individual functions.

The separation of functions provides operational stability, because each process accesses its own protected memory space. In addition, because each process is a separate software package, you can selectively upgrade all or part of the Junos OS, for added flexibility.

Table 23 on page 26 describes the primary Junos OS processes.

**Table 41: Junos OS Processes**

Process	Name	Description
Chassis process	chassisd	<p>Detects hardware on the system that is used to configure network interfaces.</p> <p>Monitors the physical status of hardware components and field-replaceable units (FRUs), detecting when environment sensors such as temperature sensors are triggered.</p> <p>Relays signals and interrupts—for example, when devices are taken offline, so that the system can close sessions and shut down gracefully.</p>
Ethernet switching process	eswd	<p>Handles Layer 2 switching functionality such as MAC address learning, Spanning Tree protocol and access port security. The process is also responsible for managing Ethernet switching interfaces, VLANs, and VLAN interfaces.</p> <p>Manages Ethernet switching interfaces, VLANs, and VLAN interfaces.</p>
Forwarding process	pfem	<p>Defines how routing protocols operate on the switch. The overall performance of the switch is largely determined by the effectiveness of the forwarding process.</p>
Interface process	dcd	<p>Configures and monitors network interfaces by defining physical characteristics such as link encapsulation, hold times, and keepalive timers.</p>
Management process	mgd	<p>Provides communication between the other processes and an interface to the configuration database.</p> <p>Populates the configuration database with configuration information and retrieves the information when queried by other processes to ensure that the system operates as configured.</p> <p>Interacts with the other processes when commands are issued through one of the user interfaces on the switch.</p> <p>If a process terminates or fails to start when called, the management process attempts to restart it a limited number of times to prevent thrashing and logs any failure information for further investigation.</p>
Routing protocol process	rpd	<p>Defines how routing protocols such as RIP, OSPF, and BGP operate on the device, including selecting routes and maintaining forwarding tables.</p>

- Related Documentation**
- For more information about processes, see the *Junos OS Network Operations Guide*
  - For more information about basic system parameters, supported protocols, and software processes, see the *Junos OS System Basics Configuration Guide*

# Initial Configuration

- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
- Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
- Configuring Date and Time for the J-EX Series Switch (J-Web Procedure) on page 192
- Configuring System Identity for a J-EX Series Switch (J-Web Procedure) on page 193

## Connecting and Configuring a J-EX Series Switch (CLI Procedure)

---

There are two ways to connect and configure a J-EX Series switch: one method is through the console using the command-line interface (CLI) and the other is using the J-Web interface. This topic describes the CLI procedure.



**NOTE:** To run the `ezsetup` script, the switch must have the factory default configuration as the active configuration. If you have configured anything on the switch and want to run `ezsetup`, revert to the factory default configuration. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.

Before you begin connecting and configuring a J-EX Series switch through the console using the CLI:

- Set the following parameter values in the console server or PC:
  - Baud Rate—9600
  - Flow Control—None
  - Data—8
  - Parity—None

- Stop Bits—1
- DCD State—Disregard

To connect and configure the switch from the console using the CLI:

1. Connect the console port to a laptop or PC using the RJ-45 to DB-9 serial port adapter. The RJ-45 cable and RJ-45 to DB-9 serial port adapter are supplied with the switch.
  - J-EX4500 switch—The console port is located on the front panel of the switch.
  - J-EX8200 switch—The console port is located on the Switch Fabric and Routing Engine (SRE) module in slot SRE0 in a J-EX8208 switch or on the Routing Engine (RE) module in slot RE0 in a J-EX8216 switch.
2. At the Junos OS shell prompt **root%**, type **ezsetup**.
3. Enter the hostname. This is optional.
4. Enter the root password you plan to use for this device. You are prompted to re-enter the root password.
5. Enter **yes** to enable services like Telnet and SSH. By default, Telnet is not enabled and SSH is enabled.



**NOTE:** When Telnet is enabled, you will not be able to log in to a J-EX Series switch through Telnet using root credentials. Root login is allowed only for SSH access.

6. Use the Management Options page to select the management scenario:



**NOTE:** On J-EX4500 and J-EX8200 switches, only the out-of-band management option is available.

- **Configure in-band management.** In this scenario you have the following two options:
    - Use the default VLAN.
    - Create a new VLAN—If you select this option, you are prompted to specify the VLAN name, VLAN ID, management IP address, and default gateway. Select the ports that must be part of this VLAN.
  - **Configure out-of-band management.** Specify the IP address and gateway of the management interface. Use this IP address to connect to the switch.
7. Specify the SNMP Read Community, Location, and Contact to configure SNMP parameters. These parameters are optional.
  8. Specify the system date and time. Select the time zone from the list. These options are optional.

9. The configured parameters are displayed. Enter **yes** to commit the configuration. The configuration is committed as the active configuration for the switch.
10. (For J-EX4500 switches only) Enter the **request chassis pic-mode intraconnect** operational mode command to set the PIC mode to intraconnect.

You can now log in with the CLI or the J-Web interface to continue configuring the switch. If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

**Related Documentation**

- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
- Installing and Connecting a J-EX4200 Switch
- Installing and Connecting a J-EX4500 Switch
- Installing and Connecting a J-EX8208 Switch
- Installing and Connecting a J-EX8216 Switch

## Connecting and Configuring a J-EX Series Switch (J-Web Procedure)

---

There are two ways to connect and configure a J-EX Series switch: one method is through the console using the command-line interface (CLI) and the other is using the J-Web interface. This topic describes the J-Web procedure.



**NOTE:** Before you begin the configuration, enable a DHCP client on the management PC you will connect to the switch so that the PC can obtain an IP address dynamically.

---



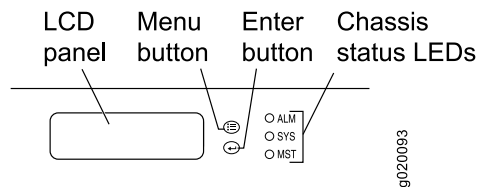
**NOTE:** Read the following steps before you begin the configuration. You must complete the initial configuration using EZSetup within 10 minutes. The switch exits EZSetup after 10 minutes and reverts to the factory default configuration, and the PC loses connectivity to the switch.

- J-EX4200, J-EX4500, or J-EX8200 switch—The LCD panel displays a count-down timer when the switch is in initial setup mode.

To connect and configure the switch using the J-Web interface:

1. Transition the switch into initial setup mode:
  - J-EX4200, J-EX4500, or J-EX8200 switch—Use the **Menu** and **Enter** buttons located to the right of the LCD panel (see Figure 6 on page 188):

**Figure 6: LCD Panel in a J-EX4200, J-EX4500, or J-EX8200 Switch**



1. Press the **Menu** button until you see **MAINTENANCE MENU**. Then press the **Enter** button.
  2. Press **Menu** until you see **ENTER EZSetup**. Then press **Enter**.
 

If EZSetup does not appear as an option in the menu, select Factory Default to return the switch to the factory default configuration. EZSetup is displayed in the menu of standalone switches only when a switch is set to the factory default configuration.
  3. Press **Enter** to confirm setup and continue with EZSetup.
2. Connect the Ethernet cable from the Ethernet port on the PC to the switch.
  - J-EX4200 switch—Connect the cable to port 0 (**ge-0/0/0**) on the front panel of the switch.
  - J-EX4500 switch—Connect the cable to the port labeled **MGMT** on the front panel of the switch.
  - J-EX8200 switch—Connect the cable to the port labeled **MGMT** on the Switch Fabric and Routing Engine (SRE) module in slot SRE0 in a J-EX8208 switch or on the Routing Engine (RE) module in slot RE0 in a J-EX8216 switch.

These ports are configured as the DHCP server with the default IP address, **192.168.1.1**. The switch can assign an IP address to the management PC in the IP address range **192.168.1.2** through **192.168.1.253**.

3. From the PC, open a Web browser, type **http://192.168.1.1** in the address field, and press Enter.



4. On the J-Web login page, type **root** as the username, leave the password field blank, and click **Login**.
5. On the Introduction page, click **Next**.
6. On the Basic Settings page, modify the hostname, the root password, and date and time settings:
  - Enter the hostname. This is optional.
  - Enter a password and reenter the password.
  - Specify the time zone.
  - Synchronize the date and time settings of the switch with the management PC or set them manually by selecting the appropriate option button. This is optional.

Click **Next**.

7. Use the Management Options page to select the management scenario:



**NOTE:** On J-EX4500 and J-EX8200 switches, only the out-of-band management option is available.

- **In-band Management—Use VLAN 'default' for management.**

Select this option to configure all data interfaces as members of the default VLAN. Click **Next**. Specify the management IP address and the default gateway for the default VLAN.

- **In-band Management—Create new VLAN for management.**

Select this option to create a management VLAN. Click **Next**. Specify the VLAN name, VLAN ID, member interfaces, management IP address, and default gateway for the new VLAN.

- **Out-of-band Management—Configure management port.**

Select this option to configure only the management interface. Click **Next**. Specify the IP address and default gateway for the management interface.

8. Click **Next**.
9. On the Manage Access page, you may select options to enable Telnet, SSH, and SNMP services. For SNMP, you can configure the read community, location, and contact.
10. Click **Next**. The Summary screen displays the configured settings.
11. Click **Finish**. The configuration is committed as the active switch configuration.



**NOTE:** After the configuration is committed, the connectivity between the PC and the switch might be lost. To renew the connection, release and renew the IP address by executing the appropriate commands on the management PC or by removing and reinserting the Ethernet cable.

12. (For J-EX4500 switches only) In the CLI, enter the **request chassis pic-mode intraconnect** operational mode command to set the PIC mode to intraconnect.

You can now log in using the CLI or the J-Web interface to continue configuring the switch.

If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

#### Related Documentation

- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Installing and Connecting a J-EX4200 Switch
- Installing and Connecting a J-EX4500 Switch
- Installing and Connecting a J-EX8208 Switch
- Installing and Connecting a J-EX8216 Switch

## Configuring the LCD Panel on J-EX Series Switches (CLI Procedure)

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The LCD panel on the front panel of J-EX Series switches displays a variety of information about the switch in the Status menu and provides the Maintenance menu to allow you to perform basic operations such as initial setup and reboot. You can disable these menus or individual menu options if you do not want switch users to use them. You can also set a custom message that will be displayed on the panel.

This topic describes:

- Disabling or Enabling Menus and Menu Options on the LCD Panel on page 190
- Configuring a Custom Display Message on page 191

### Disabling or Enabling Menus and Menu Options on the LCD Panel

By default, the Maintenance menu, the Status menu, and the options in those menus in the LCD panel are enabled. Users can configure and troubleshoot the switch using the Maintenance menu and view certain details about the switch using the Status menu.

If you do not want users to be able to use those menus or use some of the menu options, you can disable the menus or individual menu options. You can re-enable the menus or menu options.

Issue the **show chassis lcd** operational mode command to see which menus and menu options are currently enabled.



**NOTE:** On some platforms you must specify an FPC slot number in these commands. See the `lcd-menu` statement for details.

To disable a menu:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-name disable
```

To enable a menu:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-name disable
```

To disable a menu option:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-option disable
```

To enable a menu option:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-option disable
```

## Configuring a Custom Display Message

You can configure the second line of the LCD to display a custom message temporarily for 5 minutes or permanently.

To display a custom message temporarily:

- On a standalone J-EX4200 switch or a J-EX8200 switch:

```
user@switch> set chassis display message message
```

- On a switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number
```

To display a custom message permanently:

- On a standalone J-EX4200 or J-EX4500 switch or a J-EX8200 switch:

```
user@switch> set chassis display message message permanent
```

- On a switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number permanent
```



**NOTE:** The Menu button and the Enter button are disabled if the LCD is configured to display a custom message.

To disable the display of the custom message:

```
user@switch> clear chassis display message
```

You can view the custom message by issuing the command `show chassis lcd`.

- Related Documentation**
- LCD Panel in J-EX4200 Switches
  - LCD Panel in J-EX4500 Switches
  - LCD Panel in a J-EX8200 Switch

## Configuring Date and Time for the J-EX Series Switch (J-Web Procedure)

To configure date and time on a J-EX Series switch:

1. Select **Configure > System Properties > Date & Time**.
2. To modify the information, click **Edit**. Enter information into the Edit Date & Time page as described in Table 42 on page 192.
3. Click one:
  - To apply the configuration, click **OK**.
  - To cancel your entries and return to the System Properties page, click **Cancel**.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

**Table 42: Date and Time Settings**

Time	Function	Your Action
Time Zone	Identifies the timezone that the switching platform is located in.	Select the appropriate time zone from the list.
Set Time	Synchronizes the system time with that of the NTP server. You can also manually set the system time and date.	To immediately set the time, click one: <ul style="list-style-type: none"> <li>• <b>Synchronize with PC time</b>—The switch synchronizes the time with that of the PC.</li> <li>• <b>NTP Servers</b>—The switch sends a request to the NTP server and synchronizes the system time.</li> <li>• <b>Manual</b>—A pop-up window allows you to select the current date and time from a list.</li> </ul>

- Related Documentation**
- J-Web User Interface for J-EX Series Switches Overview on page 153

## Configuring System Identity for a J-EX Series Switch (J-Web Procedure)

To configure identification details for a J-EX Series switch:

1. Select **Configure > System Properties > System Identity**. The System Identity page displays configuration details.
2. To modify the configuration, click **Edit**. Enter information into the System Identity page as described in Table 43 on page 193.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

**Table 43: Set Up Configuration Summary**

Field	Function	Your Action
Host Name	Defines the hostname of the switching platform.	Type the hostname.
Domain Name	Defines the network or subnetwork that the machine belongs to.	Type the domain name.
Root Password	Sets the root password that user root can use to log in to the switching platform.	Type a plain-text password. The system encrypts the password.  <b>NOTE:</b> After a root password has been defined, it is required when you log in to the J-Web user interface or the CLI.
Confirm Root Password	Verifies that the root password has been typed correctly.	Retype the password.
DNS Name Servers	Specifies a DNS server for the switching platform to use to resolve hostnames into addresses.	To add an IP address, click <b>Add</b> . To edit an IP address, click <b>Edit</b> . To delete an IP address, click <b>Delete</b> .
Domain Search	Specifies the domains to be searched.	To add a domain, click <b>Add</b> . To edit a domain click <b>Edit</b> . To delete a domain, click <b>Delete</b> .

**Related Documentation**

- Configuring Date and Time for the J-EX Series Switch (J-Web Procedure) on page 192



CHAPTER 16

# Configuration Statements for System Setup

## arp

---

<b>Syntax</b>	<pre>arp {   aging-timer <i>minutes</i>;   gratuitous-arp-delay<i>seconds</i>;   gratuitous-arp-on-ifup;   interfaces {     <i>interface-name</i> {       aging-timer <i>minutes</i>;     }   }   passive-learning;   purging; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify ARP options. You can enable backup VRRP routers to learn ARP requests for VRRP-IP to VRRP-MAC address translation. You can also set the time interval between ARP updates.
<b>Options</b>	<p><b>aging-timer</b>—Time interval in minutes between ARP updates. In environments where the number of ARP entries to update is high (for example, on routers only, metro Ethernet environments), increasing the time between updates can improve system performance.</p> <p><b>Default:</b> 20 minutes</p> <p><b>Range:</b> 5 to 240 minutes</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS ARP Learning and Aging Options for Mapping IPv4 Network Addresses to MAC Addresses</li><li><i>Junos OS Network Interfaces Configuration Guide</i></li></ul>



## authentication-key

---

<b>Syntax</b>	<code>authentication-key <i>key-number</i> type <i>type</i> value <i>password</i>;</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure Network Time Protocol (NTP) authentication keys so that the router or switch can send authenticated packets. If you configure the router or switch to operate in authenticated mode, you must configure a key.</p> <p>Both the keys and the authentication scheme (MD5) must be identical between a set of peers sharing the same key number.</p>
<b>Options</b>	<p><b><i>key-number</i></b>—Positive integer that identifies the key.</p> <p><b><i>type type</i></b>—Authentication type. It can only be <b>md5</b>.</p> <p><b><i>value password</i></b>—The key itself, which can be from 1 through 8 ASCII characters. If the key contains spaces, enclose it in quotation marks.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring NTP Authentication Keys</a></li> <li>• <a href="#">broadcast on page 200</a></li> <li>• <a href="#">peer on page 220</a></li> <li>• <a href="#">server on page 223</a></li> <li>• <a href="#">trusted-key on page 226</a></li> </ul>

## auxiliary

---

<b>Syntax</b>	<pre>auxiliary {   disable;   insecure;   type <i>terminal-type</i>; }</pre>
<b>Hierarchy Level</b>	[edit system ports]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the characteristics of the auxiliary port.
<b>Default</b>	The auxiliary port is disabled.
<b>Options</b>	<p><b>disable</b>—Disable the port.</p> <p><b>insecure</b>—Disable super user access or root logins to establish terminal connection.</p> <p><b>type <i>terminal-type</i></b>—Type of terminal that is connected to the port.</p> <p><b>Range:</b> ansi, vt100, small-xterm, xterm</p> <p><b>Default:</b> The terminal type is unknown, and the user is prompted for the terminal type.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Set Console and Auxiliary Port Properties</li></ul>

---

## boot-server (NTP)

---

<b>Syntax</b>	<code>boot-server (address   hostname);</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure the server that NTP queries when the router or switch boots to determine the local date and time.</p> <p>When you boot the router or switch, it issues an <b>ntpdate</b> request, which polls a network server to determine the local date and time. You need to configure a server that the router or switch uses to determine the time when the router or switch boots. Otherwise, NTP will not be able to synchronize to a time server if the server's time appears to be very far off of the local router's or switch's time. You can either configure an IP address or a hostname for the boot server. If you configure a hostname instead of an IP address, the <b>ntpdate</b> request resolves the hostname to an IP address when the router or switch boots up.</p>
<b>Options</b>	<ul style="list-style-type: none"><li>• <b>address</b>—The IP address of an NTP boot server.</li><li>• <b>hostname</b>—The hostname of an NTP boot server.</li></ul>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Synchronizing and Coordinating Time Distribution Using NTP</li></ul>

## broadcast

---

<b>Syntax</b>	<code>broadcast address &lt;key key-number&gt; &lt;version value&gt; &lt;tll value&gt;;</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the local router or switch to operate in broadcast mode with the remote system at the specified <b>address</b> . In this mode, the local router or switch sends periodic broadcast messages to a client population at the specified broadcast or multicast <b>address</b> . Normally, you include this statement only when the local router or switch is operating as a transmitter.
<b>Options</b>	<p><b>address</b>—The broadcast address on one of the local networks or a multicast address assigned to NTP. You must specify an address, not a hostname. If the multicast address is used, it must be <b>224.0.1.1</b>.</p> <p><b>key key-number</b>—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number. <b>Range:</b> Any unsigned 32-bit integer</p> <p><b>tll value</b>—(Optional) Time-to-live (TTL) value to use. <b>Range:</b> 1 through 255 <b>Default:</b> 1</p> <p><b>version value</b>—(Optional) Specify the version number to be used in outgoing NTP packets. <b>Range:</b> 1 through 4 <b>Default:</b> 4</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the NTP Time Server and Time Services</li></ul>

---

## broadcast-client

---

<b>Syntax</b>	broadcast-client;
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the local router or switch to listen for broadcast messages on the local network to discover other servers on the same subnet.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Router or Switch to Listen for Broadcast Messages Using NTP</li></ul>

## console (Physical Port)

---

<b>Syntax</b>	<pre>console {   disable;   insecure;   log-out-on-disconnect;   type <i>terminal-type</i>; }</pre>
<b>Hierarchy Level</b>	[edit system ports]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the characteristics of the console port.
<b>Default</b>	The console port is enabled and its speed is 9600 baud.
<b>Options</b>	<p><b>disable</b>—Disable console login connections.</p> <p><b>insecure</b>—Disable root login connections to the console and auxiliary ports. Configuring the console port as insecure also prevents superusers and anyone with a user identifier (UID) of 0 from establishing terminal connections in multiuser mode.</p> <p><b>log-out-on-disconnect</b>—Log out the session when the data carrier on the console port is lost.</p> <p><b>type <i>terminal-type</i></b>—Type of terminal that is connected to the port.</p> <p><b>Range:</b> ansi, vt100, small-xterm, xterm</p> <p><b>Default:</b> The terminal type is unknown, and the user is prompted for the terminal type.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Set Console and Auxiliary Port Properties</li></ul>

## default-address-selection

<b>Syntax</b>	default-address-selection;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Use the loopback interface, <b>lo0</b> , as the source address for all locally generated IP packets when the packet is sent through a routed interface, but not when the packet is sent through a local interface such as <b>fxp0</b> . The <b>lo0</b> interface is the interface to the router's or switch's Routing Engine.
<b>Default</b>	<p>The default address is used as the source address for all locally generated IP packets on outgoing interfaces that are unnumbered. If an outgoing interface is numbered, the default address is chosen using the following sequence:</p> <ul style="list-style-type: none"> <li>• The primary address on the loopback interface <b>lo0</b> that is <i>not</i> <b>127.0.0.1</b> is used.</li> <li>• The primary address for the primary interface or the preferred address (if configured) for the primary interface is used.</li> </ul> <p>By default, the primary address on an interface is selected as the numerically lowest local address configured on the interface.</p> <p>An interface's <i>primary address</i> is used by default as the local address for broadcast and multicast packets sourced locally and sent out through the interface. An interface's <i>preferred address</i> is the default local address used for packets sourced by the local router or switch to destinations on the subnet. By default, the numerically lowest local address configured for the interface is chosen as the preferred address on the subnet.</p> <p>To configure a different primary address or preferred address, include the <b>primary</b> or <b>preferred</b> statement at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> or [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> hierarchy levels.</p> <p>For more information about default, primary, and preferred addresses for an interface, see "Configuring Default, Primary, and Preferred Addresses and Interfaces" in the <i>Junos OS Network Interfaces Configuration Guide</i>.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the Junos OS to Select a Fixed Source Address for Locally Generated TCP/IP Packets</li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul>

## domain-name

---

<b>Syntax</b>	<code>domain-name <i>domain-name</i>;</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the name of the domain in which the router or switch is located. This is the default domain name that is appended to hostnames that are not fully qualified.
<b>Options</b>	<i>domain-name</i> —Name of the domain.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Domain Name for the Router or Switch</li></ul>

## gre-path-mtu-discovery

---

<b>Syntax</b>	<code>(gre-path-mtu-discovery   no-gre-path-mtu-discovery);</code>
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure path MTU discovery for outgoing GRE tunnel connections: <ul style="list-style-type: none"><li><code>gre-path-mtu-discovery</code>—Path MTU discovery is enabled.</li><li><code>no-gre-path-mtu-discovery</code>—Path MTU discovery is disabled.</li></ul>
<b>Default</b>	Path MTU discovery is enabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS for Path MTU Discovery on Outgoing GRE Tunnel Connections</li></ul>



## host-name

---

<b>Syntax</b>	<code>host-name <i>hostname</i>;</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the hostname of the router or switch.
<b>Options</b>	<i>hostname</i> —Name of the router or switch.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Hostname of the Router or Switch</li> </ul>

## icmpv4-rate-limit

---

<b>Syntax</b>	<pre>icmpv4-rate-limit {   bucket-size <i>seconds</i>;   packet-rate <i>pps</i>; }</pre>
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure rate-limiting parameters for ICMPv4 messages sent.
<b>Options</b>	<p><b>bucket-size <i>seconds</i></b>—Number of seconds in the rate-limiting bucket.  <b>Range:</b> 0 through 4294967295 seconds  <b>Default:</b> 5</p> <p><b>packet-rate <i>pps</i></b>—Rate-limiting packets earned per second.  <b>Range:</b> 0 through 4294967295 pps  <b>Default:</b> 1000</p>
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages</li> </ul>

## icmpv6-rate-limit

---

<b>Syntax</b>	<pre>icmpv6-rate-limit {     bucket-size <i>seconds</i>;     packet-rate <i>packet-rate</i>; }</pre>
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure rate-limiting parameters for ICMPv6 messages sent.
<b>Options</b>	<p><b>bucket-size <i>seconds</i></b>—Number of seconds in the rate-limiting bucket. <b>Range:</b> 0 through 4294967295 seconds <b>Default:</b> 5</p> <p><b>packet-rate <i>pps</i></b>—Rate-limiting packets earned per second. <b>Range:</b> 0 through 4294967295 pps <b>Default:</b> 1000</p>
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS ICMPv6 Rate Limit for ICMPv6 Routing Engine Messages</li></ul>

---

## inet6-backup-router

---

<b>Syntax</b>	<code>inet6-backup-router <i>address</i> &lt;destination <i>destination-address</i>&gt;;</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set a default router (running IP version 6 [IPv6]) to use while the local router or switch (running IPv6) is booting and if the routing protocol processes fail to start. The Junos OS removes the route to this router or switch as soon as the software starts.
<b>Options</b>	<p><i>address</i>—Address of the default router.</p> <p><i>destination destination-address</i>—(Optional) Destination address that is reachable through the backup router. Include this option to achieve network reachability while loading, configuring, and recovering the router or switch, but without the risk of installing a default route in the forwarding table.</p> <p><b>Default:</b> All hosts (default route) are reachable through the backup router.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring a Backup Router</li></ul>

## internet-options

<b>Syntax</b>	<pre> internet-options {   (gre-path-mtu-discovery   no-gre-path-mtu-discovery);   icmpv4-rate-limit bucket-size <i>bucket-size</i> packet-rate <i>packet-rate</i>;   icmpv6-rate-limit bucket-size <i>bucket-size</i> packet-rate <i>packet-rate</i>;   (ipip-path-mtu-discovery   no-ipip-path-mtu-discovery);   ipv6-duplicate-addr-detection-transmits;   (ipv6-reject-zero-hop-limit   no-ipv6-reject-zero-hop-limit);   (ipv6-path-mtu-discovery   no-ipv6-path-mtu-discovery);   ipv6-path-mtu-discovery-timeout;   no-tcp-rfc1323;   no-tcp-rfc1323-paws;   (path-mtu-discovery   no-path-mtu-discovery);   source-port upper-limit &lt;<i>upper-limit</i>&gt;;   (source-quench   no-source-quench);   tcp-drop-synfin-set;   tcp-mss <i>mss-value</i>; } </pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure system IP options to protect against certain types of denial-of-service (DoS) attacks.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring the Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages</a></li> <li>• <a href="#">Configuring the Junos OS ICMPv6 Rate Limit for ICMPv6 Routing Engine Messages</a></li> <li>• <a href="#">Configuring the Junos OS for IP-IP Path MTU Discovery on IP-IP Tunnel Connections</a></li> <li>• <a href="#">Configuring the Junos OS for Path MTU Discovery on Outgoing GRE Tunnel Connections</a></li> <li>• <a href="#">Configuring the Junos OS for Path MTU Discovery on Outgoing TCP Connections</a></li> <li>• <a href="#">Configuring the Junos OS for IPv6 Duplicate Address Detection Attempts</a></li> <li>• <a href="#">Configuring the Junos OS for Acceptance of IPv6 Packets with a Zero Hop Limit</a></li> <li>• <a href="#">Configuring the Junos OS to Ignore ICMP Source Quench Messages</a></li> <li>• <a href="#">Configuring the Junos OS to Enable the Router or Switch to Drop Packets with the SYN and FIN Bits Set</a></li> <li>• <a href="#">Configuring the Junos OS to Disable TCP RFC 1323 Extensions</a></li> <li>• <a href="#">Configuring the Junos OS to Disable the TCP RFC 1323 PAWS Extension</a></li> <li>• <a href="#">Configuring the Junos OS to Extend the Default Port Address Range</a></li> </ul>

- Configuring TCP MSS for Session Negotiation

## ipip-path-mtu-discovery

---

<b>Syntax</b>	( <code>ipip-path-mtu-discovery</code>   <code>no-ipip-path-mtu-discovery</code> );
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure path MTU discovery for outgoing IP-IP tunnel connections: <ul style="list-style-type: none"> <li>• <code>ipip-path-mtu-discovery</code>—Path MTU discovery is enabled.</li> <li>• <code>no-ipip-path-mtu-discovery</code>—Path MTU discovery is disabled.</li> </ul>
<b>Default</b>	Path MTU discovery is enabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the Junos OS for IP-IP Path MTU Discovery on IP-IP Tunnel Connections</li> <li>• <a href="#">internet-options on page 208</a></li> </ul>

## ipv6-duplicate-addr-detection-transmits

---

<b>Syntax</b>	<code>ipv6-duplicate-addr-detection-transmits</code> ;
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Control the number of attempts for IPv6 duplicate address detection.
<b>Default</b>	The default value is 3.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the Junos OS for IPv6 Duplicate Address Detection Attempts</li> </ul>

## ipv6-path-mtu-discovery

---

<b>Syntax</b>	( <code>ipv6-path-mtu-discovery</code>   <code>no-ipv6-path-mtu-discovery</code> );
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure path MTU discovery for IPv6 packets: <ul style="list-style-type: none"><li>• <code>ipv6-path-mtu-discovery</code>—IPv6 path MTU discovery is enabled.</li><li>• <code>no-ipv6-path-mtu-discovery</code>—IPv6 path MTU discovery is disabled.</li></ul>
<b>Default</b>	IPv6 path MTU discovery is enabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Junos OS for IPv6 Path MTU Discovery</li></ul>

## ipv6-path-mtu-discovery-timeout

---

<b>Syntax</b>	<code>ipv6-path-mtu-discovery-timeout</code> <i>minutes</i> ;
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the IPv6 path MTU discovery timeout interval.
<b>Options</b>	<i>minutes</i> —IPv6 path MTU discovery timeout. <b>Default:</b> 10 minutes
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Junos OS for IPv6 Path MTU Discovery</li></ul>

---

## ipv6-reject-zero-hop-limit

---

<b>Syntax</b>	(ipv6-reject-zero-hop-limit   no-ipv6-reject-zero-hop-limit);
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Enable and disable rejecting incoming IPv6 packets with a zero hop limit value in their header.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS for Acceptance of IPv6 Packets with a Zero Hop Limit</li></ul>

## lcd-menu

<b>Syntax</b>	J-EX4200, or J-EX4500 switch:  <pre>lcd-menu fpc slot-number {   menu-item (menu-name   menu-option); }</pre> J-EX8200 switch:  <pre>lcd-menu {   menu-item (menu-name   menu-option); }</pre>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable or enable the Maintenance menu or the Status menu in the LCD panel.
<b>Options</b>	<p><b>none</b>—(J-EX8200 switches only) Disable or enable the specified menu or menu options.</p> <p><b>fpc slot-number</b>—(J-EX4200 and J-EX4500 switches only) Disable or enable the specified menu or menu options, where <b>slot-number</b> is:</p> <ul style="list-style-type: none"> <li>• 0—On a standalone J-EX4200 switch or a J-EX4500 switch</li> <li>• 0–9—On a J-EX4200 switch in a Virtual Chassis. The value is the member ID of the switch.</li> </ul> <p>The remaining statement is explained separately.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-level—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190</li> <li>• LCD Panel in J-EX4200 Switches</li> <li>• LCD Panel in J-EX4500 Switches</li> <li>• LCD Panel in a J-EX8200 Switch</li> </ul>



## location

<b>Syntax</b>	<pre>location {   altitude <i>feet</i>;   building <i>name</i>;   country-code <i>code</i>;   floor <i>number</i>;   hcoord <i>horizontal-coordinate</i>;   lata <i>service-area</i>;   latitude <i>degrees</i>;   longitude <i>degrees</i>;   npa-nxx <i>number</i>;   postal-code <i>postal-code</i>;   rack <i>number</i>;   vcoord <i>vertical-coordinate</i>; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the system location in various formats.
<b>Options</b>	<p><b>altitude <i>feet</i></b>—Number of feet above sea level.</p> <p><b>building <i>name</i></b>—Name of building. The name of the building can be 1 to 28 characters in length. If the string contains spaces, enclose it in quotation marks (" ").</p> <p><b>country-code <i>code</i></b>—Two-letter country code.</p> <p><b>floor <i>number</i></b>—Floor in the building.</p> <p><b>hcoord <i>horizontal-coordinate</i></b>—Bellcore Horizontal Coordinate.</p> <p><b>lata <i>service-area</i></b>—Long-distance service area.</p> <p><b>latitude <i>degrees</i></b>—Latitude in degree format.</p> <p><b>longitude <i>degrees</i></b>—Longitude in degree format.</p> <p><b>npa-nxx <i>number</i></b>—First six digits of the phone number (area code and exchange).</p> <p><b>postal-code <i>postal-code</i></b>—Postal code.</p> <p><b>rack <i>number</i></b>—Rack number.</p> <p><b>vcoord <i>vertical-coordinate</i></b>—Bellcore Vertical Coordinate.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Physical Location of the Router or Switch</li> </ul>

## menu-item

<b>Syntax</b>	<code>menu-item (menu-name   menu-option);</code>
<b>Hierarchy Level</b>	<code>[edit chassis lcd-menu fpc slot-number]</code>
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable or enable the Maintenance menu, the Status menu, or an individual option in one of those menus in the LCD panel.
<b>Options</b>	<p><i>menu-name</i>—Name of the LCD menu:</p> <ul style="list-style-type: none"> <li>• <code>maintenance-menu</code></li> <li>• <code>status-menu</code></li> </ul> <p><i>menu-option</i>—Specific option on one of the LCD menus. You must include the quotation marks when you type the option.</p> <ul style="list-style-type: none"> <li>• <code>"maintenance-menu halt-menu"</code>—System halt option</li> <li>• <code>"maintenance-menu system-reboot"</code>—System reboot option</li> <li>• <code>"maintenance-menu rescue-config"</code>—Load rescue option</li> <li>• <code>"maintenance-menu vc-uplink-config"</code>—(J-EX4200 switches only) Request VC port option for a J-EX4200 switch in a Virtual Chassis configuration</li> <li>• <code>"maintenance-menu factory-default"</code>—Factory default option</li> <li>• <code>"status-menu vcp-status"</code>—(J-EX4200 switches only) Virtual Chassis port (VCP) status for a J-EX4200 switch in a Virtual Chassis configuration</li> <li>• <code>"status-menu sf-status1-menu"</code>—(J-EX8200 switches only) Status of the switch fabric on the Switch Fabric and Routing Engine (SRE) module in slot SRE0 on J-EX8208 switches. Status of the switch fabric on the Switch Fabric (SF) modules in slots SF0 and SF1 on J-EX8216 switches.</li> <li>• <code>"status-menu sf-status2-menu"</code>—(J-EX8200 switches only) Status of the switch fabric on the SRE module in slot SRE1 on J-EX8208 switches. Status of the switch fabric on the SF modules in slots SF2–SF5 on J-EX8216 switches.</li> <li>• <code>"status-menu sf-status3-menu"</code>—(J-EX8216 switches only) Status of the switch fabric on the SF modules in slots SF6 and SF7</li> <li>• <code>"status-menu power-status"</code>—(J-EX4200 and J-EX4500 switches only) Status of the power supply</li> <li>• <code>"status-menu psu-status1-menu"</code>—(J-EX8200 switches only) Status of the power supplies in slots P0 and P1</li> <li>• <code>"status-menu psu-status2-menu"</code>—(J-EX8200 switches only) Status of the power supplies in slots P2–P5</li> <li>• <code>"status-menu environ-status"</code>—Status of the fan and the temperature</li> </ul>

- **"status-menu show-version"**—The version of Junos OS for J-EX Series switches loaded on the switch

**Required Privilege Level** view-level—To view this statement in the configuration.  
control-level—To add this statement to the configuration.

**Related Documentation**

- Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
- LCD Panel in J-EX4200 Switches
- LCD Panel in J-EX4500 Switches
- LCD Panel in a J-EX8200 Switch

## multicast-client

---

**Syntax** multicast-client <address>;

**Hierarchy Level** [edit system ntp]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** For NTP, configure the local router or switch to listen for multicast messages on the local network to discover other servers on the same subnet.

**Options** **address**—(Optional) One or more IP addresses. If you specify addresses, the router or switch joins those multicast groups.

**Default:** 224.0.1.1.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Configuring the Router or Switch to Listen for Multicast Messages Using NTP

## no-multicast-echo

---

<b>Syntax</b>	no-multicast-echo;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable the Routing Engine from responding to ICMP echo requests sent to multicast group addresses.
<b>Default</b>	The Routing Engine responds to ICMP echo requests sent to multicast group addresses.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Disable the Routing Engine Response to Multicast Ping Packets</li></ul>

## no-ping-record-route

---

<b>Syntax</b>	no-ping-record-route;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the Junos OS to disable the reporting of the IP address in ping responses.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Disable the Reporting of IP Address and Timestamps in Ping Responses</li></ul>

## no-ping-time-stamp

---

<b>Syntax</b>	no-ping-time-stamp;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the Junos OS to disable the recording of timestamps in ping responses.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Junos OS to Disable the Reporting of IP Address and Timestamps in Ping Responses</li> </ul>

## no-redirects

---

<b>Syntax</b>	no-redirects;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Disable the sending of protocol redirect messages by the router or switch.</p> <p>To disable the sending of redirect messages on a per-interface basis, include the <b>no-redirects</b> statement at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i>] hierarchy level.</p>
<b>Default</b>	The router or switch sends redirect messages.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Junos OS to Disable Protocol Redirect Messages on the Router or Switch</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul>

## no-tcp-rfc1323

---

<b>Syntax</b>	no-tcp-rfc1323;
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the Junos OS to disable RFC 1323 TCP extensions.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Disable TCP RFC 1323 Extensions</li></ul>

## no-tcp-rfc1323-paws

---

<b>Syntax</b>	no-tcp-rfc1323-paws;
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the Junos OS to disable the RFC 1323 Protection Against Wrapped Sequence (PAWS) number extension.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Disable the TCP RFC 1323 PAWS Extension</li></ul>

## ntp

<b>Syntax</b>	<pre>ntp {   authentication-key <i>number</i> <i>type</i> <i>type</i> <i>value</i> <i>password</i>;   boot-server <i>address</i>;   broadcast &lt;<i>address</i>&gt; &lt;<i>key</i> <i>key-number</i>&gt; &lt;<i>version</i> <i>value</i>&gt; &lt;<i>tll</i> <i>value</i>&gt;;   broadcast-client;   multicast-client &lt;<i>address</i>&gt;;   peer <i>address</i> &lt;<i>key</i> <i>key-number</i>&gt; &lt;<i>version</i> <i>value</i>&gt; &lt;<i>prefer</i>&gt;;   server <i>address</i> &lt;<i>key</i> <i>key-number</i>&gt; &lt;<i>version</i> <i>value</i>&gt; &lt;<i>prefer</i>&gt;;   source-address <i>source-address</i>;   trusted-key [ <i>key-numbers</i> ]; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure NTP on the router or switch.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Synchronizing and Coordinating Time Distribution Using NTP</li> </ul>

## path-mtu-discovery

<b>Syntax</b>	(path-mtu-discovery   no-path-mtu-discovery);
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure path MTU discovery for outgoing Transmission Control Protocol (TCP) connections:</p> <ul style="list-style-type: none"> <li><b>path-mtu-discovery</b>—Path MTU discovery is enabled.</li> <li><b>no-path-mtu-discovery</b>—Path MTU discovery is disabled.</li> </ul>
<b>Default</b>	Path MTU discovery is enabled.
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Junos OS for Path MTU Discovery on Outgoing TCP Connections</li> </ul>

## peer

---

<b>Syntax</b>	<code>peer address &lt;key key-number&gt; &lt;version value&gt; &lt;prefer&gt;;</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For NTP, configure the local router or switch to operate in symmetric active mode with the remote system at the specified address. In this mode, the local router or switch and the remote system can synchronize with each other. This configuration is useful in a network in which either the local router or switch or the remote system might be a better source of time.
<b>Options</b>	<p><b>address</b>—Address of the remote system. You must specify an address, not a hostname.</p> <p><b>key key-number</b>—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number.</p> <p><b>Range:</b> Any unsigned 32-bit integer</p> <p><b>prefer</b>—(Optional) Mark the remote system as the preferred host, which means that if all other factors are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p><b>version value</b>—(Optional) Specify the NTP version number to be used in outgoing NTP packets.</p> <p><b>Range:</b> 1 through 4</p> <p><b>Default:</b> 4</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the NTP Time Server and Time Services</li></ul>



---

## ports

---

**Syntax**

```
ports {
  auxiliary {
    disable;
    insecure;
    type terminal-type;
  }
  console {
    disable;
    insecure;
    log-out-on-disconnect;
    type terminal-type;
  }
}
```

**Hierarchy Level** [edit system]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure the properties of the console and auxiliary ports. The ports are located on the router's craft interface.

See the switch's hardware documentation for port locations.

The remaining statements are explained separately.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring the Junos OS to Set Console and Auxiliary Port Properties](#)

## processes

**Syntax** `processes {  
     process-name (enable | disable) failover (alternate-media | other-routing-engine);  
     timeout seconds;  
 }`

**Hierarchy Level** [edit system]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure which Junos OS processes are running on the router or switch.



**CAUTION:** Never disable any of the software processes unless instructed to do so by a customer support engineer.

**Default** All processes are enabled by default.

**Options** `(enable | disable)`—(Optional) Enable or disable a specified process.

`failover (alternate-media | other-routing-engine)`—(Optional) For routers or switches with redundant Routing Engines only, switch to backup media if a process fails repeatedly. If a process fails four times within 30 seconds, the router or switch reboots from the alternate media or the other Routing Engine.

`process-name`—One of the valid process names. You can obtain a complete list of process names by using the CLI command completion feature. After specifying a process name, command completion also indicates any additional options for that process.

`timeout seconds`—(Optional) How often the system checks the watchdog timer, in seconds. If the watchdog timer has not been checked in the specified number of seconds, the system reloads. If you set the time value too low, it is possible for the system to reboot immediately after it loads.

**Values:** 15, 60, or 180

**Default:** 180 seconds (rounded up to 291 seconds by the Junos kernel)

**Required Privilege Level** `system`—To view this statement in the configuration.  
`system-control`—To add this statement to the configuration.

**Related Documentation**

- Disabling Junos OS Processes

## server (NTP)

---

<b>Syntax</b>	<code>server address &lt;key key-number&gt; &lt;version value&gt; &lt;prefer&gt;;</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For NTP, configure the local router or switch to operate in client mode with the remote system at the specified <b>address</b> . In this mode, the local router or switch can be synchronized with the remote system, but the remote system can never be synchronized with the local router or switch.
<b>Options</b>	<p><b>address</b>—Address of the remote system. You must specify an address, not a hostname.</p> <p><b>key key-number</b>—(Optional) Use the specified key number to encrypt authentication fields in all packets sent to the specified address.</p> <p><b>Range:</b> Any unsigned 32-bit integer</p> <p><b>prefer</b>—(Optional) Mark the remote system as preferred host, which means that if all other things are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p><b>version value</b>—(Optional) Specify the version number to be used in outgoing NTP packets.</p> <p><b>Range:</b> 1 through 4</p> <p><b>Default:</b> 4</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the NTP Time Server and Time Services</li> </ul>

## tcp-drop-synfin-set

---

<b>Syntax</b>	<code>tcp-drop-synfin-set;</code>
<b>Hierarchy Level</b>	[edit system internet-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the router or switch to drop packets that have both the SYN and FIN bits set.
<b>Required Privilege Level</b>	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Junos OS to Enable the Router or Switch to Drop Packets with the SYN and FIN Bits Set</li> </ul>

## tracoptions (SBC Configuration Process)

<b>Syntax</b>	<pre>tracoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regex</i>&gt; &lt;size <i>size</i>&gt;     &lt;world-readable   no-world-readable&gt;;   flag <i>flag</i>; }</pre>
<b>Hierarchy Level</b>	[edit system processes sbc-configuration-process]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure trace options for the session border controller (SBC) process of the border signaling gateway (BSG).
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory <code>/var/log</code>. You can include the following file options:</p> <ul style="list-style-type: none"> <li>• <b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</li> </ul> <p>If you specify a maximum number of files, you must also specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000  <b>Default:</b> 3 files</p> <ul style="list-style-type: none"> <li>• <b>match <i>regex</i></b>—(Optional) Refine the output to include lines that contain the regular expression.</li> <li>• <b>no-world-readable</b>—(Optional) Disable unrestricted file access.</li> <li>• <b>size <i>size</i></b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the trace-file again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and filename.</li> </ul> <p><b>Syntax:</b> <b>xk</b> to specify KB, <b>xm</b> to specify MB, or <b>xg</b> to specify GB.  <b>Range:</b> 10 KB through 1 GB  <b>Default:</b> 128 KB</p> <ul style="list-style-type: none"> <li>• <b>world-readable</b>—(Optional) Enable unrestricted file access.</li> </ul> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p>

- **all *trace-level***—Trace all SBC process operations.
- **common *trace-level***—Trace common events.
- **configuration *trace-level***—Trace configuration events.
- **device-monitor *trace-level***—Trace device monitor events.
- **ipc *trace-level***—Trace IPC events.
- **memory—pool *trace-level***—Trace memory pool events.
- ***trace-level***—Trace level options are related to the severity of the event being traced. When you choose a trace level, messages at that level and higher levels are captured. Enter one of the following trace levels as the ***trace-level***:
  - **debug**—Log all code flow of control.
  - **error**—Log failures with a short-term effect.
  - **info**—Log summary for normal operations, such as the policy decisions made for a call.
  - **trace**—Log program trace START and EXIT macros.
  - **warning**—Log failure recovery events or failure of an external entity.
- **ui *trace-level***—Trace user interface operations.

**Required Privilege Level**    system—To view this statement in the configuration.  
                                   system-control—To add this statement to the configuration.

**Related Documentation**    • See “Troubleshooting the IMSG” in the *Junos OS Multiplay Solutions Guide*  
                                   • System Management Configuration Statements

## trusted-key

---

<b>Syntax</b>	<code>trusted-key [ <i>key-numbers</i> ];</code>
<b>Hierarchy Level</b>	[edit system ntp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For NTP, configure the keys you are allowed to use when you configure the local router or switch to synchronize its time with other systems on the network.
<b>Options</b>	<i>key-numbers</i> —One or more key numbers. Each key can be any 32-bit unsigned integer except 0.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring NTP Authentication Keys</a></li><li>• <a href="#">authentication-key on page 197</a></li><li>• <a href="#">broadcast on page 200</a></li><li>• <a href="#">peer on page 220</a></li><li>• <a href="#">server on page 223</a></li></ul>

CHAPTER 17

# Operational Commands for System Setup

## clear chassis display message

<b>Syntax</b>	clear chassis display message
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Clear or stop a text message on the craft interface display, which is on the front of the router or switch or on the LCD panel display on the router or switch. The craft interface alternates the display of text messages with standard craft interface messages, switching between messages every 2 seconds. By default, on both the router and the switch, the text message is displayed for 5 minutes. The craft interface display has four 20-character lines. The LCD panel display has two 16-character lines, and text messages appear only on the second line.
<b>Options</b>	none—Clear or stop a text message on the craft interface display.
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190</li> <li><b>set chassis display message on page 257</b></li> <li>show chassis craft-interface</li> </ul>
<b>List of Sample Output</b>	<b>clear chassis display message on page 228</b>
<b>Output Fields</b>	See show chassis craft-interface for an explanation of output fields.

## Sample Output

**clear chassis display message** The following example displays and then clears the text message on the craft interface display:

```

user@host> show chassis craft-interface
Red alarm:      LED off, relay off
Yellow alarm:   LED off, relay off
Host OK LED:    On
Host fail LED:  Off
FPCs           0 1 2 3 4 5 6 7
-----
Green .. *.. * *.
Red           .....
LCD screen:
      +-----+
      |NOC contact Dusty |
      |(888) 526-1234   |
      +-----+

user@host> clear chassis display message

user@host> show chassis craft-interface
Red alarm:      LED off, relay off
Yellow alarm:   LED off, relay off
Host OK LED:    On

```



```
Host fail LED: Off
FPCs    0 1 2 3 4 5 6 7
-----
Green .. *.. * *.
Red     .....
LCD screen:
+-----+
|host   |
|Up: 0+17:05:47|
|       |
|Temperature OK|
+-----+
```

## clear system reboot

---

<b>Syntax</b>	clear system reboot <both-routing-engines>
<b>Syntax (J-EX Series Switch)</b>	clear system reboot <all-members> <both-routing-engines> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Clear any pending system software reboots or halts.
<b>Options</b>	<p>none—Clear all pending system software reboots or halts.</p> <p>all-members—(J-EX4200 switches only) (Optional) Clear all halt or reboot requests on all members of the Virtual Chassis configuration.</p> <p>both-routing-engines—(Systems with multiple Routing Engines) (Optional) Clear all halt or reboot requests on both Routing Engines.</p> <p>local—(J-EX4200 switches only) (Optional) Clear all halt or reboot requests on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Clear all halt or reboot requests on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>request system reboot</li><li>request system reboot</li></ul>
<b>List of Sample Output</b>	clear system reboot on page 231
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
clear system reboot user@host> clear system reboot
reboot requested by root at Sat Dec 12 19:37:34 1998
[process id 17855]
Terminating...
```

## configure

---

<b>Syntax</b>	configure <dynamic> <exclusive> <private>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Enter configuration mode. When this command is entered without any optional keywords, everyone can make configuration changes and commit all changes made to the configuration.
<b>Options</b>	none—Enter configuration mode.  dynamic—(Optional) Configure routing policies and certain routing policy objects in a dynamic database that is not subject to the same verification required in the standard configuration database. As a result, the time it takes to commit changes to the dynamic database is much shorter than for the standard configuration database. You can then reference these policies and policy objects in routing policies you configure in the standard database.  exclusive—(Optional) Lock the candidate configuration for as long as you remain in configuration mode, allowing you to make changes without interference from other users. Other users can enter and exit configuration mode, but they cannot change the configuration.  private—(Optional) Allow multiple users to edit different parts of the configuration at the same time and to commit only their own changes, or to roll back without interfering with one another's changes. You cannot commit changes in configure private mode when another user is in configure exclusive mode.
<b>Additional Information</b>	For more information about the different methods of entering configuration mode and the restrictions that apply, see the <i>Junos OS System Basics Configuration Guide</i> .
<b>Required Privilege Level</b>	configure
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show configuration on page 269</a></li></ul>
<b>List of Sample Output</b>	<a href="#">configure on page 232</a>
<b>Output Fields</b>	When you enter this command, you are placed in configuration mode and the system prompt changes from <i>hostname&gt;</i> to <i>hostname#</i> .

## Sample Output

```
configure user@host> configure
```

```
Entering configuration mode  
[edit]  
user@host#
```

---

**op**



---

<b>Syntax</b>	<pre>op filename &lt;detail&gt; &lt;argument-name argument-value&gt; &lt;key (md5   sha-256   sha1) key-value&gt; &lt;url url&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Execute an op script stored in one of the following locations:</p> <ul style="list-style-type: none"> <li>• On the router or switch in the <code>/var/db/scripts/op</code> directory</li> <li>• At a remote URL</li> </ul>
<b>Options</b>	<p><code>detail</code>—(Optional) Display detailed output.</p> <p><code>argument-name argument-value</code>—(Optional) Specify one or more arguments to the script. For each argument you include on the command line, you must specify a corresponding value for the argument.</p> <p><code>key (md5   sha-256   sha1) key-value</code>—(Optional) With the <code>&lt;url&gt;</code> option, specify a checksum hash to verify the integrity of the script. You can include the <code>&lt;key&gt;</code> option if the <b>checksum</b> statement is included at the <code>[edit system scripts op file <i>filename</i>]</code> hierarchy level.</p> <p><code>url url</code>—(Optional) Specify a URL where the script is located.</p>
<b>Additional Information</b>	For more information about Junos op scripts, see the <i>Junos OS Configuration and Operations Automation Guide</i> .
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Executing an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• checksum</li> <li>• file checksum md5 on page 378</li> <li>• file checksum sha-256 on page 380</li> <li>• file checksum sha1 on page 379</li> </ul>
<b>List of Sample Output</b>	<pre>op on page 235 op url on page 235</pre>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
op user@host> op script1 interface ge-0/2/0.0 protocol inet
op url user@host> op url https://www.juniper.net/fa/2009-04-01.01.slax key md5
8de24d09e1d90b2581bb937d2a5ad590 interface ge-0/2/0.0 protocol inet
```

## request chassis pic

<b>Syntax</b>	<code>request chassis pic (offline   online) fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Control the operation of the PIC.
	<div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;">  <b>NOTE:</b> To view a list of built-in PICs on the router or switch chassis, use the <code>show chassis hardware</code> command. </div>
<b>Options</b>	<p><code>offline</code>—Take the PIC offline.</p> <p><code>online</code>—Bring the PIC online.</p> <p><code>fpc-slot <i>slot-number</i></code>—Flexible PIC Concentrator (FPC) slot number. Replace <i>slot-number</i> with a value appropriate for your router or switch:</p> <ul style="list-style-type: none"> <li>• J-EX Series switches: <ul style="list-style-type: none"> <li>• J-EX4200 standalone switches—0.</li> <li>• J-EX4200 switches in a Virtual Chassis configuration—0 through 9 (switch's member ID).</li> <li>• J-EX8208 switches—0 through 7 (line card).</li> <li>• J-EX8216 switches—0 through 15 (line card).</li> </ul> </li> </ul> <p><code>pic-slot <i>slot-number</i></code>—PIC slot number. For J-EX4200 switches, it is 0 for built-in network interfaces and 1 for interfaces on uplink modules. For J-EX8208 and J-EX8216 switches, it is 0.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show chassis hardware on page 656</a></li> <li>• <a href="#">show chassis pic on page 665</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request chassis pic on page 236</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request chassis pic user@host> request chassis pic pic-slot 0 online fpc-slot 0
FPC 0, PIC 0 is already online
```



## request chassis routing-engine master

**Syntax** request chassis routing-engine master (acquire | release | switch)  
<force>  
<no-confirm>

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** For routers or switches with multiple Routing Engines, control which Routing Engine is the master.



**NOTE:** Successive graceful Routing Engine switchover events must be a minimum of 240 seconds (4 minutes) apart after both Routing Engines have come up.

If the router or switch displays a warning message similar to “Standby Routing Engine is not ready for graceful switchover. Packet Forwarding Engines that are not ready for graceful switchover might be reset,” do not attempt switchover. If you choose to proceed with switchover, only the Packet Forwarding Engines that were not ready for graceful switchover are reset. None of the Flexible PIC concentrators (FPCs) should spontaneously restart. We recommend that you wait until the warning no longer appears and then proceed with the switchover.

**Options** acquire—Attempt to become the master Routing Engine.

release—Request that the other Routing Engine become the master.

switch—Toggle mastership between Routing Engines.

The **acquire**, **release**, and **switch** options have the following suboptions:

no-confirm—(Optional) Do not request confirmation for the switch.

force—(Optional) Available only with the acquire option. Force the change to a new master Routing Engine.

**Additional Information** Because both Routing Engines are always running, the transition from one to the other as the master Routing Engine is immediate. However, the changeover interrupts communication to the System and Switch Board (SSB). The SSB takes several seconds to reinitialize the Flexible PIC Concentrators (FPCs) and restart the PICs. Interior gateway protocol (IGP) and BGP convergence times depend on the specific network environment.

By default, the Routing Engine in slot 0 (RE0) is the master and the Routing Engine in slot 1 (RE1) is the backup. To change the default master Routing Engine, include the **routing-engine** statement at the [edit chassis redundancy] hierarchy level in the configuration. For more information, see the *Junos OS System Basics Configuration Guide*

To have the backup Routing Engine become the master Routing Engine, use the **request chassis routing-engine master switch** command. If you use this command to change the master and then restart the chassis software for any reason, the master reverts to the default setting.



**NOTE:** Although the configurations on the two Routing Engines do not have to be the same and are not automatically synchronized, we recommend making both configurations the same.

<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show chassis routing-engine on page 668</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request chassis routing-engine master acquire on page 238</a> <a href="#">request chassis routing-engine master switch on page 238</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request chassis routing-engine master acquire
user@host> request chassis routing-engine master acquire
warning: Traffic will be interrupted while the PFE is re-initialized
warning: The other routing engine's file system could be corrupted
Reset other routing engine and become master ? [yes,no] (no)
```

```
request chassis routing-engine master switch
user@host> request chassis routing-engine master switch
warning: Traffic will be interrupted while the PFE is re-initialized
Toggle mastership between Routing Engines ? [yes,no] (no) yes

Resolving mastership...
Complete. The other Routing Engine becomes the master.
```

Switch mastership back to the local Routing Engine:

```
user@host> request chassis routing-engine master switch
warning: Traffic will be interrupted while the PFE is re-initialized
Toggle mastership between routing engines ? [yes,no] (no) yes

Resolving mastership...
Complete. The local routing engine becomes the master.
```

## request system halt

<b>Syntax</b>	request system halt <at <i>time</i> > <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash   disk   removable-compact-flash   usb)> <message " <i>text</i> ">
<b>Syntax (J-EX Series Switch)</b>	request system halt <all-members> <at <i>time</i> > <both-routing-engines> <in <i>minutes</i> > <local> <media (external   internal)> <member <i>member-id</i> > <message " <i>text</i> "> <other-routing-engine> <slice <i>slice</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Stop the router or switch software.
<b>Options</b>	<p>none—Stop the router or switch software immediately.</p> <p>all-members—(J-EX4200 switches only) (Optional) Halt all members of the Virtual Chassis configuration.</p> <p>at <i>time</i> —(Optional) Time at which to stop the software, specified in one of the following ways:</p> <ul style="list-style-type: none"> <li>• <b>now</b>—Stop the software immediately. This is the default.</li> <li>• <b>+minutes</b>—Number of minutes from now to stop the software.</li> <li>• <b>yymmddhhmm</b>—Absolute time at which to stop the software, specified as year, month, day, hour, and minute.</li> <li>• <b>hh:mm</b>—Absolute time on the current day at which to stop the software.</li> </ul> <p>both-routing-engines—(Optional) Halt both Routing Engines at the same time.</p> <p>local—(J-EX4200 switches only) (Optional) Halt the local Virtual Chassis member.</p> <p>in <i>minutes</i>—(Optional) Number of minutes from now to stop the software. This option is an alias for the <b>at +minutes</b> option.</p> <p>media (compact-flash   disk   removable-compact-flash   usb)—(Optional) Boot medium for next boot.</p> <p>media (external   internal)—(J-EX Series switches) (Optional) Halt the boot media:</p>

- **external**—Halt the external mass storage device.
- **internal**—Halt the internal flash device.

**member *member-id***—(J-EX4200 switches only) (Optional) Halt the specified member of the Virtual Chassis configuration. Replace *member-id* with a value from 0 through 9.

**message "*text*"**—(Optional) Message to display to all system users before stopping the software.

**other-routing-engine**—(Optional) Halt the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is halted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is halted.

**slice *slice***—(J-EX Series switches) (Optional) Halt a partition on the boot media. This option has the following suboptions:

- **1**—Halt partition 1.
- **2**—Halt partition 2.
- **alternate**—Reboot from the alternate partition.

**Additional Information**



**NOTE:** If you have a router or switch with two Routing Engines and you want to shut the power off to the router or switch or remove a Routing Engine, you must first halt the backup Routing Engine (if it has been upgraded), then halt the master Routing Engine. To halt a Routing Engine, issue the `request system halt` command. You can also halt both Routing Engines at the same time by issuing the `request system halt both-routing-engines` command.

**Required Privilege Level** maintenance

**Related Documentation** • [clear system reboot on page 230](#)

**List of Sample Output** [request system halt on page 241](#)  
[request system halt \(in 2 Hours\) on page 241](#)  
[request system halt \(Immediately\) on page 241](#)  
[request system halt \(at 1:20 AM\) on page 241](#)  
[request system halt \(in 2 Hours\) on page 241](#)  
[request system halt \(Immediately\) on page 241](#)  
[request system halt \(at 1:20 AM\) on page 241](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system halt user@host> request system halt
Halt the system ? [yes,no] (no) yes

*** FINAL System shutdown message from root@section2 ***
System going down IMMEDIATELY
Terminated
...
syncing disks... 11 8 done
The operating system has halted.
Please press any key to reboot.
```

**request system halt (in 2 Hours)** The following example, which assumes that the time is 5 PM (1700), illustrates three different ways to request that the system stop 2 hours from now:

```
user@host> request system halt at +120
user@host> request system halt in 120
user@host> request system halt at 19:00
```

**request system halt (Immediately)** user@host> request system halt at now

**request system halt (at 1:20 AM)** To stop the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system halt at yymmdd120
request system halt at 120
Halt the system at 120? [yes,no] (no) yes
```

## Sample Output

**request system halt (in 2 Hours)** The following example, which assumes that the time is 5 PM (1700), illustrates three different ways to request that the system stop 2 hours from now:

```
user@switch> request system halt at +120
user@switch> request system halt in 120
user@switch> request system halt at 19:00
```

**request system halt (Immediately)** user@switch> request system halt at now

**request system halt (at 1:20 AM)** To stop the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@switch> request system halt at yymmdd120
request system halt at 120
Halt the system at 120? [yes,no] (no) yes
```

## request system logout

---

<b>Syntax</b>	request system logout (pid <i>pid</i>   terminal <i>terminal</i>   user <i>username</i> ) <all>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Log out users from the router or switch and the configuration database. If a user held the <b>configure exclusive</b> lock, this command clears the exclusive lock.
<b>Options</b>	<p>all—(Optional) Log out all sessions owned by a particular PID, terminal session, or user.</p> <p>pid <i>pid</i>—Log out the user session using the specified management process identifier (PID). The PID type must be management process.</p> <p>terminal <i>terminal</i>—Log out the user for the specified terminal session.</p> <p>user <i>username</i>—Log out the specified user.</p>
<b>Required Privilege Level</b>	configure
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Junos OS System Basics Configuration Guide</i></li></ul>
<b>List of Sample Output</b>	<b>request system logout on page 242</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

request system logout user@host> request system logout user tammy all  
Connection closed by foreign host.

## request system power-off

---

<b>Syntax</b>	request system power-off <both-routing-engines> <other-routing-engine> <at <i>time</i> > <in <i>minutes</i> > <media (compact-flash   disk   removable-compact-flash   usb)> <message " <i>text</i> ">
<b>Syntax (J-EX Series Switch)</b>	request system power-off <all-members> <at <i>time</i> > <both-routing-engines> <in <i>minutes</i> > <local> <media (external   internal)> <member <i>member-id</i> > <message " <i>text</i> "> <other-routing-engine> <slice <i>slice</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Power off the software.
<b>Options</b>	<p>none—Power off the router or switch software immediately.</p> <p>all-members—(J-EX4200 switches only) (Optional) Power off all members of the Virtual Chassis configuration.</p> <p>at <i>time</i>—(Optional) Time at which to power off the software, specified in one of the following ways:</p> <ul style="list-style-type: none"> <li>• <b>now</b>—Power off the software immediately. This is the default.</li> <li>• <b>+minutes</b>—Number of minutes from now to power off the software.</li> <li>• <b>yymmddhhmm</b>—Absolute time at which to power off the software, specified as year, month, day, hour, and minute.</li> <li>• <b>hh:mm</b>—Absolute time on the current day at which to power off the software.</li> </ul> <p>both-routing-engines—(Optional) Power off both Routing Engines at the same time.</p> <p>in <i>minutes</i>—(Optional) Number of minutes from now to power off the software. This option is an alias for the <b>at +minutes</b> option.</p> <p>local—(J-EX4200 switches only) (Optional) Power off the local Virtual Chassis member.</p> <p>media (compact-flash   disk   removable-compact-flash   usb)—(Optional) Boot medium for next boot. (The options <b>removable-compact-flash</b> and <b>usb</b> pertain to the J Series routers only.)</p>

media (external | internal)—(J-EX Series switches) (Optional) Power off the boot media:

- **external**—Power off the external mass storage device.
- **internal**—Power off the internal flash device.

member *member-id*—(J-EX4200 switches only) (Optional) Power off the specified member of the Virtual Chassis configuration. Replace *member-id* with a value from 0 through 9.

message "*text*"—(Optional) Message to display to all system users before powering off the software.

other-routing-engine—(Optional) Power off the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is halted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is halted.

slice *slice*—(J-EX Series switches) (Optional) Power off a partition on the boot media. This option has the following suboptions:

- **1**—Power off partition 1.
- **2**—Power off partition 2.
- **alternate**—Reboot from the alternate partition.

**Required Privilege Level** maintenance

**List of Sample Output** request system power-off on page 244

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
user@host> request system power-off message "This router will be powered off in 30 minutes.
Please save your data and log out immediately."
warning: This command will not halt the other routing-engine.
If planning to switch off power, use the both-routing-engines option.
Power Off the system ? [yes,no] (no) yes

*** FINAL System shutdown message from remote@nutmeg ***
System going down IMMEDIATELY

This router will be powered off in 30 minutes. Please save your data and log out
immediately.

Shutdown NOW!
[pid 5177]
```



## request system reboot

**Syntax** request system reboot  
 <all-members | local | member *member-id*>  
 <at *time*>  
 <in *minutes*>  
 <media (external | internal)>  
 <message "*text*">  
 <other-routing-engine>  
 <slice (1 | 2 | alternate)>

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Reboot the Junos OS.

Reboot requests are recorded in the system log files, which you can view with the **show log** command. You can view the process names with the **show system processes** command.

**Options** none—Reboots the software immediately.

**all-members | local | member *member-id***—(J-EX4200 switch only) (Optional) Specify which member of the Virtual Chassis to reboot:

- **all-members**—Reboots each switch that is a member of the Virtual Chassis.
- **local**—Reboots the local switch, meaning the switch you are logged into, only.
- **member *member-id***—Reboots the specified member switch of the Virtual Chassis.

**at *time***—(Optional) Time at which to reboot the software, specified in one of the following ways:

- **+*minutes***—Number of minutes from now to reboot the software.
- ***hh:mm***—Absolute time on the current day at which to reboot the software, specified in 24-hour time.
- **now**—Stop or reboot the software immediately. This is the default.
- ***yymmddhhmm***—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute.

**in *minutes***—(Optional) Number of minutes from now to reboot the software. This option is an alias for the **at +*minutes*** option.

**media (external | internal)**—(Optional) Boot medium for the next boot. The external option reboots the switch using a software package stored on an external boot source, such as a USB flash drive. The internal option reboots the switch using a software package stored in an internal memory source.

**message "*text*"**—(Optional) Message to display to all system users before rebooting the software.

**other-routing-engine**—(Optional) Reboot the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is rebooted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is rebooted.

**slice (1 | 2 | alternate)**—(Optional) Reboot using the specified partition on the boot media. This option has the following suboptions:

- **1**—Reboot from partition 1.
- **2**—Reboot from partition 2.
- **alternate**—Reboot from the alternate partition, which is the partition that did not boot the switch at the last bootup.

**Required Privilege Level** maintenance

**Related Documentation**

- [clear system reboot on page 230](#)
- [request system halt on page 239](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

**request system reboot** user@host> **request system reboot**  
Reboot the system ? [yes,no] (no)

**request system reboot (at 2300)** user@host> **request system reboot at 2300 message ?Maintenance time!?**  
Reboot the system ? [yes,no] (no) yes

```
shutdown: [pid 186]
*** System shutdown message from root@berry.network.net ***
System going down at 23:00
```

**request system reboot (in 2 Hours)** The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
user@host> request system reboot in 120
user@host> request system reboot at 19:00
```

**request system reboot (Immediately)** user@host> **request system reboot at now**

**request system reboot (at 1:20 AM)** To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120
request system reboot at 120
Reboot the system at 120? [yes,no] (no) yes
```

## request system scripts convert

<b>Syntax</b>	<code>request system scripts convert (slax-to-xslt   xslt-to-slax) source <i>source/filename</i> destination <i>destination/&lt;filename&gt;</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Convert an Extensible Stylesheet Language Transformations (XSLT) script to Stylesheet Language, Alternative syntaX (SLAX), or convert a SLAX script to XSLT.
<b>Options</b>	<p><code>destination <i>destination/&lt;filename&gt;</i></code>—Specify a destination for the converted file.</p> <p>Optionally, you can specify a filename for the converted file. If you do not specify a filename, the software assigns one automatically. The default destination filename is the same as the source filename, except the file extension is altered. For example, the software converts a source file called <b>test.xml</b> to <b>test.slax</b>. The software converts a source file called <b>test1.slax</b> to <b>test1.xml</b>.</p> <p><code>slax-to-xslt</code>—Convert a SLAX script to XSLT.</p> <p><code>source <i>source/filename</i></code>—Specify a source file that you want to convert.</p> <p><code>xslt-to-slax</code>—Convert an XSLT script to SLAX.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p><code>request system scripts convert slax-to-xslt</code> on page 247</p> <p><code>request system scripts convert xslt-to-slax</code> on page 247</p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

<code>request system scripts convert slax-to-xslt</code>	<code>user@host&gt; request system scripts convert slax-to-xslt source /var/db/scripts/op/script1.slax destination /var/db/scripts/op conversion complete</code>
<code>request system scripts convert xslt-to-slax</code>	<code>user@host&gt; request system scripts convert xslt-to-slax source /var/db/scripts/commit/script1.xml destination /var/db/scripts/commit conversion complete</code>

## request system scripts refresh-from commit

<b>Syntax</b>	<code>request system scripts refresh-from commit file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard commit scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;commit&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p>file <i>file-name</i>—Name of the file to be downloaded.</p> <p>url <i>url-path</i>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from commit file config.txt url http://host1.juniper.net</code> on page 248

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from commit file config.txt url
refresh-from commit http://host1.juniper.net
file config.txt url user@switch>
http://host1.juniper.net
```

## request system scripts refresh-from event

<b>Syntax</b>	<code>request system scripts refresh-from event file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard event scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;event&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li>• <i>Junos OS Junos XML Management Protocol Guide</i></li> <li>• <i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from event file config.txt url http://host1.juniper.net</code> on page 249

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from event file config.txt url http://host1.juniper.net
refresh-from event file user@switch>
config.txt url
http://host1.juniper.net
```

## request system scripts refresh-from op

<b>Syntax</b>	<code>request system scripts refresh-from op file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard op scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;op&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from op file config.txt url http://host1.juniper.net</code> on page 250

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from op file config.txt url http://host1.juniper.net
refresh-from op file user@switch>
config.txt url
http://host1.juniper.net
```

## request system storage cleanup

<b>Syntax</b>	request system storage cleanup <dry-run>
<b>Syntax (J-EX Series Switch)</b>	request system storage cleanup <all-members> <dry-run> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Free storage space on the router or switch by rotating log files and proposing a list of files for deletion. User input is required for file deletion.
<b>Options</b>	all-members—(J-EX4200 switches only) (Optional) Delete files on all members of the Virtual Chassis configuration.  dry-run—(Optional) List files proposed for deletion (without deleting them).  local—(J-EX4200 switches only) (Optional) Delete files on the local Virtual Chassis member.  member <i>member-id</i> —(J-EX4200 switches only) (Optional) Delete files on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.
<b>Additional Information</b>	If logging is configured and being used, the <b>dry-run</b> option will rotate the log files. In that case, the output displays the message “Currently rotating log files, please wait.” If no logging is currently underway, the output displays only a list of files to delete.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">request system storage cleanup dry-run on page 251</a> <a href="#">request system storage cleanup on page 252</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

request system storage cleanup dry-run
user@host> request system storage cleanup dry-run
Currently rotating log files, please wait.
This operation can take up to a minute.

List of files to delete:

      Size Date      Name
11.4K Mar  8 15:00 /var/log/messages.1.gz
7245B Feb  5 15:00 /var/log/messages.3.gz
11.8K Feb 22 13:00 /var/log/messages.2.gz
3926B Mar 16 13:57 /var/log/messages.0.gz
3962B Feb 22 12:47 /var/log/sampled.1.gz

```

```
4146B Mar  8 12:20 /var/log/sampled.0.gz
4708B Dec 21 11:39 /var/log/sampled.2.gz
7068B Jan 16 18:00 /var/log/messages.4.gz
13.7K Dec 27 22:00 /var/log/messages.5.gz
 890B Feb 22 17:22 /var/tmp/sampled.pkts
65.8M Oct 26 09:10 /var/sw/pkg/jinstall-7.4R1.7-export-signed.tgz
63.1M Oct 26 09:13 /var/sw/pkg/jbundle-7.4R1.7.tgz
```

```
request system storage cleanup
user@host> request system storage cleanup
Currently rotating log files, please wait.
This operation can take up to a minute.
```


List of files to delete:

	Size	Date	Name
	11.4K	Mar  8 15:00	/var/log/messages.1.gz
	7245B	Feb  5 15:00	/var/log/messages.3.gz
	11.8K	Feb 22 13:00	/var/log/messages.2.gz
	3926B	Mar 16 13:57	/var/log/messages.0.gz
	11.6K	Mar  8 15:00	/var/log/messages.5.gz
	7254B	Feb  5 15:00	/var/log/messages.6.gz
	12.9K	Feb 22 13:00	/var/log/messages.8.gz
	3726B	Mar 16 13:57	/var/log/messages.7.gz
	3962B	Feb 22 12:47	/var/log/sampled.1.gz
	4146B	Mar  8 12:20	/var/log/sampled.0.gz
	4708B	Dec 21 11:39	/var/log/sampled.2.gz
	7068B	Jan 16 18:00	/var/log/messages.4.gz
	13.7K	Dec 27 22:00	/var/log/messages.5.gz
	890B	Feb 22 17:22	/var/tmp/sampled.pkts
	65.8M	Oct 26 09:10	/var/sw/pkg/jinstall-7.4R1.7-export-signed.tgz
	63.1M	Oct 26 09:13	/var/sw/pkg/jbundle-7.4R1.7.tgz

Delete these files ? [yes,no] (yes)



## restart

<b>Syntax</b>	restart <adaptive-services   audit-process   chassis-control   class-of-service   dhcp-service   diameter-service   disk-monitoring   dynamic-flow-capture   ecc-error-logging   event-processing   firewall   interface-control   ipsec-key-management   kernel-replication   l2-learning   l2tp-service   lacp   mib-process   pgcp-service   pgm   pic-services-logging   ppp   pppoe   protected-system-domain-service   redundancy-interface-process   remote-operations   root-system-domain-service   routing <logical-system <i>logical-system-name</i> >   sampling   service-deployment   services pgcp gateway <i>gateway-name</i>  sbc-configuration-process   snmp   usb-control  web-management> <gracefully   immediately   soft>
<b>Syntax (J-EX Series Switch)</b>	restart <autoinstallation   chassis-control   class-of-service   database-replication   dhcp   dhcp-service   diameter-service   dot1x-protocol   ethernet-link-fault-management   ethernet-switching   event-processing   firewall   general-authentication-service   interface-control   kernel-replication   l2-learning   lacp   license-service   link-management   lldpd-service   mib-process   mountd-service   multicast-snooping   pgm   redundancy-interface-process   remote-operations   routing   secure-neighbor-discovery   service-deployment   sflow-service   snmp   vrrp   web-management> <gracefully   immediately   soft>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Restart a Junos OS process.
	 <b>CAUTION:</b> Never restart a software process unless instructed to do so by a customer support engineer. A restart might cause the router or switch to drop calls and interrupt transmission, resulting in possible loss of data. <hr style="border-top: 1px dotted black;"/>
<b>Options</b>	<p>none—Same as <b>gracefully</b>.</p> <p>adaptive-services—(Optional) Restart the configuration management process that manages the configuration for stateful firewall, Network Address Translation (NAT), intrusion detection services (IDS), and IP Security (IPsec) services on the Adaptive Services PIC.</p> <p>audit-process—(Optional) Restart the RADIUS accounting process.</p> <p>autoinstallation—(J-EX Series switch only) (Optional) Restart the autoinstallation process.</p> <p>chassis-control—(Optional) Restart the chassis management process.</p> <p>class-of-service—(Optional) Restart the class-of-service (CoS) process, which controls the router's or switch's CoS configuration.</p> <p>database-replication—(J-EX Series switch only) (Optional) Restart the database replication process.</p>

- dhcp—(J-EX Series switch only) (Optional) Restart the software process for a Dynamic Host Configuration Protocol (DHCP) server. A DHCP server allocates network IP addresses and delivers configuration settings to client hosts without user intervention.
- dhcp-service—(J-EX Series switch only) (Optional) Restart the Dynamic Host Configuration Protocol process.
- diameter-service—(Optional) Restart the diameter process.
- disk-monitoring—(Optional) Restart disk monitoring, which checks the health of the hard disk drive on the Routing Engine.
- dot1x-protocol—(J-EX Series switch only) (Optional) Restart the port-based network access control process.
- dynamic-flow-capture—(Optional) Restart the dynamic flow capture (DFC) process, which controls DFC configurations on Monitoring Services III PICs.
- ecc-error-logging—(Optional) Restart the error checking and correcting (ECC) process, which logs ECC parity errors in memory on the Routing Engine.
- ethernet-link-fault-management—(J-EX Series switch only) (Optional) Restart the Ethernet OAM link fault management process.
- ethernet-switching—(J-EX Series switch only) (Optional) Restart the Ethernet switching process.
- event-processing—(Optional) Restart the event process (eventd).
- firewall—(Optional) Restart the firewall management process, which manages firewall configuration.
- general-authentication-service—(J-EX Series switch only) (Optional) Restart the general authentication process.
- gracefully—(Optional) Restart the software process.
- immediately—(Optional) Immediately restart the software process.
- interface-control—(Optional) Restart the interface process, which controls the router's or switch's physical interface devices and logical interfaces.
- ipsec-key-management—(Optional) Restart the IPsec key management process.
- kernel-replication—(Optional) Restart the kernel replication process, which replicates the state of the backup Routing Engine when graceful Routing Engine switchover is configured.
- l2-learning—(Optional) Restart the Layer 2 address flooding and learning process.
- lacp—(Optional) Restart the Link Aggregation Control Protocol process.
- license-service—(J-EX Series switch only) (Optional) Restart the feature license management process.

- lldpd-service—(J-EX Series switch only) (Optional) Restart the Link Layer Discovery Protocol process.
- mib-process—(Optional) Restart the Management Information Base (MIB) II process, which provides the router's MIB II agent.
- mountd-service—(J-EX Series switch only) (Optional) Restart the service for NFS mounts requests.
- multicast-snooping—(J-EX Series switch only) (Optional) Restart the multicast snooping process.
- pgcp-service—(Optional) Restart the pgcpd service process running on the Routing Engine. This option does not restart pgcpd processes running on mobile station PICs. To restart pgcpd processes running on mobile station PICs, use the **services pgcp gateway** option.
- pgm—(Optional) Restart the process that implements the Pragmatic General Multicast (PGM) protocol for assisting in the reliable delivery of multicast packets.
- pic-services-logging—(Optional) Restart the logging process for some PICs. With this process, also known as fsad (the file system access daemon), PICs send special logging information to the Routing Engine for archiving on the hard disk.
- ppp—(Optional) Restart the Point-to-Point Protocol (PPP) process.
- pppoe—(Optional) Restart the Point-to-Point Protocol over Ethernet (PPPoE) process.
- protected-system-domain-service—(Optional) Restart the Protected System Domain (PSD) process.
- redundancy-interface-process—(Optional) Restart the ASP redundancy process.
- remote-operations—(Optional) Restart the remote operations process, which provides the ping and traceroute MIBs.
- root-system-domain-service—(Optional) Restart the Root System Domain (RSD) service.
- routing—(J-EX Series switch only) (Optional) Restart the routing protocol process.
- routing <logical-system *logical-system-name*>—(Optional) Restart the routing protocol process, which controls the routing protocols that run on the router or switch and maintains the routing tables. Optionally, restart the routing protocol process for the specified logical system only.
- sampling—(Optional) Restart the sampling process, which performs packet sampling and cflowd export.
- secure-neighbor-discovery—(J-EX Series switch only) (Optional) Restart the secure Neighbor Discovery Protocol process.
- service-deployment—(Optional) Restart the service deployment service process.

`services pgcp gateway gateway-name`—(Optional) Restart the pgcpd process for a specific BGF running on an MS-PIC. This option does not restart the pgcpd process running on the Routing Engine. To restart the pgcpd process on the Routing Engine, use the `pgcp-service` option.

`sflow-service`—(J-EX Series switch only) (Optional) Restart the flow sampling (sFlow technology) process.

`snmp`—(Optional) Restart the SNMP process, which provides the router's or switch's SNMP master agent.

`soft`—(Optional) Reread and reactivate the configuration without completely restarting the software processes. For example, BGP peers stay up and the routing table stays constant. Omitting this option results in a graceful restart of the software process.

`vrrp`—(J-EX Series switch only) (Optional) Restart the Virtual Router Redundancy Protocol process.

`web-management`—(J-EX Series switch only) (Optional) Restart the Web management process.

**Required Privilege Level** reset

**Related Documentation**

- Overview of Junos OS CLI Operational Mode Commands

**List of Sample Output** [restart interfaces on page 256](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
restart interfaces user@host> restart interfaces
interfaces process terminated
interfaces process restarted
```

## set chassis display message

<b>Syntax</b>	set chassis display message " <i>message</i> " <permanent>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display or stop a text message on the craft interface display, which is on the front of the router, or on the LCD panel display on the switch. The craft interface alternates the display of text messages with standard craft interface messages, switching between messages every 2 seconds. By default, on both the router and the switch, the text message is displayed for 5 minutes. The craft interface display has four 20-character lines. The LCD panel display has two 16-character lines, and text messages appear only on the second line.
<b>Options</b>	<p><i>"message"</i>—Message to display. On the craft interface display, if the message is longer than 20 characters, it wraps onto the next line. If a word does not fit on one line, the entire word moves down to the next line. Any portion of the message that does not fit on the display is truncated. An empty pair of quotation marks (" ") deletes the text message from the craft interface display. On the LCD panel display, the message is limited to 16 characters.</p> <p>fpc-slot <i>slot-number</i>—(J-EX4200 only) On the router or switch, display the text message on the craft interface for a specific Flexible PIC Concentrator (FPC). Replace <i>slot-number</i> with a value from 0 through 31. On the switch, display the text message for a specific member of a Virtual Chassis, where <b>fpc-slot <i>slot-number</i></b> corresponds to the member ID. Replace <i>slot-number</i> with a value from 0 through 9.</p> <p>permanent—(Optional) Display a text message on the craft interface display or LCD panel display permanently.</p>
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190</li> <li><b>clear chassis display message on page 228</b></li> <li>show chassis craft-interface</li> </ul>
<b>List of Sample Output</b>	<p>set chassis display message (Creating) on page 257</p> <p>set chassis display message (Deleting) on page 258</p>
<b>Output Fields</b>	See show chassis craft-interface for an explanation of output fields.

### Sample Output

**set chassis display message (Creating)** The following example shows how to set the display message and verify the result:

```
user@host> set chassis display message "NOC contact Dusty (888) 555-1234"
```

```

message sent

user@host> show chassis craft-interface
Red alarm:    LED off, relay off
Yellow alarm: LED off, relay off
Host OK LED:  On
Host fail LED: Off
FPCs         0 1 2 3 4 5 6 7
-----
Green  .. *.. * *.
Red    .....
LCD screen:
      +-----+
      |NOC contact Dusty |
      |(888) 555-1234   |
      +-----+
    
```

**set chassis display message (Deleting)**

The following example shows how to delete the display message and verify that the message is removed:

```

user@host> set chassis display message ""
message sent

user@host> show chassis craft-interface
Red alarm:    LED off, relay off
Yellow alarm: LED off, relay off
Host OK LED:  On
Host fail LED: Off
FPCs         0 1 2 3 4 5 6 7
-----
Green  .. *.. * *.
Red    .....
LCD screen:
      +-----+
      |host              |
      |Up: 0+17:05:47   |
      |                 |
      |Temperature OK   |
      +-----+
    
```

## set date

---

<b>Syntax</b>	<code>set date (<i>date-time</i> ntp &lt;<i>servers</i>&gt; &lt;<i>source-address source-address</i>&gt;)</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the date and time.
<b>Options</b>	<p><i>date-time</i>—Date and time. Enter this string inside quotation marks.</p> <p><i>ntp</i>—Use a Network Time Protocol (NTP) server to synchronize the current date and time setting on the router or switch.</p> <p><i>servers</i>—(Optional) Specify the IP address of one or more NTP servers.</p> <p><i>source-address source-address</i>—Specify the source address that the router or switch uses to contact the remote NTP server.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Setting the Date and Time</li> </ul>
<b>List of Sample Output</b>	<a href="#">set date on page 259</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

set date user@host> set date ntp
21 Apr 17:22:02 ntpdate[3867]: step time server 172.17.27.46 offset 8.759252 sec

```

## show chassis firmware

<b>Syntax</b>	show chassis firmware
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches. Command introduced for J-EX8200 switches in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	On the routers and switches, display the version levels of the firmware running on the System Control Board (SCB), Switching and Forwarding Module (SFM), System and Switch Board (SSB), Forwarding Engine Board (FEB), Flexible PIC Concentrators (FPCs), and Routing Engines.  On J-EX4200 switches, display the version levels of the firmware running on the switch. On a J-EX8208 switch, display the version levels of the firmware running on the Switch Fabric and Routing Engine (SRE) modules and on the line cards (shown as FPCs). On a J-EX8216 switch, display the version levels of the firmware running on the Routing Engine (RE) modules and on the line cards (shown as FPCs).
<b>Options</b>	none—Display the version levels of the firmware running. For a J-EX4200 switch that is a member of a Virtual Chassis, display version levels for all members.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>show chassis firmware (J-EX4200 Switch) on page 260</b> <b>show chassis firmware (J-EX8200 Switch) on page 261</b>
<b>Output Fields</b>	Table 44 on page 260 lists the output fields for the <b>show chassis firmware</b> command. Output fields are listed in the approximate order in which they appear.

**Table 44: show chassis firmware Output Fields**

Field Name	Field Description
<b>Part</b>	Chassis part name.
<b>Type</b>	Type of firmware: On routers: <b>ROM</b> or <b>O/S</b> . On switches: <b>uboot</b> or <b>loader</b> .
<b>Version</b>	Version of firmware running on the chassis part.

## Sample Output

```

user@host> show chassis firmware
(J-EX4200 Switch)
Part          Type          Version
FPC 0        uboot         U-Boot 1.1.6 (Feb  6 2008 - 11:27:42)
              loader       FreeBSD/PowerPC U-Boot bootstrap loader 2.1
FPC 1        uboot         U-Boot 1.1.6 (Feb  6 2008 - 11:27:42)
              loader       FreeBSD/PowerPC U-Boot bootstrap loader 2.1

```



```

FPC 2                uboot          U-Boot 1.1.6 (Feb  6 2008 - 11:27:42)
                    loader          FreeBSD/PowerPC U-Boot bootstrap loader 2.1

```

**show chassis firmware**  
(J-EX8200 Switch)

```

user@host> show chassis firmware

```

Part	Type	Version
FPC 0	U-Boot Loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 3	U-Boot Loader	U-Boot 1.1.6 (Dec  4 2009 - 13:17:34) 3.1.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 5	U-Boot Loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 7	U-Boot Loader	U-Boot 1.1.6 (Feb  6 2009 - 05:31:46) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
Routing Engine 0	U-Boot Loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
Routing Engine 1	U-Boot Loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2

## show chassis lcd

---

**Syntax** `show chassis lcd`  
`<fpc-slot <fpc-slot-number>>`  
`<menu <(all-members | local | member member-id)>>`

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.  
**menu** option introduced in Junos OS Release 10.2 for J-EX Series switches.

**Description** Display the information that appears on the LCD panel of J-EX4200, J-EX4500, and J-EX8200 switches. Display the status of the currently selected port parameter of the Status LED for each network port on the switch or line card.

**Options** none—Display the information that appears on the LCD panel (for J-EX4200 switches configured as a Virtual Chassis, display the information for all Virtual Chassis members). Display the status of the currently selected port parameter of the Status LED for each network port.

`fpc-slot <fpc-slot-number>`—(Optional) Display the information as follows:

- (Standalone J-EX4200 or J-EX4500 switches) Display the information that appears on the LCD panel for either an FPC slot with no **fpc-slot-number** value specified or for the FPC slot specified by **fpc-slot 0**. **fpc-slot** refers to the switch itself and **0** is the only valid value for **fpc-slot-number**. Output for these options is the same as for the **none** option.

Also display the status of the currently selected port parameter of the Status LED for each network port.

- (J-EX4200 switches in a Virtual Chassis with two or more members) If no **fpc-slot-number** value is specified, display the information that appears on the LCD panel for all members of the Virtual Chassis. Output for this option is the same as for the **none** option. If the **fpc-slot-number** value is specified (it equals the **member-id** value), display the information for the specified member.

Also display the status of the currently selected port parameter of the Status LED for each network port.

- (J-EX8200 switches)—Display the information that appears on the LCD panel for the line card in the line-card slot specified by the **fpc-slot-number** value.

Also display the status of the currently selected port parameter of the Status LED for each network port.

**menu**—(Optional) Display the names of the menus and menu options that are currently enabled on the LCD panel.

**menu all-members**—(J-EX4200 switches only) (Optional) Display the names of the menus and menu options that are currently enabled on the LCD panel for all Virtual Chassis members.

menu local—(J-EX4200 switches only) (Optional) Display the names of the menus and menu options that are currently enabled on the LCD panel for the Virtual Chassis member from which you issued the command.

menu member *member-id*—(J-EX4200 switches only) (Optional) Display the names of the menus and menu options that are currently enabled on the LCD panel for the specified Virtual Chassis member.

**Required Privilege Level** view

**Related Documentation**

- LCD Panel in J-EX4500 Switches
- LCD Panel in a J-EX8200 Switch
- Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190

**List of Sample Output**

**show chassis lcd (Two-Member Virtual Chassis) on page 264**  
**show chassis lcd fpc-slot 1 (Virtual Chassis) on page 265**  
**show chassis lcd (J-EX8200 Switch) on page 266**  
**show chassis lcd fpc-slot 2 (J-EX8200 Switch) on page 267**  
**show chassis lcd menu (J-EX4200 Switch) on page 268**  
**show chassis lcd menu (J-EX8200 Switch) on page 268**

**Output Fields** Table 45 on page 263 lists the output fields for the **show chassis lcd** command. Output fields are listed in the approximate order in which they appear.

**Table 45: show chassis lcd Output Fields**

Field Name	Field Description
<b>Front panel contents for slot</b>	FPC slot number of the switch whose content is being displayed. The number is always 0, except for J-EX4200 switches in a Virtual Chassis, where it is the member ID value.
<b>Front panel contents</b> (J-EX8200 and QFX Series)	On J-EX8200 switches, no slot number is displayed.
<b>LCD screen</b>	The first line displays the hostname (for Virtual Chassis members, displays the member ID, the current role, and hostname; for J-EX8200 switches, displays <b>RE</b> and the hostname). The second line displays the currently selected port parameter of the Status LED and the alarms counter. The Status LED port parameters are: <ul style="list-style-type: none"> <li>• <b>ADM</b>—Administrative</li> <li>• <b>SPD</b>—Speed</li> <li>• <b>DPX</b>—Duplex</li> <li>• <b>POE</b>—Power over Ethernet (J-EX4200 switches only)</li> </ul>
<b>LEDs status</b>	Current state of the Alarms, System, and Master LEDs (chassis status LEDs).
<b>Interface</b>	Names of the interfaces on the switch.

Table 45: show chassis lcd Output Fields (*continued*)

Field Name	Field Description
LED (ADM/SPD/DPX/POE)	<p>State of the currently selected port parameter of the Status LED for the interface. The Status LED port parameters are:</p> <p><b>NOTE:</b> J-EX4500 and J-EX8200 switches do not have the POE port parameter. The QFX Series products do not have any of the port parameters listed below.</p> <ul style="list-style-type: none"> <li>• <b>ADM</b>—Administrative</li> <li>• <b>SPD</b>—Speed</li> <li>• <b>DPX</b>—Duplex</li> <li>• <b>POE</b>—Power over Ethernet</li> </ul>
fpcx	On J-EX4500 switches, always 0. On J-EX4200 switches, member ID of the Virtual Chassis member whose LCD menu is displayed.

## Sample Output

```

user@switch> show chassis lcd
(Two-Member Virtual Chassis)
show chassis lcd
Front panel contents for slot: 0
-----
LCD screen:
  00:BK switch1
  LED:SPD ALARM 00
LEDs status:
  Alarms LED: Off
  System LED: Green
  Master LED: Off
Interface      LED(ADM/SPD/DPX/POE)
-----
ge-0/0/0       Off
ge-0/0/1       Off
ge-0/0/2       Off
ge-0/0/3       Off
ge-0/0/4       Off
ge-0/0/5       Off
ge-0/0/6       Off
ge-0/0/7       Off
ge-0/0/8       Off
ge-0/0/9       Off
ge-0/0/10      Off
ge-0/0/11      Off
ge-0/0/12      Off
ge-0/0/13      Off
ge-0/0/14      Off
ge-0/0/15      Off
ge-0/0/16      Off
ge-0/0/17      Off
ge-0/0/18      Off
ge-0/0/19      Off
ge-0/0/20      Off
ge-0/0/21      Off
ge-0/0/22      Off
ge-0/0/23      Off
Front panel contents for slot: 1
-----

```

```

LCD screen:
  01:RE switch2
  LED:SPD ALARM 01
LEDs status:
  Alarms LED: Yellow
  System LED: Green
  Master LED: Green
Interface      LED(ADM/SPD/DPX/POE)
-----
ge-1/0/0      Off
ge-1/0/1      Off
ge-1/0/2      Off
ge-1/0/3      Off
ge-1/0/4      Off
ge-1/0/5      Off
ge-1/0/6      Off
ge-1/0/7      Off
ge-1/0/8      Off
ge-1/0/9      Off
ge-1/0/10     Off
ge-1/0/11     Off
ge-1/0/12     Off
ge-1/0/13     Off
ge-1/0/14     Off
ge-1/0/15     Off
ge-1/0/16     Off
ge-1/0/17     Off
ge-1/0/18     Off
ge-1/0/19     Off
ge-1/0/20     Off
ge-1/0/21     Off
ge-1/0/22     Off
ge-1/0/23     Off

```

The output for the `show chassis lcd fpc-slot` command is the same as the output for the `show chassis lcd` command.

## Sample Output

```

show chassis lcd fpc-slot 1 (Virtual Chassis)
user@switch> show chassis lcd fpc-slot 1
Front panel contents for slot: 1
-----
LCD screen:
  01:RE switch2
  LED:SPD ALARM 01
LEDs status:
  Alarms LED: Yellow
  System LED: Green
  Master LED: Green
Interface      LED(ADM/SPD/DPX/POE)
-----
ge-1/0/0      Off
ge-1/0/1      Off
ge-1/0/2      Off
ge-1/0/3      Off
ge-1/0/4      Off
ge-1/0/5      Off
ge-1/0/6      Off
ge-1/0/7      Off
ge-1/0/8      Off

```

```

ge-1/0/9      Off
ge-1/0/10     Off
ge-1/0/11     Off
ge-1/0/12     Off
ge-1/0/13     Off
ge-1/0/14     Off
ge-1/0/15     Off
ge-1/0/16     Off
ge-1/0/17     Off
ge-1/0/18     Off
ge-1/0/19     Off
ge-1/0/20     Off
ge-1/0/21     Off
ge-1/0/22     Off
ge-1/0/23     Off

```

## Sample Output

**show chassis lcd**  
(J-EX8200 Switch)

**show chassis lcd**  
Front panel contents:

-----  
LCD screen:

```

RE st-8200-r
LED:ADM ALARM 01

```

LEDs status:

```

Alarms LED: Yellow
System LED: Yellow
Master LED: Green

```

Interface      LED(ADM/SPD/DPX)

```

-----
ge-0/0/0      Off
ge-0/0/1      Off
ge-0/0/2      Off
ge-0/0/3      Off
ge-0/0/4      Off
ge-0/0/5      Off
ge-0/0/6      Off
ge-0/0/7      Off
ge-0/0/8      Off
ge-0/0/9      Off
ge-0/0/10     Off
ge-0/0/11     Off
ge-0/0/12     Off
ge-0/0/13     Off
ge-0/0/14     Off
ge-0/0/15     Off
ge-0/0/16     Off
ge-0/0/17     Off
ge-0/0/18     Off
ge-0/0/19     Off
ge-0/0/20     Off
ge-0/0/21     Off
ge-0/0/22     Off
ge-0/0/23     Off
ge-0/0/24     Off
ge-0/0/25     Off
ge-0/0/26     Off
ge-0/0/27     Off
ge-0/0/28     Off
ge-0/0/29     Off
ge-0/0/30     Off

```

```

ge-0/0/31      Off
ge-0/0/32      Off
ge-0/0/33      Off
ge-0/0/34      Off
ge-0/0/35      Off
ge-0/0/36      Off
ge-0/0/37      Off
ge-0/0/38      Off
ge-0/0/39      Off
ge-0/0/40      Off
ge-0/0/41      Off
ge-0/0/42      Off
ge-0/0/43      Off
ge-0/0/44      Off
ge-0/0/45      Off
ge-0/0/46      Off
ge-0/0/47      Off
xe-2/0/0       Off
xe-2/0/1       Off
xe-2/0/2       Off
xe-2/0/3       Off
xe-2/0/4       Off
xe-2/0/5       Off
xe-2/0/6       Off
xe-2/0/7       Off
xe-3/0/0       Off
xe-3/0/1       Off
xe-3/0/2       Off
xe-3/0/3       Off
xe-3/0/4       Off
xe-3/0/5       Off
xe-3/0/6       Off
xe-3/0/7       Off
xe-5/0/0       Off
xe-5/0/1       Off
xe-5/0/2       Off
xe-5/0/3       Off
xe-5/0/4       Off
xe-5/0/5       Off
xe-5/0/6       On
xe-5/0/7       On
xe-7/0/5       Off

```

### Sample Output

```

show chassis lcd
fpc-slot 2 (J-EX8200
Switch)

```

```
show chassis lcd fpc-slot 2
```

Interface	LED(ADM/SPD/DPX)
xe-2/0/0	Off
xe-2/0/1	Off
xe-2/0/2	Off
xe-2/0/3	Off
xe-2/0/4	Off
xe-2/0/5	Off
xe-2/0/6	Off
xe-2/0/7	Off

## Sample Output

**show chassis lcd menu**  
(J-EX4200 Switch) user@switch> show chassis lcd menu  
fpc0:

```
-----  
status-menu  
status-menu vcp-status  
status-menu power-status  
status-menu environ-menu  
status-menu show-version  
maintenance-menu  
maintenance-menu halt-menu  
maintenance-menu system-reboot  
maintenance-menu rescue-config  
maintenance-menu vc-uplink-config  
maintenance-menu factory-default
```

On a J-EX4200 switch in a Virtual Chassis, the output for the **show chassis lcd menu all-members** command is the same as the output for the **show chassis lcd menu** command.

## Sample Output

**show chassis lcd menu**  
(J-EX8200 Switch) user@switch> show chassis lcd menu

```
status-menu  
status-menu sf-status1-menu  
status-menu sf-status2-menu  
status-menu psu-status1-menu  
status-menu psu-status2-menu  
status-menu environ-menu  
status-menu show-version  
maintenance-menu  
maintenance-menu halt-menu  
maintenance-menu system-reboot  
maintenance-menu rescue-config  
maintenance-menu factory-default
```



## show configuration

---

<b>Syntax</b>	show configuration < <i>statement-path</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the configuration that currently is running on the router or switch, which is the last committed configuration.
<b>Options</b>	<p>none—Display the entire configuration.</p> <p><i>statement-path</i>—(Optional) Display one of the following hierarchies in a configuration. (Each <b><i>statement-path</i></b> option has additional suboptions not described here. See the appropriate configuration guide or J-EX Series switch documentation for more information.)</p> <ul style="list-style-type: none"> <li>• <b>access</b>—Network access configuration.</li> <li>• <b>access-profile</b>—Access profile configuration.</li> <li>• <b>accounting-options</b>—Accounting data configuration.</li> <li>• <b>applications</b>—Applications defined by protocol characteristics.</li> <li>• <b>apply-groups</b>—Groups from which configuration data is inherited.</li> <li>• <b>chassis</b>—Chassis configuration.</li> <li>• <b>chassis network-services</b>—Current running mode.</li> <li>• <b>class-of-service</b>—Class-of-service configuration.</li> <li>• <b>diameter</b>—Diameter base protocol layer configuration.</li> <li>• <b>ethernet-switching-options</b>—(J-EX Series switch only) Ethernet switching configuration.</li> <li>• <b>event-options</b>—Event processing configuration.</li> <li>• <b>firewall</b>—Firewall configuration.</li> <li>• <b>forwarding-options</b>—Options that control packet sampling.</li> <li>• <b>groups</b>—Configuration groups.</li> <li>• <b>interfaces</b>—Interface configuration.</li> <li>• <b>jsrc</b>—JSRC partition configuration.</li> <li>• <b>jsrc-partition</b>—JSRC partition configuration.</li> <li>• <b>logical-systems</b>—Logical system configuration.</li> <li>• <b>poe</b>—(J-EX Series switch only) Power over Ethernet configuration.</li> <li>• <b>policy-options</b>—Routing policy option configuration.</li> <li>• <b>protocols</b>—Routing protocol configuration.</li> </ul>

- **routing-instances**—Routing instance configuration.
- **routing-options**—Protocol-independent routing option configuration.
- **security**—Security configuration.
- **services**—Service PIC applications configuration.
- **snmp**—Simple Network Management Protocol configuration.
- **system**—System parameters configuration.
- **virtual-chassis**—(J-EX Series switch only) Virtual Chassis configuration.
- **vlan**—(J-EX Series switch only) VLAN configuration.

**Additional Information** The portions of the configuration that you can view depend on the user class that you belong to and the corresponding permissions. If you do not have permission to view a portion of the configuration, the text **ACCESS-DENIED** is substituted for that portion of the configuration. If you do not have permission to view authentication keys and passwords in the configuration, because the **secret** permission bit is not set for your user account, the text **SECRET-DATA** is substituted for that portion of the configuration. If an identifier in the configuration contains a space, the identifier is displayed in quotation marks.

**Required Privilege Level** view

**Related Documentation**

- [Displaying the Current Junos OS Configuration](#)
- [Overview of Junos OS CLI Operational Mode Commands](#)

**List of Sample Output** [show configuration on page 270](#)  
[show configuration policy-options on page 271](#)

**Output Fields** This command displays information about the current running configuration.

## Sample Output

```

show configuration user@host> show configuration
## Last commit: 2006-10-31 14:13:00 PST by alant version "8.2I0 [builder]"; ##
Last changed: 2006-10-31 14:05:53 PST
system {
  host-name nesor;
  domain-name east.net;
  backup-router 192.1.1.254;
  time-zone America/Los_Angeles;
  default-address-selection;
  name-server {
    192.154.169.254;
    192.154.169.249;
    192.154.169.176;
  }
  services {
    telnet;
  }
  tacplus-server {

```

```
        1.2.3.4 {
            secret /* SECRET-DATA */;
            ...
        }
    }
}
interfaces {
    ...
}
protocols {
    isis {
        export "direct routes";
    }
}
policy-options {
    policy-statement "direct routes" {
        from protocol direct;
        then accept;
    }
}
```

```
show configuration user@host> show configuration policy-options
policy-options    policy-options {
                    policy-statement "direct routes" {
                        from protocol direct;
                        then accept;
                    }
                }
```

## show host

---

<b>Syntax</b>	<code>show host <i>hostname</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Domain Name System (DNS) hostname information.
<b>Options</b>	<i>hostname</i> —Hostname or address.
<b>Additional Information</b>	The <code>show host</code> command displays the raw data received from the DNS server.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show host on page 272

### Sample Output

```
show host user@host> show host snark
snark.boojum.net has address 192.168.1.254

user@host> show host 192.168.1.254
Name: snark.boojum.net
Address: 192.168.1.254
Aliases:
```

## show ntp associations

<b>Syntax</b>	show ntp associations <no-resolve>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Network Time Protocol (NTP) peers and their state.
<b>Options</b>	none—Display NTP peers and their state.  no-resolve—(Optional) Suppress symbolic addressing.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show ntp status on page 275</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ntp associations on page 274</a>
<b>Output Fields</b>	Table 46 on page 273 describes the output fields for the <b>show ntp associations</b> command. Output fields are listed in the approximate order in which they appear.

**Table 46: show ntp associations Output Fields**

Field Name	Field Description
remote	Address or name of the remote NTP peer.
refid	Reference identifier of the remote peer. If the reference identifier is not known, this field shows a value of 0.0.0.0.
st	Stratum of the remote peer.
t	Type of peer: <b>b</b> (broadcast), <b>l</b> (local), <b>m</b> (multicast), or <b>u</b> (unicast).
when	When the last packet from the peer was received.
poll	Polling interval, in seconds.
reach	Reachability register, in octal.
delay	Current estimated delay of the peer, in milliseconds.
offset	Current estimated offset of the peer, in milliseconds.
disp	Current estimated dispersion of the peer, in milliseconds.

Table 46: show ntp associations Output Fields (*continued*)

Field Name	Field Description
<i>peer-name</i>	Peer name and status of the peer in the clock selection process: <ul style="list-style-type: none"> <li>• space—Discarded because of a high stratum value or failed sanity checks.</li> <li>• x—Designated "falseticker" by the intersection algorithm.</li> <li>• .—Culled from the end of the candidate list.</li> <li>• ——Discarded by the clustering algorithm.</li> <li>• +—Included in the final selection set.</li> <li>• #—Selected for synchronization, but the distance exceeds the maximum.</li> <li>• *—Selected for synchronization.</li> <li>• o—Selected for synchronization, but the packets-per-second (pps) signal is in use.</li> </ul>

### Sample Output

```

show ntp associations user@host> show ntp associations
      remote          refid          st t when poll reach  delay  offset  disp
=====
*wolfe-gw.junipe tick.ucla.edu    2 u  43  64  377  1.86  0.319  0.08

```

## show ntp status

---

<b>Syntax</b>	show ntp status <no-resolve>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the values of internal variables returned by Network Time Protocol (NTP) peers.
<b>Options</b>	none—Display the values of internal variables returned by NTP peers.  no-resolve—(Optional) Suppress symbolic addressing.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show ntp associations on page 273</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ntp status on page 275</a>

### Sample Output

```

user@host> show ntp status
status=0644 leap_none, sync_ntp, 4 events, event_peer/strat_chg,
version="ntpd 4.1.0-a Fri Jun 24 06:40:56 GMT 2005 (1)",
processor="i386", system="JUNOS7.4-20050624.0", leap=00, stratum=2,
precision=-28, rootdelay=6.849, rootdispersion=10.615, peer=38788,
refid=ntp-server.company-a.net,
reftime=c66705d9.06ee0f3c Fri, Jun 24 2005 15:21:13.027, poll=6,
clock=c6670602.cf6db940 Fri, Jun 24 2005 15:21:54.810, state=4,
offset=0.205, frequency=75.911, jitter=0.396, stability=0.005

```

## show system firmware

<b>Syntax</b>	show system firmware <compatibility>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display firmware information.
<b>Options</b>	compatibility—(Optional) Display firmware compatibility information.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show system firmware on page 276</a> <a href="#">show system firmware compatibility on page 276</a>
<b>Output Fields</b>	Table 47 on page 276 lists the output fields for the show system firmware command. Output fields are listed in the approximate order in which they appear.

**Table 47: show system firmware Output Fields**

Field Name	Field Description
<b>Part</b>	Physical part on the router or switch affected by the firmware.
<b>Type</b>	Type of firmware on the router or switch.
<b>Tag</b>	Location of the firmware on the interface.
<b>Current version</b>	Firmware version on the affected router or switch parts.
<b>Available version</b>	New versions of firmware for upgrading or downgrading.
<b>Status</b>	Firmware condition on the router or switch.
<b>Action</b>	Whether you can upgrade or downgrade, or if no action is available ( <b>none</b> ).

## Sample Output

```

user@host> show system firmware
Part          Type          Tag Current  Available Status
              version
FPC 0        ROM Monitor 0 0  6.4.10
Routing Engine 0 RE BIOS      0  0

```

```

user@host> show system firmware compatibility
Part          Type          Tag Current  Available Action
              version

```



FPC 0	ROM Monitor 0	0	6.4.10	None
Routing Engine 0	RE BIOS	0	0	None

## show system reboot

---

<b>Syntax</b>	show system reboot <both-routing-engines>
<b>Syntax (J-EX Series Switch)</b>	show system reboot <all-members> <both-routing-engines> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display pending system reboots or halts.
<b>Options</b>	none—Display pending reboots or halts on the active Routing Engine.  all-members—(J-EX4200 switches only) (Optional) Display halt or reboot request information for all members of the Virtual Chassis configuration.  both-routing-engines—(Systems with multiple Routing Engines) (Optional) Display halt or reboot request information on both Routing Engines.  local—(J-EX4200 switches only) (Optional) Display halt or reboot request information for the local Virtual Chassis member.  member <i>member-id</i> —(J-EX4200 switches only) (Optional) Display halt or reboot request information for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	show system reboot on page 278

### Sample Output

```
show system reboot user@host> show system reboot
reboot requested by root at Wed Feb 10 17:40:46 1999
[process id 17885]
```

## show system snapshot

<b>Syntax</b>	<pre>show system snapshot &lt;all-members   local   member <i>member-id</i>&gt; &lt;media (external   internal)&gt; &lt;slice (1   2   alternate)&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the complete collection of files in a snapshot.
<b>Options</b>	<p>none—Display the system snapshot on the alternate media, which is the media that does not have the software packages that last booted the switch.</p> <p>all-members   local   member <i>member-id</i>—(J-EX4200 switch only) Display the snapshot in a Virtual Chassis configuration:</p> <ul style="list-style-type: none"> <li>• <b>all-members</b>—Display the snapshot for each switch that is a member of the Virtual Chassis.</li> <li>• <b>local</b>—Display the snapshot on the switch that you are currently logged into.</li> <li>• <b>member <i>member-id</i></b>—Display the snapshot for the specified member switch of the Virtual Chassis.</li> </ul> <p>media (external   internal)—(Optional) Display the destination media location for the snapshot. The <b>external</b> option specifies the snapshot on an external mass storage device, such as a USB flash drive. The <b>internal</b> option specifies the snapshot on an internal memory source, such as internal flash memory.</p> <p>slice (1   2   alternate)—Display the snapshot in a partition:</p> <ul style="list-style-type: none"> <li>• <b>1</b>—Display the snapshot in partition 1.</li> <li>• <b>2</b>—Display the snapshot in partition 2.</li> <li>• <b>alternate</b>—Display the snapshot in the alternate partition, which is the partition that did not boot the switch at the last bootup.</li> </ul>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request system snapshot on page 125</a></li> <li>• <a href="#">Creating a Snapshot and Using It to Boot a J-EX Series Switch on page 92</a></li> <li>• <a href="#">Verifying That a System Snapshot Was Created on a J-EX Series Switch on page 100</a></li> </ul>

## show system snapshot media external

```
user@switch> show system snapshot media external
Information for snapshot on external (da1s1)
Creation date: Oct 13 20:23:23 2009
JUNOS version on snapshot:
```

```
jbase : 10.0I20090726_0011_user  
jcrypto-ex: 10.0I20090726_0011_user  
jdocs-ex: 10.0I20090726_0011_user  
jkernel-ex: 10.0I20090726_0011_user  
jroute-ex: 10.0I20090726_0011_user  
jswitch-ex: 10.0I20090726_0011_user  
jweb-ex: 10.0I20090726_0011_user  
jpfe-ex42x: 10.0I20090726_0011_user
```

## show system software

---

<b>Syntax</b>	show system software <detail>
<b>Syntax (J-EX Series Switch)</b>	show system software <all-members> <detail> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the Junos OS extensions loaded on your router or switch.
<b>Options</b>	<p>none—Display standard information about all loaded Junos OS extensions.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display the system software running on all members of the Virtual Chassis configuration.</p> <p>detail—(Optional) Display detailed information about available Junos OS extensions.</p> <p>local—(J-EX4200 switches only) (Optional) Display the system software running on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display the system software running on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	show system software on page 281
<b>Output Fields</b>	When you enter this command, you are provided a list of Junos OS packages installed on the router and their corresponding Junos OS release number.

### Sample Output

```

user@host> show system software
Information for jbase:

Comment:
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [7.2R1.7]
Information for jdocs:

Comment:
JUNOS Online Documentation [7.2R1.7]

```

Information for jkernel:

Comment:

JUNOS Kernel Software Suite [7.2R1.7]

Information for jpfe:

Comment:

JUNOS Packet Forwarding Engine Support (M20/M40) [7.2R1.7]

Information for jroute:

Comment:

JUNOS Routing Software Suite [7.2R1.7]

Information for junos:

Comment:

JUNOS Base OS boot [7.2R1.7]

## show system storage

<b>Syntax</b>	show system storage <detail>
<b>Syntax (J-EX Series Switch)</b>	show system storage <detail> <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display statistics about the amount of free disk space in the router's or switch's file systems.
<b>Options</b>	<p>none—Display standard information about the amount of free disk space in the router's or switch's file systems.</p> <p>detail—(Optional) Display detailed output.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display system storage statistics for all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Display system storage statistics for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display system storage statistics for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show system storage on page 284
<b>Output Fields</b>	Table 48 on page 283 describes the output fields for the <b>show system storage</b> command. Output fields are listed in the approximate order in which they appear.

**Table 48: show system storage Output Fields**

Field Name	Field Description
Filesystem	Name of the file system.
Size	Size of the file system.
Used	Amount of space used in the file system.
Avail	Amount of space available in the file system.
Capacity	Percentage of the file system's space that is being used.

Table 48: show system storage Output Fields (*continued*)

Field Name	Field Description
Mounted on	Directory in which the file system is mounted.

## Sample Output


```

user@host> show system storage
show system storage
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/ad0s1a     77M       37M       34M     52%      /
devfs           16K       16K        0B     100%    /dev/
/dev/vn0        12M       12M        0B     100%    /packages/mnt/jbase
/dev/vn1        39M       39M        0B     100%
/packages/mnt/jkernel-7.2R1.7
/dev/vn2        12M       12M        0B     100%
/packages/mnt/jpfe-M40-7.2R1.7
/dev/vn3        2.3M      2.3M       0B     100%
/packages/mnt/jdocs-7.2R1.7
/dev/vn4        14M       14M        0B     100%
/packages/mnt/jroute-7.2R1.7
/dev/vn5        4.5M      4.5M       0B     100%
/packages/mnt/jcrypto-7.2R1.7
mfs:172        1.5G      4.0K      1.3G      0%      /tmp
/dev/ad0s1e     12M       20K       11M      0%      /config
procfs         4.0K      4.0K       0B     100%    /proc
/dev/ad1s1f     9.4G      4.9G      3.7G     57%     /var

```



## show system switchover

<b>Syntax</b>	show system switchover
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display whether graceful Routing Engine switchover (GRES) is configured, the state of the kernel replication (ready or synchronizing), any replication errors, and whether the primary and standby Routing Engines are using compatible versions of the kernel database.
	 <p><b>NOTE:</b> Issue the <code>show system switchover</code> command <i>only</i> on the backup Routing Engine. This command is <i>not</i> supported on the master Routing Engine because the kernel-replication process daemon does not run on the master Routing Engine. This process runs only on the backup Routing Engine.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show system switchover (Backup Routing Engine) on page 286</a>
<b>Output Fields</b>	Table 49 on page 285 describes the output fields for the <code>show system switchover</code> command. Output fields are listed in the approximate order in which they appear.

**Table 49: show system switchover Output Fields**

Field Name	Field Description
Graceful switchover	Display graceful Routing Engine switchover status: <ul style="list-style-type: none"> <li>• <b>On</b>—Indicates <code>graceful-switchover</code> is specified for the <code>routing-options</code> configuration command.</li> <li>• <b>Off</b>—Indicates <code>graceful-switchover</code> is not specified for the <code>routing-options</code> configuration command.</li> </ul>
Configuration database	State of the configuration database: <ul style="list-style-type: none"> <li>• <b>Ready</b>—Configuration database has synchronized.</li> <li>• <b>Synchronizing</b>—Configuration database is synchronizing. Displayed when there are updates within the last 5 seconds.</li> <li>• <b>Synchronize failed</b>—Configuration database synchronize process failed.</li> </ul>
Kernel database	State of the kernel database: <ul style="list-style-type: none"> <li>• <b>Ready</b>—Kernel database has synchronized.</li> <li>• <b>Synchronizing</b>—Kernel database is synchronizing. Displayed when there are updates within the last 5 seconds.</li> <li>• <b>Version incompatible</b>—The primary and standby Routing Engines are running incompatible kernel database versions.</li> <li>• <b>Replication error</b>—An error occurred when the state was replicated from the primary Routing Engine. Inspect <code>/var/log/ksyncd</code> for possible causes, or notify Juniper Networks customer support.</li> </ul>

Table 49: show system switchover Output Fields (*continued*)

Field Name	Field Description
Peer state	Routing Engine peer state: <ul style="list-style-type: none"><li>• <b>Steady State</b>—Peer completed switchover transition.</li><li>• <b>Peer Connected</b>—Peer in switchover transition.</li></ul>

### Sample Output

```
show system switchover (Backup Routing Engine) user@host> show system switchover
Graceful switchover: On
Configuration database: Ready
Kernel database: Ready
Peer state: Steady State
```

## show system uptime

<b>Syntax</b>	show system uptime
<b>Syntax (J-EX Series Switch)</b>	show system uptime <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the current time and information about how long the router or switch, router or switch software, and routing protocols have been running.
<b>Options</b>	<p>none—Show time since the system rebooted and processes started.</p> <p>all-members—(J-EX4200 switches only) (Optional) Show time since the system rebooted and processes started on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Show time since the system rebooted and processes started on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Show time since the system rebooted and processes started on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Monitoring System Process Information</li> <li>Monitoring System Properties</li> </ul>
<b>List of Sample Output</b>	<a href="#">show system uptime on page 288</a>
<b>Output Fields</b>	Table 50 on page 287 describes the output fields for the <b>show system uptime</b> command. Output fields are listed in the approximate order in which they appear.

**Table 50: show system uptime Output Fields**

Field Name	Field Description
Current time	Current system time in UTC.
System booted	Date and time when the Routing Engine on the router or switch was last booted and how long it has been running.
Protocols started	Date and time when the routing protocols were last started and how long they have been running.
Last configured	Date and time when a configuration was last committed. Also shows name of user who issued the last <b>commit</b> command.


Table 50: show system uptime Output Fields (*continued*)

Field Name	Field Description
<b>time and up</b>	Current time, in the local time zone, and how long the router or switch has been operational.
<b>users</b>	Number of users logged in to the router or router.
<b>load averages</b>	Load averages for the last 1 minute, 5 minutes, and 15 minutes.

### Sample Output

```
show system uptime user@host> show system uptime
Current time:      1998-10-13 19:45:47 UTC
System booted:    1998-10-12 20:51:41 UTC (22:54:06 ago)
Protocols started: 1998-10-13 19:33:45 UTC (00:12:02 ago)
Last configured:  1998-10-13 19:33:45 UTC (00:12:02 ago) by abc
12:45PM up 22:54, 2 users, load averages: 0.07, 0.02, 0.01
```

## show system users

<b>Syntax</b>	show system users <no-resolve>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	List information about the users who are currently logged in to the router or switch.
	 <p><b>NOTE:</b> The <code>show system users</code> command does not list information about the automated users that are currently logged in to the router or switch from a remote client application using Junos XML APIs, such as NETCONF. It only shows details of administrative users that are logged in to a router or switch using the CLI, J-Web, or an SSH client.</p>
<b>Options</b>	<p>none—List information about the users who are currently logged in to the router or switch.</p> <p>no-resolve—(Optional) Do not attempt to resolve IP addresses to hostnames.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show system users on page 290
<b>Output Fields</b>	Table 51 on page 289 describes the output fields for the <code>show system users</code> command. Output fields are listed in the approximate order in which they appear.

**Table 51: show system users Output Fields**

Field Name	Field Description
<i>time and up</i>	Current time, in the local time zone, and how long the router or switch has been operational.
<i>users</i>	Number of users logged in to the router or switch.
<i>load averages</i>	Load averages for the last 1 minute, 5 minutes, and 15 minutes.
<i>USER</i>	Username.
<i>TTY</i>	Terminal through which the user is logged in.
<i>FROM</i>	System from which the user has logged in. A hyphen indicates that the user is logged in through the console.
<i>LOGIN@</i>	Time when the user logged in.
<i>IDLE</i>	How long the user has been idle.
<i>WHAT</i>	Processes that the user is running.

## Sample Output

```
show system users user@host> show system users
7:30PM up 4 days, 2:26, 2 users, load averages: 0.07, 0.02, 0.01
USER      TTY FROM                LOGIN@  IDLE WHAT
root      d0  -                    Fri05PM 4days -csh (csh)
blue     p0  leve15.company.net 7:30PM   - cli
```

## show system virtual-memory


<b>Syntax</b>	show system virtual-memory
<b>Syntax (J-EX Series)</b>	show system virtual-memory <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the usage of Junos OS kernel memory listed first by size of allocation and then by type of usage. Use the <b>show system virtual-memory</b> command for troubleshooting with Dell Support.
<b>Options</b>	<p>none—Display kernel dynamic memory usage information.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display kernel dynamic memory usage information for all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Display kernel dynamic memory usage information for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display kernel dynamic memory usage information for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Additional Information</b>	 <p><b>NOTE:</b> The <b>show system virtual-memory</b> command with the <b>  display XML</b> pipe option now displays XML output for the command in the parent tags: <b>&lt;vmstat-memstat-malloc&gt;</b>, <b>&lt;vmstat-memstat-zone&gt;</b>, <b>&lt;vmstat-sumstat&gt;</b>, <b>&lt;vmstat-intr&gt;</b>, and <b>&lt;vmstat-kernel-state&gt;</b> with each child element as a separate XML tag.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><b>show system virtual-memory on page 293</b></p> <p><b>show system virtual-memory   display xml on page 297</b></p>
<b>Output Fields</b>	Table 52 on page 292 lists the output fields for the <b>show system virtual-memory</b> command. Output fields are listed in the approximate order in which they appear.

Table 52: show system virtual-memory Output Fields

Field Name	Field Description
<b>Memory statistics by bucket size</b>	
<b>Size</b>	Memory block size (bytes). The kernel memory allocator appropriates blocks of memory whose size is exactly a power of 2.
<b>In Use</b>	Number of memory blocks of this size that are in use (bytes).
<b>Free</b>	Number of memory blocks of this size that are free (bytes).
<b>Requests</b>	Number of memory allocation requests made.
<b>HighWater</b>	Maximum value the free list can have. Once the system starts reclaiming physical memory, it continues until the free list is increased to this value.
<b>Couldfree</b>	Total number of times that the free elements for a bucket size exceed the high-water mark for that bucket size.
<b>Memory usage type by bucket size</b>	
<b>Size</b>	Memory block size (bytes).
<b>Type(s)</b>	Kernel modules that are using these memory blocks. For a definition of each type, refer to a FreeBSD book.
<b>Memory statistics by type</b>	
<b>Type</b>	Kernel module that is using dynamic memory.
<b>InUse</b>	Number of memory blocks used by this type. The number is rounded up.
<b>MemUse</b>	Amount of memory in use, in kilobytes (KB).
<b>HighUse</b>	Maximum memory ever used by this type.
<b>Limit</b>	Maximum memory that can be allocated to this type.
<b>Requests</b>	Total number of dynamic memory allocation requests this type has made.
<b>Type Limit</b>	Number of times requests were blocked for reaching the maximum limit.
<b>Kern Limit</b>	Number of times requests were blocked for the kernel map.
<b>Size(s)</b>	Memory block sizes this type is using.
<b>Memory Totals</b>	
<b>In Use</b>	Total kernel dynamic memory in use (bytes, rounded up).
<b>Free</b>	Total kernel dynamic memory free (bytes, rounded up).



Table 52: show system virtual-memory Output Fields (*continued*)

Field Name	Field Description
Requests	Total number of memory allocation requests.
ITEM	Kernel module that is using memory.
Size	Memory block size (bytes).
Limit	Maximum memory that can be allocated to this type.
Used	Number of memory blocks used by this type. The number is rounded up.
Free	Number of memory blocks available to this type.
Requests	Total number of memory allocation requests this type has made.
interrupt	Timer events and scheduling interruptions.
total	Total number of interruptions for each type.
rate	Interruption rate.
Total	Total for all interruptions.

### Sample Output

```

show system virtual-memory user@host> show system virtual-memory
Memory statistics by bucket size
Size  In Use  Free  Requests  HighWater  Couldfree
16    906    118   154876    1280       0
32    455    313   209956    640        0
64    4412   260   75380     320        20
128   3200   32    19361     160        81
256   1510   10    8844      80         4
512   446    2     5085      40         0
1K    18     2     5901      20         0
2K    1128   2     4445      10         1368
4K    185    1     456       5          0
8K    5      1     2653      5          0
16K   181    0     233       5          0
32K   2      0     1848      5          0
64K   20     0     22        5          0
128K  5      0     5         5          0
256K  2      0     2         5          0
512K  1      0     1         5          0

Memory usage type by bucket size
Size  Type(s)
16    uc_devlist, nexusrdev, iftable, temp, devbuf, atexit, COS, BPF,
      DEVFS mount, DEVFS node, vnodes, mount, pcb, soname, proc-args, kld,
      MD disk, rman, ATA generic, bus, sysctl, ippool, pfestat, ifstate,
      pfe_ipc, mkey, rtable, ifmaddr, ipfw, rnode
32    atkbddev, dirrem, mkdir, diradd, freefile, freefrag, indirdep,

```

```

        bmsafemap, newblk, temp, devbuf, COS, vnodes, cluster_save buffer,
        pcb, soname, proc-args, sigio, kld, Gzip trees, taskqueue, SWAP,
        eventhandler, bus, sysctl, uidinfo, subproc, pgrp, pfestat, itable32,
        ifstate, pfe_ipc, mkey, rtable, ifmaddr, ipfw, rnode, rtnexthop
64  isadev, iftable, MFS node, allocindir, allocdirect, pagedep, temp,
        devbuf, lockf, COS, NULLFS hash, DEVFS name, vnodes,
        cluster_save buffer, vfscache, pcb, soname, proc-args, file,
        AR driver, AD driver, Gzip trees, rman, eventhandler, bus, sysctl,
        subproc, pfestat, pic, ifstate, pfe_ipc, mkey, ifaddr, rtable, ipfw
128 ZONE, freeblks, inodedep, temp, devbuf, zombie, COS, DEVFS node,
        vnodes, mount, vfscache, pcb, soname, proc-args, ttys, dev_t,
        timecounter, kld, Gzip trees, ISOFS node, bus, uidinfo, cred,
        session, pic, itable16, ifstate, pfe_ipc, rtable, ifstat, metrics,
        rtnexthop, iffamily
256 iflogical, iftable, MFS node, FFS node, newblk, temp, devbuf,
        NFS daemon, vnodes, proc-args, kqueue, file desc, Gzip trees, bus,
        subproc, itable16, ifstate, pfe_ipc, sysctl, rtnexthop
512 UFS mount, temp, devbuf, mount, BIO buffer, ptys, ttys, AR driver,
        Gzip trees, ISOFS mount, msg, ioctlops, ATA generic, bus, proc,
        pfestat, lr, ifstate, pfe_ipc, rtable, ipfw, ifstat, rtnexthop
1K  iftable, temp, devbuf, NQNFSL Lease, kqueue, kld, AD driver,
        Gzip trees, sem, MD disk, bus, ifstate, pfe_ipc, ipfw
2K  uc_devlist, UFS mount, temp, devbuf, BIO buffer, pcb, AR driver,
        Gzip trees, ioctlops, bus, ipfw, ifstat, rcache
4K  memdesc, iftable, UFS mount, temp, devbuf, kld, Gzip trees, sem, msg
8K  temp, devbuf, syncache, Gzip trees
16K indirdep, temp, devbuf, shm, msg
32K pagedep, kld, Gzip trees
64K VM pgdata, devbuf, MSDOSFS mount
128K UFS ihash, inodedep, NFS hash, kld, ISOFS mount
256K mbuf, vfscache
512K SWAP
    
```

Memory statistics by type					Type	Kern		
Type	InUse	MemUse	HighUse	Limit	Requests	Limit	Limit	Size(s)
isadev	13	1K	1K127753K		13	0	0	64
atkbddev	2	1K	1K127753K		2	0	0	32
uc_devlist	24	3K	3K127753K		24	0	0	16,2K
nexusdev	3	1K	1K127753K		3	0	0	16
memdesc	1	4K	4K127753K		1	0	0	4K
mbuf	1	152K	152K127753K		1	0	0	256K
iflogical	6	2K	2K127753K		6	0	0	256
iftable	17	9K	9K127753K		18	0	0	16,64,256,1K,4K
ZONE	15	2K	2K127753K		15	0	0	128
VM pgdata	1	64K	64K127753K		1	0	0	64K
UFS mount	12	26K	26K127753K		12	0	0	512,2K,4K
UFS ihash	1	128K	128K127753K		1	0	0	128K
MFS node	6	2K	3K127753K		35	0	0	64,256
FFS node	906	227K	227K127753K		1352	0	0	256
dirrem	0	0K	4K127753K		500	0	0	32
mkdir	0	0K	1K127753K		38	0	0	32
diradd	0	0K	6K127753K		521	0	0	32
freefile	0	0K	4K127753K		374	0	0	32
freeblks	0	0K	8K127753K		219	0	0	128
freefrag	0	0K	1K127753K		193	0	0	32
allocindir	0	0K	25K127753K		1518	0	0	64
indirdep	0	0K	17K127753K		76	0	0	32,16K
allocdirect	0	0K	10K127753K		760	0	0	64
bmsafemap	0	0K	1K127753K		72	0	0	32
newblk	1	1K	1K127753K		2279	0	0	32,256
inodedep	1	128K	175K127753K		2367	0	0	128,128K

pagedep	1	32K	33K127753K	47	0	0	64,32K
temp	1239	92K	96K127753K	8364	0	0	16,32,64K
devbuf	1413	5527K	5527K127753K	1535	0	0	16,32,64,128,256
lockf	38	3K	3K127753K	2906	0	0	64
atexit	1	1K	1K127753K	1	0	0	16
zombie	0	0K	2K127753K	3850	0	0	128
NFS hash	1	128K	128K127753K	1	0	0	128K
NQNFSLease	1	1K	1K127753K	1	0	0	1K
NFS daemon	1	1K	1K127753K	1	0	0	256
synccache	1	8K	8K127753K	1	0	0	8K
COS	353	44K	44K127753K	353	0	0	16,32,64,128
BPF	189	3K	3K127753K	189	0	0	16
MSDOSFS mount	1	64K	64K127753K	1	0	0	64K
NULLFS hash	1	1K	1K127753K	1	0	0	64
DEVFS mount	2	1K	1K127753K	2	0	0	16
DEVFS name	487	31K	31K127753K	487	0	0	64
DEVFS node	471	58K	58K127753K	479	0	0	16,128
vnodes	28	7K	7K127753K	429	0	0	16,32,64,128,256
mount	15	8K	8K127753K	18	0	0	16,128,512
cluster_save buffer	0	0K	1K127753K	55	0	0	32,64
vfscache	1898	376K	376K127753K	3228	0	0	64,128,256K
BIO buffer	49	98K	398K127753K	495	0	0	512,2K
pcb	159	16K	17K127753K	399	0	0	16,32,64,128,2K
soname	82	10K	10K127753K	42847	0	0	16,32,64,128
proc-args	57	2K	3K127753K	2105	0	0	16,32,64,128,256
ptys	32	16K	16K127753K	32	0	0	512
ttys	254	33K	33K127753K	522	0	0	128,512
kqueue	5	3K	4K127753K	23	0	0	256,1K
sigio	1	1K	1K127753K	27	0	0	32
file	383	24K	24K127753K	16060	0	0	64
file desc	76	19K	20K127753K	3968	0	0	256
shm	1	12K	12K127753K	1	0	0	16K
dev_t	286	36K	36K127753K	286	0	0	128
timecounter	10	2K	2K127753K	10	0	0	128
kld	11	117K	122K127753K	34	0	0	16,32,128,1K,4K
AR driver	1	1K	3K127753K	5	0	0	64,512,2K
AD driver	2	2K	3K127753K	2755	0	0	64,1K
Gzip trees	0	0K	46K127753K	133848	0	0	32,64,128,256
ISOFS node	1136	142K	142K127753K	1189	0	0	128
ISOFS mount	9	132K	132K127753K	10	0	0	512,128K
sem	3	6K	6K127753K	3	0	0	1K,4K
MD disk	2	2K	2K127753K	2	0	0	16,1K
msg	4	25K	25K127753K	4	0	0	512,4K,16K
rman	59	4K	4K127753K	461	0	0	16,64
ioctlops	0	0K	2K127753K	992	0	0	512,2K
taskqueue	2	1K	1K127753K	2	0	0	32
SWAP	2	413K	413K127753K	2	0	0	32,512K
ATA generic	6	3K	3K127753K	6	0	0	16,512
eventhandler	17	1K	1K127753K	17	0	0	32,64
bus	340	30K	31K127753K	794	0	0	16,32,64,128,256
sysctl	0	0K	1K127753K	130262	0	0	16,32,64
uidinfo	4	1K	1K127753K	10	0	0	32,128
cred	22	3K	3K127753K	3450	0	0	128
subproc	156	10K	10K127753K	7882	0	0	32,64,256
proc	2	1K	1K127753K	2	0	0	512
session	12	2K	2K127753K	34	0	0	128
pgrp	16	1K	1K127753K	45	0	0	32
ippool	1	1K	1K127753K	1	0	0	16
pfestat	0	0K	1K127753K	47349	0	0	16,32,64,512
pic	5	1K	1K127753K	5	0	0	64,128
lr	1	1K	1K127753K	1	0	0	512

itable32	110	4K	4K127753K	110	0	0	32
itable16	161	26K	26K127753K	161	0	0	128,256
ifstate	694	159K	160K127753K	1735	0	0	16,32,64,128,1K
pfe_ipc	0	0K	1K127753K	56218	0	0	16,32,64,128,1K
mkey	250	4K	4K127753K	824	0	0	16,32,64
ifaddr	9	1K	1K127753K	9	0	0	64
sysctl	0	0K	1K127753K	30	0	0	256
rtable	49	6K	6K127753K	307	0	0	16,32,64,128,512
ifmaddr	22	1K	1K127753K	22	0	0	16,32
ipfw	23	10K	10K127753K	48	0	0	16,32,64,512,2K
ifstat	698	805K	805K127753K	698	0	0	128,512,2K
rcache	4	8K	8K127753K	4	0	0	2K
rnode	27	1K	1K127753K	285	0	0	16,32
metrics	1	1K	1K127753K	3	0	0	128
rtnextop	57	9K	9K127753K	312	0	0	32,128,256,512
iffamily	12	2K	2K127753K	12	0	0	128

Memory Totals: In Use           Free       Requests  
                   9311K           54K       489068

ITEM	SIZE	LIMIT	USED	FREE	REQUESTS
PIPE:	192,	0,	4,	81,	4422
SWAPMETA:	160,	95814,	0,	0,	0
unpcb:	160,	0,	114,	36,	279
ripcb:	192,	25330,	5,	37,	5
syncache:	128,	15359,	0,	64,	5
tcpcb:	576,	25330,	23,	12,	32
udpcb:	192,	25330,	14,	28,	255
socket:	256,	25330,	246,	26,	819
KNOTE:	96,	0,	27,	57,	71
NFSNODE:	352,	0,	0,	0,	0
NFSMOUNT:	544,	0,	0,	0,	0
VNODE:	224,	0,	2778,	43,	2778
NAMEI:	1024,	0,	0,	8,	40725
VMSPACE:	192,	0,	57,	71,	3906
PROC:	448,	0,	73,	17,	3923
DP fakepg:	64,	0,	0,	0,	0
PV ENTRY:	28,	499566,	44530,	152053,	1525141
MAP ENTRY:	48,	0,	1439,	134,	351075
KMAP ENTRY:	48,	35645,	179,	119,	10904
MAP:	108,	0,	7,	3,	7
VM OBJECT:	92,	0,	2575,	109,	66912

792644 cpu context switches  
 9863474 device interrupts  
 286510 software interrupts  
 390851 traps  
 3596829 system calls  
   16 kernel threads created  
 3880 fork() calls  
   27 vfork() calls  
   0 rfork() calls  
   0 swap pager pageins  
   0 swap pager pages paged in  
   0 swap pager pageouts  
   0 swap pager pages paged out  
 380 vnode pager pageins  
 395 vnode pager pages paged in  
 122 vnode pager pageouts  
 1476 vnode pager pages paged out  
   0 page daemon wakeups

```

    0 pages examined by the page daemon
    101 pages reactivated
161722 copy-on-write faults
    0 copy-on-write optimized faults
    84623 zero fill pages zeroed
    83063 zero fill pages prezeroed
    7 intransit blocking page faults
535606 total VM faults taken
    0 pages affected by kernel thread creation
238254 pages affected by fork()
    2535 pages affected by vfork()
    0 pages affected by rfork()
283379 pages freed
    0 pages freed by daemon
190091 pages freed by exiting processes
    17458 pages active
    29166 pages inactive
    0 pages in VM cache
    10395 pages wired down
134610 pages free
    4096 bytes per page
183419 total name lookups
    cache hits (90% pos + 7% neg) system 0% per-directory
    deletions 0%, falsehits 0%, toolong 0%

```

interrupt	total	rate
ata0 irq14	113338	3
mux irq7	727643	21
fxp1 irq10	1178671	34
sio0 irq4	833	0
clk irq0	3439769	99
rtc irq8	4403221	127
Total	9863475	286

```

show system
virtual-memory |
display xml

```

```

user@host> show system virtual-memory | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/10.2R1/junos">
  <system-virtual-memory-information>
    <vmstat-memstat-alloc>
      <memstat-name>CAM dev queue</memstat-name>
      <inuse>1</inuse>
      <memuse>1</memuse>
      <high-use>-</high-use>
      <memstat-req>1</memstat-req>
      <memstat-size>64</memstat-size>
    <memstat-name>entropy</memstat-name>
      <inuse>1024</inuse>
      <memuse>64</memuse>
      <high-use>-</high-use>
      <memstat-req>1024</memstat-req>
      <memstat-size>64</memstat-size>
    <memstat-name>linker</memstat-name>
      <inuse>481</inuse>
      <memuse>1871</memuse>
      <high-use>-</high-use>
      <memstat-req>1145</memstat-req>
      <memstat-size>16,32,64,4096,32768,131072</memstat-size>
    <memstat-name>lockf</memstat-name>
      <inuse>56</inuse>
      <memuse>4</memuse>
      <high-use>-</high-use>
      <memstat-req>5998</memstat-req>

```

```

<memstat-size>64</memstat-size>
<memstat-name>devbuf</memstat-name>
<inuse>2094</inuse>
<memuse>3877</memuse>
<high-use>--</high-use>
<memstat-req>2099</memstat-req>

```

```
<memstat-size>16, 32, 64, 128, 512, 1024, 4096, 8192, 16384, 32768, 65536, 131072</memstat-size>
```

```

<memstat-name>temp</memstat-name>
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<memuse>66</memuse>
<high-use>--</high-use>
<memstat-req>3127</memstat-req>

```

```
<memstat-size>16, 32, 64, 128, 256, 512, 2048, 4096, 8192, 16384, 32768, 65536, 131072</memstat-size>
```

```

<memstat-name>ip6ndp</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>in6ifmulti</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>in6grentry</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>iflogical</memstat-name>
<inuse>13</inuse>
<memuse>3</memuse>
<high-use>--</high-use>
<memstat-req>13</memstat-req>
<memstat-size>64, 2048</memstat-size>
<memstat-name>iffamily</memstat-name>
<inuse>28</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
<memstat-req>28</memstat-req>
<memstat-size>32, 1024, 2048</memstat-size>
<memstat-name>rtnextHop</memstat-name>
<inuse>127</inuse>
<memuse>18</memuse>
<high-use>--</high-use>
<memstat-req>129</memstat-req>
<memstat-size>32, 256, 512, 1024, 2048, 4096</memstat-size>
<memstat-name>metrics</memstat-name>
<inuse>3</inuse>
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<inuse>3</inuse>

```

```

<memuse>1</memuse>
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<memstat-req>3</memstat-req>
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<memstat-name>ingrentry</memstat-name>
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<memuse>1</memuse>
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<memstat-req>6</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>rnode</memstat-name>
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<memuse>2</memuse>
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<memstat-req>76</memstat-req>
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<memstat-name>rcache</memstat-name>
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<memuse>8</memuse>
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<memstat-size>65536</memstat-size>
<memstat-name>ifdevice</memstat-name>
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<memuse>1</memuse>
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<memuse>22</memuse>
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<memstat-size>512,16384,32768</memstat-size>
<memstat-name>ipfw</memstat-name>
<inuse>42</inuse>
<memuse>23</memuse>
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<memuse>3</memuse>
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<memstat-req>103</memstat-req>
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<memstat-name>rtable</memstat-name>
<inuse>129</inuse>
<memuse>14</memuse>
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<memuse>0</memuse>
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<memstat-req>14847</memstat-req>
<memstat-size>16,32,64,4096,16384,32768</memstat-size>
<memstat-name>ifaddr</memstat-name>
<inuse>29</inuse>

```

```

<memuse>3</memuse>
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<memstat-name>mkey</memstat-name>
<inuse>345</inuse>
<memuse>6</memuse>
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<memstat-req>2527</memstat-req>
<memstat-size>16,128</memstat-size>
<memstat-name>pfe_ipc</memstat-name>
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<memuse>0</memuse>
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<memstat-name>ifstate</memstat-name>
<inuse>594</inuse>
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<memstat-req>655</memstat-req>

<memstat-size>16,32,64,128,256,1024,2048,4096,16384,32768</memstat-size>
<memstat-name>itable16</memstat-name>
<inuse>276</inuse>
<memuse>52</memuse>
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<memstat-req>294</memstat-req>
<memstat-size>1024,4096</memstat-size>
<memstat-name>itable32</memstat-name>
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<memstat-name>itable64</memstat-name>
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<memuse>1</memuse>
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<memstat-req>2</memstat-req>
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<memstat-name>lr</memstat-name>
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<memstat-name>pic</memstat-name>
<inuse>5</inuse>
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<memstat-req>5</memstat-req>
<memstat-size>64,512</memstat-size>
<memstat-name>pfestat</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>162</memstat-req>
<memstat-size>16,32,128,256,16384</memstat-size>

```



```

<memstat-name>gencfg</memstat-name>
<inuse>224</inuse>
<memuse>56</memuse>
<high-use>--</high-use>
<memstat-req>540</memstat-req>
<memstat-size>16,32,64,256,512,32768,65536</memstat-size>
<memstat-name>jsr</memstat-name>
<inuse>2</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
<memstat-size>16</memstat-size>
<memstat-name>idl</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>13</memstat-req>
<memstat-size>16,32,64,128,256,4096,16384,32768,131072</memstat-size>

```

```

<memstat-name>rtsmsg</memstat-name>
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<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
<memstat-size>131072</memstat-size>
<memstat-name>module</memstat-name>
<inuse>249</inuse>
<memuse>16</memuse>
<high-use>--</high-use>
<memstat-req>249</memstat-req>
<memstat-size>64,128</memstat-size>
<memstat-name>mtx_pool</memstat-name>
<inuse>1</inuse>
<memuse>8</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64,128</memstat-size>
<memstat-name>DEVFS3</memstat-name>
<inuse>109</inuse>
<memuse>12</memuse>
<high-use>--</high-use>
<memstat-req>117</memstat-req>
<memstat-size>256</memstat-size>
<memstat-name>DEVFS1</memstat-name>
<inuse>102</inuse>
<memuse>23</memuse>
<high-use>--</high-use>
<memstat-req>109</memstat-req>
<memstat-size>2048</memstat-size>
<memstat-name>pgrp</memstat-name>
<inuse>12</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>21</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>session</memstat-name>
<inuse>8</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>15</memstat-req>
<memstat-size>512</memstat-size>

```

```
<memstat-name>proc</memstat-name>
<inuse>2</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
<memstat-size>16384</memstat-size>
<memstat-name>subproc</memstat-name>
<inuse>244</inuse>
<memuse>496</memuse>
<high-use>--</high-use>
<memstat-req>1522</memstat-req>
<memstat-size>2048,131072</memstat-size>
<memstat-name>cred</memstat-name>
<inuse>30</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
<memstat-req>11409</memstat-req>
<memstat-size>256</memstat-size>
<memstat-name>plimit</memstat-name>
<inuse>17</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
<memstat-req>133</memstat-req>
<memstat-size>2048</memstat-size>
<memstat-name>uidinfo</memstat-name>
<inuse>3</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>6</memstat-req>
<memstat-size>32,512</memstat-size>
<memstat-name>sysctloid</memstat-name>
<inuse>1117</inuse>
<memuse>34</memuse>
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<memstat-req>1117</memstat-req>
<memstat-size>16,32,64</memstat-size>
<memstat-name>sysctltmp</memstat-name>
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<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>743</memstat-req>
<memstat-size>16,32,64,1024</memstat-size>
<memstat-name>umtx</memstat-name>
<inuse>144</inuse>
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<memstat-req>144</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>SWAP</memstat-name>
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<memuse>209</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>bus</memstat-name>
<inuse>496</inuse>
<memuse>55</memuse>
<high-use>--</high-use>
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<memstat-name>bus-sc</memstat-name>
```

```

<inuse>23</inuse>
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<memstat-req>335</memstat-req>

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<memstat-name>devstat</memstat-name>
<inuse>10</inuse>
<memuse>21</memuse>
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<memstat-req>10</memstat-req>
<memstat-size>16, 131072</memstat-size>
<memstat-name>eventhandler</memstat-name>
<inuse>35</inuse>
<memuse>2</memuse>
<high-use>--</high-use>
<memstat-req>36</memstat-req>
<memstat-size>32, 128</memstat-size>
<memstat-name>kobj</memstat-name>
<inuse>93</inuse>
<memuse>186</memuse>
<high-use>--</high-use>
<memstat-req>111</memstat-req>
<memstat-size>65536</memstat-size>
<memstat-name>DEVFS</memstat-name>
<inuse>8</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>9</memstat-req>
<memstat-size>16, 64</memstat-size>
<memstat-name>rman</memstat-name>
<inuse>71</inuse>
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<memstat-name>sbuf</memstat-name>
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<memstat-name>NULLFS hash</memstat-name>
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<memuse>1</memuse>
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<memstat-name>turnstiles</memstat-name>
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<memstat-size>64</memstat-size>
<memstat-name>Unitno</memstat-name>

```

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<memstat-req>44</memstat-req>
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<memuse>0</memuse>
<high-use>-</high-use>
<memstat-req>27622</memstat-req>
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<memstat-name>iov</memstat-name>
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<memuse>0</memuse>
<high-use>-</high-use>
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<memstat-name>msg</memstat-name>
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<memstat-name>shm</memstat-name>
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<high-use>-</high-use>
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<memuse>1</memuse>
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<memstat-name>soname</memstat-name>
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<memuse>12</memuse>
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<memstat-req>24712</memstat-req>
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<memstat-name>pcb</memstat-name>
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<memstat-req>405</memstat-req>
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<memstat-name>cluster_save buffer</memstat-name>
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<memstat-name>pfs_nodes</memstat-name>
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<memuse>3</memuse>
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<memstat-req>25</memstat-req>
<memstat-size>128</memstat-size>
<memstat-name>pfs_vncache</memstat-name>
<inuse>27</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>53</memstat-req>
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<memstat-name>STP</memstat-name>
<inuse>1</inuse>

```

```

    <memuse>1</memuse>
    <high-use>--</high-use>
    <memstat-req>1</memstat-req>
    <memstat-size>64</memstat-size>
    <memstat-name>GEOM</memstat-name>
    <inuse>146</inuse>
    <memuse>11</memuse>
    <high-use>--</high-use>
    <memstat-req>1042</memstat-req>

<memstat-size>16, 32, 64, 128, 256, 512, 2048, 16384, 32768, 131072</memstat-size>
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<memuse>0</memuse>
<high-use>--</high-use>
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<memstat-name>NFS daemon</memstat-name>
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<high-use>--</high-use>
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<memstat-size>16, 32, 64, 128, 256, 512, 2048, 16384, 32768, 131072</memstat-size>
<memstat-name>p1003.1b</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>16</memstat-size>
<memstat-name>MD disk</memstat-name>
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<memstat-size>65536</memstat-size>
<memstat-name>ata_generic</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>6</memstat-req>
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<memstat-name>ISOFs mount</memstat-name>
<inuse>8</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>15</memstat-req>
<memstat-size>512</memstat-size>
<memstat-name>ISOFs node</memstat-name>
<inuse>1440</inuse>
<memuse>135</memuse>
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<memstat-req>1457</memstat-req>

```

```

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<memuse>1</memuse>
<high-use>-</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>CAM XPT</memstat-name>
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<memuse>1</memuse>
<high-use>-</high-use>
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<used>1146</used>
<free>72</free>
<zone-req>1306</zone-req>
<zone-name>FFS1 dinode:</zone-name>
<zone-size>128</zone-size>

```

```

    <count-limit>0</count-limit>
    <used>1146</used>
    <free>24</free>
    <zone-req>1306</zone-req>
    <zone-name>FFS2 dinode:</zone-name>
    <zone-size>256</zone-size>
    <count-limit>0</count-limit>
    <used>0</used>
    <free>0</free>
    <zone-req>0</zone-req>
  </vmstat-memstat-zone>
<vmstat-sumstat>
  <cpu-context-switch>934906</cpu-context-switch>
  <dev-intr>1707986</dev-intr>
  <soft-intr>33819</soft-intr>
  <traps>203604</traps>
  <sys-calls>1200636</sys-calls>
  <kernel-thrds>60</kernel-thrds>
  <fork-calls>1313</fork-calls>
  <vfork-calls>21</vfork-calls>
  <rfork-calls>0</rfork-calls>
  <swap-pageins>0</swap-pageins>
  <swap-pagedin>0</swap-pagedin>
  <swap-pageouts>0</swap-pageouts>
  <swap-pagedout>0</swap-pagedout>
  <vnode-pageins>23094</vnode-pageins>
  <vnode-pagedin>23119</vnode-pagedin>
  <vnode-pageouts>226</vnode-pageouts>
  <vnode-pagedout>3143</vnode-pagedout>
  <page-daemon-wakeup>0</page-daemon-wakeup>
  <page-daemon-examined-pages>0</page-daemon-examined-pages>
  <pages-reactivated>8821</pages-reactivated>
  <copy-on-write-faults>48364</copy-on-write-faults>
  <copy-on-write-optimized-faults>31</copy-on-write-optimized-faults>
  <zero-fill-pages-zeroed>74665</zero-fill-pages-zeroed>
  <zero-fill-pages-prezeroed>70061</zero-fill-pages-prezeroed>
  <transit-blocking-page-faults>85</transit-blocking-page-faults>
  <total-vm-faults>191824</total-vm-faults>

<pages-affected-by-kernel-thrd-creat>0</pages-affected-by-kernel-thrd-creat>
  <pages-affected-by-fork>95343</pages-affected-by-fork>
  <pages-affected-by-vfork>3526</pages-affected-by-vfork>
  <pages-affected-by-rfork>0</pages-affected-by-rfork>
  <pages-freed>221502</pages-freed>
  <pages-freed-by-deamon>0</pages-freed-by-deamon>
  <pages-freed-by-exiting-proc>75630</pages-freed-by-exiting-proc>
  <pages-active>45826</pages-active>
  <pages-inactive>13227</pages-inactive>
  <pages-in-vm-cache>49278</pages-in-vm-cache>
  <pages-wired-down>10640</pages-wired-down>
  <pages-free>70706</pages-free>
  <bytes-per-page>4096</bytes-per-page>
  <swap-pages-used>0</swap-pages-used>
  <peak-swap-pages-used>0</peak-swap-pages-used>
  <total-name-lookups>214496</total-name-lookups>
  <positive-cache-hits>92</positive-cache-hits>
  <negative-cache-hits>5</negative-cache-hits>
  <pass2>0</pass2>
  <cache-deletions>0</cache-deletions>
  <cache-falsehits>0</cache-falsehits>
  <toolong>0</toolong>

```

```
</vmstat-sumstat>
<vmstat-intr>
  <intr-name>irq0: clk          </intr-name>
  <intr-cnt>124345</intr-cnt>
  <intr-rate>999</intr-rate>
  <intr-name>irq4: sio0        </intr-name>
  <intr-cnt>1140</intr-cnt>
  <intr-rate>0</intr-rate>
  <intr-name>irq8: rtc         </intr-name>
  <intr-cnt>159164</intr-cnt>
  <intr-rate>127</intr-rate>
  <intr-name>irq9: cbb1 fxp0   </intr-name>
  <intr-cnt>28490</intr-cnt>
  <intr-rate>22</intr-rate>
  <intr-name>irq10: fxp1       </intr-name>
  <intr-cnt>20593</intr-cnt>
  <intr-rate>16</intr-rate>
  <intr-name>irq14: ata0       </intr-name>
  <intr-cnt>5031</intr-cnt>
  <intr-rate>4</intr-rate>
  <intr-name>Total</intr-name>
  <intr-cnt>1457873</intr-cnt>
  <intr-rate>1171</intr-rate>
</vmstat-intr>
<vm-kernel-state>
  <vm-kmem-map-free>248524800</vm-kmem-map-free>
</vm-kernel-state>
</system-virtual-memory-information>
<cli>
  <banner></banner>
</cli>
</rpc-reply>
```

## show task replication

<b>Syntax</b>	<code>show task replication</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Displays graceful Routing Engine switchover (GRES) and nonstop active routing (NSR) status. When you issue this command on the master Routing Engine, the status of nonstop active routing synchronization is also displayed.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<code>show task replication</code> (Issued on the Master Routing Engine) on page 320 <code>show task replication</code> (Issued on the Backup Routing Engine) on page 320
<b>Output Fields</b>	Table 53 on page 320 lists the output fields for the <code>show task replication</code> command. Output fields are listed in the approximate order in which they appear.

**Table 53: show task replication Output Fields**

Field Name	Field Description
<b>Stateful replication</b>	Displays whether or not graceful Routing Engine switchover is configured. The status can be <b>Enabled</b> or <b>Disabled</b> .
<b>RE mode</b>	Displays the Routing Engine on which the command is issued: <b>Master</b> , <b>Backup</b> , or <b>Not applicable</b> (when the router has only one Routing Engine).
<b>Protocol</b>	Protocol that are supported by nonstop active routing.
<b>Synchronization Status</b>	Nonstop active routing synchronization status for the supported protocols. States are <b>NotStarted</b> , <b>InProgress</b> , and <b>Complete</b> .

## Sample Output

<b>show task replication</b> (Issued on the Master Routing Engine)	<pre> user@host&gt; show task replication           Stateful Replication: Enabled           RE mode: Master            Protocol                Synchronization Status           OSPF                    NotStarted           BGP                     Complete           IS-IS                   NotStarted           LDP                     Complete </pre>
<b>show task replication</b> (Issued on the Backup Routing Engine)	<pre> user@host&gt; show task replication </pre>

Stateful Replication: Enabled  
RE mode: Master

## show version

---

<b>Syntax</b>	show version <brief   detail>
<b>Syntax (J-EX Series Switch)</b>	show version <all-members> <brief   detail> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the hostname and version information about the software running on the router or switch.
<b>Options</b>	<p>none—Display standard information about the hostname and version of the software running on the router or switch.</p> <p>brief   detail—(Optional) Display the specified level of output.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display standard information about the hostname and version of the software running on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Display standard information about the hostname and version of the software running on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display standard information about the hostname and version of the software running on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show version on page 323

## Sample Output

```
show version user@host> show version
Hostname: router1
Model: m20
JUNOS Base OS boot [7.2-20050312.0]
JUNOS Base OS Software Suite [7.2-20050312.0]
JUNOS Kernel Software Suite [7.2R1.7]
JUNOS Packet Forwarding Engine Support (M20/M40) [7.2R1.7]
JUNOS Routing Software Suite [7.2R1.7]
JUNOS Online Documentation [7.2R1.7]
JUNOS Crypto Software Suite [7.2R1.7]

{master}

user@host> show version psd 1
psd1-re0:
-----
Hostname: china
Model: t640
JUNOS Base OS boot [9.1I20080311_1959_adthakur]
JUNOS Base OS Software Suite [9.1-20080321.0]
JUNOS Kernel Software Suite [9.1-20080321.0]
JUNOS Crypto Software Suite [9.1-20080321.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [9.1-20080321.0]
JUNOS Packet Forwarding Engine Support (T-series) [9.1-20080321.0]
JUNOS Online Documentation [9.1-20080321.0]
JUNOS Routing Software Suite [9.1-20080321.0]
labpkg [7.0]
```





## PART 6

# Junos OS for J-EX Series Switches Configuration Management

- Configuration Management Overview on page 327
- Managing Junos OS Configuration on page 343
- Verifying Configuration on page 361
- Configuration Statements for Configuration File Management on page 363
- Operational Commands for Configuration File Management on page 373



# Configuration Management Overview

- Configuration Files—Overview on page 327
- J-EX Series Switches Default Configuration on page 331

## Configuration Files—Overview

---

- Understanding Configuration Files for J-EX Series Switches on page 327
- Configuration Files Terms on page 328
- Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329
- Understanding Autoinstallation of Configuration Files on J-EX Series Switches on page 329

## Understanding Configuration Files for J-EX Series Switches

A configuration file stores the complete configuration of a switch. The current configuration of a switch is called the active configuration. You can alter this current configuration and you can also return to a previous configuration or to a rescue configuration. For more information, see “Configuration Files Terms” on page 328.

The Junos operating system (Junos OS) saves the 50 most recently committed configuration files on the switch so that you can return to a previous configuration. The configuration files are named:

- **juniper.conf.gz**—The current active configuration.
- **juniper.conf.1.gz** to **juniper.conf.49.gz**—Rollback configurations.

To make changes to the configuration file, you have to work in the configuration mode in the CLI or use the configuration tools in the J-Web interface. When making changes to a configuration file, you are viewing and changing the candidate configuration file. The candidate configuration allows you to make configuration changes without causing operational changes to the active configuration or causing potential damage to your current network operations. Once you commit the changes made to the candidate configuration, the system updates the active configuration.

### Related Documentation

- Managing Configuration Files Through the Configuration History (J-Web Procedure) on page 350
- Uploading a Configuration File (CLI Procedure) on page 348

- [Uploading a Configuration File \(J-Web Procedure\) on page 349](#)
- [Loading a Previous Configuration File \(CLI Procedure\) on page 352](#)
- [Reverting to the Rescue Configuration for the J-EX Series Switch on page 355](#)
- [Configuration Files Terms on page 328](#)

## Configuration Files Terms

Table 54 on page 328 lists the various configuration file terms used for J-EX Series switches and their definitions.

**Table 54: Configuration File Terms**

Term	Definition
active configuration	The current committed configuration of a switch.
candidate configuration	A working copy of the configuration that allows users to make configurational changes without causing any operational changes until this copy is committed.
configuration group	Group of configuration statements that can be inherited by the rest of the configuration.
commit a configuration	Have the candidate configuration checked for proper syntax, activated, and marked as the current configuration file running on the switching platform.
configuration hierarchy	The Junos OS configuration consists of a hierarchy of statements. There are two types of statements: container statements, which contain other statements, and leaf statements, which do not contain other statements. All the container and leaf statements together form the configuration hierarchy.
default configuration	The default configuration contains the initial values set for each configuration parameter when a switch is shipped.
rescue configuration	Well-known configuration that recovers a switch from a configuration that denies management access. You set a current committed configuration to be the rescue configuration through the J-Web interface or CLI.
roll back a configuration	Return to a previously committed configuration.

### Related Documentation

- [J-EX4200 Default Configuration on page 331](#)
- [J-EX4500 Default Configuration on page 336](#)
- [J-EX8200 Switch Default Configuration on page 341](#)
- [Loading a Previous Configuration File \(CLI Procedure\) on page 352](#)
- [Managing Configuration Files Through the Configuration History \(J-Web Procedure\) on page 350](#)
- [Reverting to the Rescue Configuration for the J-EX Series Switch on page 355](#)
- [Understanding Configuration Files for J-EX Series Switches on page 327](#)

## Understanding Automatic Refreshing of Scripts on J-EX Series Switches

You can automatically refresh **commit**, **event**, and **op** scripts using operational mode commands on J-EX Series switches. The commands are:

- **request system scripts refresh-from commit**
- **request system scripts refresh-from event**
- **request system scripts refresh-from op**

The existing Junos operating system (Junos OS) command-line interface (CLI) **refresh** and **refresh-from** configuration mode statements have been extended to work with Junos XML management protocol and NETCONF XML management protocol sessions.

### Related Documentation

- Understanding Autoinstallation of Configuration Files on J-EX Series Switches on page 329
- CLI User Interface Overview on page 151
- *Junos OS Junos XML Management Protocol Guide*
- *Junos OS NETCONF XML Management Protocol Guide*

## Understanding Autoinstallation of Configuration Files on J-EX Series Switches

Autoinstallation is the automatic configuration of a device over the network from a pre-existing configuration file that you create and store on a configuration server—typically a Trivial File Transfer Protocol (TFTP) server. You can use autoinstallation to automatically configure new devices and to deploy multiple devices from a central location in the network.

Autoinstallation takes place automatically when you connect an Ethernet port on a new switch to the network and power on the switch. You can also explicitly enable autoinstallation on J-EX Series Switches in your network to implement autoinstallation when they are powered on. To configure autoinstallation, you specify a configuration server, an autoinstallation interface, and a protocol for IP address acquisition.

This topic describes:

- Typical Uses for Autoinstallation on page 329
- Autoinstallation Configuration Files and IP Addresses on page 330
- Typical Autoinstallation Process on a New Switch on page 330

### Typical Uses for Autoinstallation

- To deploy and update multiple devices from a central location in the network.
- To configure a new device—Autoinstallation takes place when you power on a device that has only the factory default configuration (boot) file.
- To update a device—Autoinstallation takes place when a device that has been manually configured for autoinstallation is powered on.

## Autoinstallation Configuration Files and IP Addresses

---

For the autoinstallation process to work, you must store one or more host-specific or default configuration files on a configuration server in the network and have a service available—typically Dynamic Host Configuration Protocol (DHCP)—to assign an IP address to the switch.

You can set up the following configuration files for autoinstallation on the switch:

- **network.conf**—Default configuration file for autoinstallation, in which you specify IP addresses and associated hostnames for devices on the network.
- **switch.conf**—Default configuration file for autoinstallation with a minimum configuration sufficient for you to telnet to the device and configure it manually.
- **hostname.conf**—Host-specific configuration file for autoinstallation on a device that contains all the configuration information necessary for the switch. In the filename, **hostname** is replaced with the hostname assigned to the switch.

If the server with the autoinstallation configuration file is not on the same LAN segment as the new device, or if a specific device is required by the network, you must configure an intermediate device directly attached to the new switch, through which the new switch can send TFTP, boot protocol (BOOTP), and Domain Name System (DNS) requests. In this case, you specify the IP address of the intermediate device as the location to receive TFTP requests for autoinstallation.

## Typical Autoinstallation Process on a New Switch

---

When a J-EX Series switch is powered on for the first time, it performs the following autoinstallation tasks:

1. The new switch sends out DHCP or BOOTP requests on each connected interface simultaneously to obtain an IP address.

If a DHCP server responds to these requests, it provides the switch with some or all of the following information:

- An IP address and subnet mask for the autoinstallation interface.
- The location of the (typically) TFTP server, Hypertext Transfer Protocol (HTTP) server, or FTP server on which the configuration file is stored.
- The name of the configuration file to be requested from the TFTP server.
- The IP address or hostname of the TFTP server.

If the DHCP server provides the server's hostname, a DNS server must be available on the network to resolve the name to an IP address.

- The IP address of an intermediate device if the configuration server is on a different LAN segment from the new switch.

2. After the new switch acquires an IP address, the autoinstallation process on the switch attempts to download a configuration file in the following ways:
  - a. If the DHCP server specifies the host-specific configuration file **hostname.conf**, the switch uses that filename in the TFTP server request. The autoinstallation process on the new switch makes three unicast TFTP requests for **hostname.conf**. If these attempts fail, the switch broadcasts three requests to any available TFTP server for the file.
  - b. If the new switch does not locate a **hostname.conf** file, the autoinstallation process sends three unicast TFTP requests for a **network.conf** file that contains the switch's hostname-to-IP-address mapping information. If these attempts fail, the switch broadcasts three requests to any available TFTP server for the file.
  - c. If the switch fails to find a **network.conf** file that contains a hostname entry for the switch, the autoinstallation process sends out a DNS request and attempts to resolve the new switch's IP address to a hostname.
  - d. If the new switch determines its hostname, it sends a TFTP request for the **hostname.conf** file.
  - e. If the new switch is unable to map its IP address to a hostname, it sends TFTP requests for the default configuration file **switch.conf**. The TFTP request procedure is the same as for the **network.conf** file.
3. After the new switch locates a configuration file on a TFTP server, the autoinstallation process downloads the file, installs the file on the switch, and commits the configuration.

**Related Documentation**

- [Configuring Autoinstallation of Configuration Files \(CLI Procedure\) on page 357](#)
- [Connecting and Configuring a J-EX Series Switch \(CLI Procedure\) on page 185](#)
- [Connecting and Configuring a J-EX Series Switch \(J-Web Procedure\) on page 187](#)
- [Configuration Files Terms on page 328](#)

## J-EX Series Switches Default Configuration

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- [J-EX4200 Default Configuration on page 331](#)
- [J-EX4500 Default Configuration on page 336](#)
- [J-EX8200 Switch Default Configuration on page 341](#)

### J-EX4200 Default Configuration

Each J-EX Series switch is programmed with a factory default configuration that contains the values set for each configuration parameter when a switch is shipped. The default configuration file sets values for system parameters such as **syslog** and **commit**; configures Power over Ethernet (PoE), storm control, and Ethernet switching on all interfaces; and enables the LLDP and RSTP protocols.

When you commit changes to the configuration, a new configuration file is created that becomes the active configuration. You can always revert to the factory default configuration. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.

The following factory default configuration file is for a J-EX4200 switch with 24 ports (for models that have more ports, this default configuration file has more interfaces):



**NOTE:** In this example, `ge-0/0/0` through `ge-0/0/23` are the network interface ports. Optional uplink modules provide either two 10-gigabit small form-factor pluggable transceivers (`xe-0/1/0` and `xe-0/1/1`) or four 1-gigabit SFP transceivers (`ge-0/1/0` through `ge-0/1/3`). Although you can install only one uplink module, the interfaces for both are shown below.

```

system {
  syslog {
    user * {
      any emergency;
    }
    file messages {
      any notice;
      authorization info;
    }
    file interactive-commands {
      interactive-commands any;
    }
  }
  commit {
    factory-settings {
      reset-chassis-lcd-menu;
      reset-virtual-chassis-configuration;
    }
  }
}
interfaces {
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching;
    }
  }
  ge-0/0/1 {
    unit 0 {
      family ethernet-switching;
    }
  }
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching;
    }
  }
  ge-0/0/3 {
    unit 0 {

```



```
        family ethernet-switching;
    }
}
ge-0/0/4 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/5 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/6 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/7 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/8 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/9 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/10 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/11 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/12 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/13 {
    unit 0 {
        family ethernet-switching;
    }
}
ge-0/0/14 {
    unit 0 {
        family ethernet-switching;
    }
}
```

```
    }  
  }  
  ge-0/0/15 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/16 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/17 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/18 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/19 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/20 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/21 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/22 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  ge-0/0/23 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/1/0 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/1/1 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }
```

```

}
ge-0/1/0 {
  unit 0 {
    family ethernet-switching;
  }
}
ge-0/1/1 {
  unit 0 {
    family ethernet-switching;
  }
}
ge-0/1/2 {
  unit 0 {
    family ethernet-switching;
  }
}
ge-0/1/3 {
  unit 0 {
    family ethernet-switching;
  }
}
}
protocols {
  igmp-snooping {
    vlan all;
  }
  lldp {
    interface all;
  }
  lldp-med {
    interface all;
  }
  rstp;
}
ethernet-switching-options {
  storm-control {
    interface all;
  }
}
}
poe {
  interface all;
}
}

```

**Related  
Documentation**

- [Reverting to the Default Factory Configuration for the J-EX Series Switch on page 353](#)
- [Connecting and Configuring a J-EX Series Switch \(CLI Procedure\) on page 185](#)
- [Connecting and Configuring a J-EX Series Switch \(J-Web Procedure\) on page 187](#)
- [Understanding Configuration Files for J-EX Series Switches on page 327](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)

## J-EX4500 Default Configuration

Each J-EX Series switch is programmed with a factory default configuration that contains the values set for each configuration parameter when a switch is shipped. The default configuration file sets values for system parameters such as **syslog** and **commit**, configures Ethernet switching on all interfaces, enables IGMP snooping, and enables the LLDP and RSTP protocols.



**NOTE:** Interfaces `xe-0/0/0` through `xe-0/0/39` are the network interface ports. Optional uplink modules provide four 10-gigabit small form-factor pluggable (SFP+) transceivers (`xe-0/1/0` through `xe-0/1/3`) or four 1-gigabit small form-factor pluggable (SFP) transceivers (`xe-0/2/0` through `xe-0/2/3`). Although you can install only one uplink module, the interfaces for both are shown below.

When you commit changes to the configuration, a new configuration file is created, which becomes the active configuration. You can always revert to the factory default configuration. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.

This topic shows the factory default configuration file of a J-EX4500 switch:

```
system {
  syslog {
    user * {
      any emergency;
    }
    file messages {
      any notice;
      authorization info;
    }
    file interactive-commands {
      interactive-commands any;
    }
  }
  commit {
    factory-settings {
      reset-chassis-lcd-menu;
      reset-virtual-chassis-configuration;
    }
  }
}
interfaces {
  xe-0/0/0 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/0/1 {
    unit 0 {
      family ethernet-switching;
    }
  }
}
```

```
    }  
  }  
  xe-0/0/2 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/3 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/4 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/5 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/6 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/7 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/8 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/9 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/10 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/11 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }  
  xe-0/0/12 {  
    unit 0 {  
      family ethernet-switching;  
    }  
  }
```

```
}
xe-0/0/13 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/14 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/15 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/16 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/17 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/18 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/19 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/20 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/21 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/22 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/23 {
  unit 0 {
    family ethernet-switching;
  }
}
```

```
xe-0/0/24 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/25 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/26 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/27 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/28 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/29 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/30 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/31 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/32 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/33 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/34 {
  unit 0 {
    family ethernet-switching;
  }
}
xe-0/0/35 {
```

```
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/0/36 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/0/37 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/0/38 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/0/39 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/1/0 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/1/1 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/1/2 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/1/3 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/2/0 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/2/1 {
    unit 0 {
      family ethernet-switching;
    }
  }
  xe-0/2/2 {
    unit 0 {
```



```

        family ethernet-switching;
    }
}
xe-0/2/3 {
    unit 0 {
        family ethernet-switching;
    }
}
}
protocols {
    igmp-snooping {
        vlan all;
    }
    rstp;
    lldp {
        interface all;
    }
    lldp-med {
        interface all;
    }
}
}
ethernet-switching-options {
    storm-control {
        interface all;
    }
}
}

```

#### Related Documentation

- [Reverting to the Default Factory Configuration for the J-EX Series Switch on page 353](#)
- [Connecting and Configuring a J-EX Series Switch \(CLI Procedure\) on page 185](#)
- [Connecting and Configuring a J-EX Series Switch \(J-Web Procedure\) on page 187](#)
- [Understanding Configuration Files for J-EX Series Switches on page 327](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)

### J-EX8200 Switch Default Configuration

Each J-EX8200 switch is programmed with a factory default configuration that contains the values set for each configuration parameter when a switch is shipped. The default configuration file sets values for system parameters such as the ARP aging timer, the system log, and file messages, while also enabling the LLDP protocol, the RSTP protocol, IGMP snooping, and storm control.

When you commit changes to the configuration, a new configuration file is created that becomes the active configuration. You can always revert to the factory default configuration. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.

This topic shows the factory default configuration file of a J-EX8200 switch:

```

system {
    arp {
        aging-timer 5
    }
}

```

```
}
syslog {
  user * {
    any emergency;
  }
  file messages {
    any notice;
    authorization info;
  }
  file interactive-commands {
    interactive-commands any;
  }
}
commit {
  factory-settings {
    reset-chassis-lcd-menu;
  }
}
}
protocols {
  igmp-snooping {
    vlan all;
  }
  lldp {
    interface all;
  }
  rstp;
}
ethernet-switching-options {
  storm-control {
    interface all;
  }
}
}
```

**Related  
Documentation**

- [Configuration Files Terms on page 328](#)
- [Connecting and Configuring a J-EX Series Switch \(CLI Procedure\) on page 185](#)
- [Connecting and Configuring a J-EX Series Switch \(J-Web Procedure\) on page 187](#)
- [Understanding Configuration Files for J-EX Series Switches on page 327](#)
- [J-EX8208 Switch Hardware Overview on page 35](#)
- [J-EX8216 Switch Hardware Overview on page 38](#)

# Managing Junos OS Configuration

- Using the Configuration Tools in J-Web on page 343
- Managing Junos OS Configuration on page 347

## Using the Configuration Tools in J-Web

---

- Using the CLI Viewer in the J-Web Interface to View Configuration Text on page 343
- Using the CLI Editor in the J-Web Interface to Edit Configuration Text on page 343
- Using the Point and Click CLI Tool in the J-Web Interface to Edit Configuration Text on page 344
- Using the Commit Options to Commit Configuration Changes (J-Web Procedure) on page 346

### Using the CLI Viewer in the J-Web Interface to View Configuration Text

To view the entire configuration file contents in text format, select **Configure > CLI Tools > CLI Viewer**. The main pane displays the configuration in text format.

Each level in the hierarchy is indented to indicate each statement's relative position in the hierarchy. Each level is generally set off with braces, with an open brace ( { ) at the beginning of each hierarchy level and a closing brace ( } ) at the end. If the statement at a hierarchy level is empty, the braces are not displayed. Each leaf statement ends with a semicolon ( ; ), as does the last statement in the hierarchy.

This indented representation is used when the configuration is displayed or saved as an ASCII file. However, when you load an ASCII configuration file, the format of the file is not so strict. The braces and semicolons are required, but the indention and use of new lines are not required in ASCII configuration files.

#### Related Documentation

- Understanding J-Web Configuration Tools on page 155

### Using the CLI Editor in the J-Web Interface to Edit Configuration Text

Use the CLI Editor to edit configuration if you know the Junos OS CLI or prefer a command interface.

To edit the entire configuration in text format:



**CAUTION:** We recommend that you use this method to edit and commit the configuration only if you have experience editing configurations through the CLI.

1. Select **Configure > CLI Tools > CLI Editor**. The main pane displays the configuration in a text editor.

2. Navigate to the hierarchy level you want to edit.

You can edit the candidate configuration using standard text editor operations—insert lines (by using the Enter key), delete lines, and modify, copy, and paste text.

3. Click **Commit** to load and commit the configuration.

The switching platform checks the configuration for the correct syntax before committing it.

**Related Documentation**

- CLI User Interface Overview on page 151
- Understanding J-Web Configuration Tools on page 155

## Using the Point and Click CLI Tool in the J-Web Interface to Edit Configuration Text

To edit the configuration on a series of pages of clickable options that steps you through the hierarchy, select **Configure > CLI Tools > Point&Click CLI**. The side pane displays the top level of the configured hierarchy, and the main pane displays configured hierarchy options and the Icon Legend.

To expand or hide the hierarchy of all the statements in the side pane, click **Expand all** or **Hide all**. To expand or hide an individual statement in the hierarchy, click the expand (+) or collapse (–) icon to the left of the statement.



**TIP:** Only those statements included in the committed configuration are displayed in the hierarchy.

The configuration information in the main pane consists of configuration options that correspond to configuration statements. Configuration options that contain subordinate statements are identified by the term *Nested*.

To include, edit, or delete statements in the candidate configuration, click one of the links described in Table 55 on page 344. Then specify configuration information by typing in a field, selecting a value from a list, or clicking a check box (toggle).

**Table 55: J-Web Edit Point & Click Configuration Links**

Link	Function
Add new entry	Displays fields and lists for a statement identifier, allowing you to add a new identifier to a statement.

Table 55: J-Web Edit Point & Click Configuration Links (*continued*)

Link	Function
Configure	Displays information for a configuration option that has not been configured, allowing you to include a statement.
Delete	Deletes the corresponding statement or identifier from the configuration. All subordinate statements and identifiers contained within a deleted statement are also discarded.
Edit	Displays information for a configuration option that has already been configured, allowing you to edit a statement.
Identifier	Displays fields and lists for an existing statement identifier, allowing you to edit the identifier.

As you navigate through the configuration, the hierarchy level is displayed at the top of the main pane. You can click a statement or identifier in the hierarchy to display the corresponding configuration options in the main pane.

The main pane includes icons that display information about statements and identifiers when you place your cursor over them. Table 56 on page 345 describes these icons.

Table 56: J-Web Edit Point &amp; Click Configuration Icons

Icon	Function
C	Displays a comment about a statement.
I	Indicates that a statement is inactive.
M	Indicates that a statement has been added or modified but has not been committed.
*	Indicates that the statement or identifier is required in the configuration.
?	Provides online help information.

After typing or selecting your configuration edits, click a button in the main pane (described in Table 57 on page 345) to apply your changes or cancel them, refresh the display, or discard parts of the candidate configuration. An updated configuration does not take effect until you commit it.

Table 57: J-Web Edit Point &amp; Click Configuration Buttons

Button	Function
Refresh	Updates the display with any changes to the configuration made by other users.
Commit	Verifies edits and applies them to the current configuration file running on the switch.
Discard	Removes edits applied to or deletes existing statements or identifiers from the candidate configuration.

- Related Documentation**
- CLI User Interface Overview on page 151
  - Understanding J-Web Configuration Tools on page 155

## Using the Commit Options to Commit Configuration Changes (J-Web Procedure)

You can use the single-commit feature to commit all outstanding configuration changes in the J-Web interface on J-EX Series switches simultaneously. This helps in reducing the time J-Web takes for committing configurations because when changes are committed at every step, rollback configurations pile up.

For example, suppose you want to delete a firewall filter and add a new one. With immediate commits, you would need to commit your changes twice for this action. Using single commit, you can decrease the number of commits to one, thus saving time for working on other configurations.

When you edit a configuration, you work on a copy of the current configuration, which is your candidate configuration. The changes you make to the candidate configuration are visible through the user interface immediately, allowing other users to edit those configurations, but they do not take effect on the switch until you commit the changes. When you commit the configuration, the candidate file is checked for proper syntax, activated, and marked as the current, operational software configuration file. If multiple users are editing the configuration when you commit the candidate configuration, changes made by all users take effect.

You can configure the commit options to either commit all configuration changes together or commit each configuration change immediately using the J-Web Commit Preference page.



**NOTE:** There are some pages on which configuration changes must be committed immediately. For such pages, if you configure the commit options for a single commit, the system displays warning notifications that remind you to commit your changes immediately. An example of such a page is the Interface Page (**Configure > Interface**).

---

To configure the commit options on a J-EX Series switch using the J-Web interface:

1. Select **Commit Options**.



**NOTE:** All action links except **Preference** are disabled unless you edit, add, or delete a configuration.

---

2. Choose an action. See Table 58 on page 347 for details on the actions.
3. Configure the commit options by selecting **Preference**. See Table 59 on page 347 for details on preference options.

Table 58: Commit Options

Menu Item	Function	Your Action
Commit	Commits the candidate configuration of the current user session, along with changes from other user sessions.	<ol style="list-style-type: none"> <li>1. Select <b>Commit Options &gt; Commit</b>. Changes are committed after the system validates your configuration. A window displays that the configuration was successfully committed or that the commit failed.</li> <li>2. Click <b>OK</b>. Click <b>Details</b> to view the commit log.</li> </ol>
Compare	Displays the XML log of pending uncommitted configurations on the device.	<ol style="list-style-type: none"> <li>1. Select <b>Commit Options &gt; Compare</b>. The XML log of pending configurations on the devices are displayed similar to the CLI interface, in a “human-readable” form.</li> <li>2. Click <b>Close</b>.</li> </ol>
Discard	Discards the candidate configuration of your current session, along with changes from other user sessions.	<ol style="list-style-type: none"> <li>1. Select <b>Commit Options &gt; Discard</b>.</li> <li>2. Click <b>OK</b> to confirm the discard action. Your changes are discarded after the system validates your configuration.</li> </ol>
Preference	Indicates your choice of committing all global configurations together or committing each configuration change immediately.	<ol style="list-style-type: none"> <li>1. Select <b>Commit Options &gt; Preference</b>. The Commit Preference page is displayed.</li> <li>2. Configure the commit options by selecting your preference. See Table 59 on page 347 for details on preference options.</li> </ol>

Table 59: Commit Preference Options

Option	Function
Validate and commit configuration changes	Sets the system to validate and force an immediate commit on every screen after every configuration change.
Validate configuration changes	<p>Loads all the configuration changes for an accumulated single commit. If there are errors in loading the configuration, the errors are logged. This is the default mode.</p> <p>Once you select this option, you need to select <b>Commit Options &gt; Commit</b> to commit your changes.</p>

**Related Documentation**

- J-Web User Interface for J-EX Series Switches Overview on page 153
- J-EX Series Switch Software Features Overview on page 3

## Managing Junos OS Configuration

- Uploading a Configuration File (CLI Procedure) on page 348
- Uploading a Configuration File (J-Web Procedure) on page 349

- Managing Configuration Files Through the Configuration History (J-Web Procedure) on page 350
- Loading a Previous Configuration File (CLI Procedure) on page 352
- Reverting to the Default Factory Configuration for the J-EX Series Switch on page 353
- Reverting to the Rescue Configuration for the J-EX Series Switch on page 355
- Setting or Deleting the Rescue Configuration (CLI Procedure) on page 356
- Setting or Deleting the Rescue Configuration (J-Web Procedure) on page 357
- Configuring Autoinstallation of Configuration Files (CLI Procedure) on page 357

## Uploading a Configuration File (CLI Procedure)

You can create a configuration file on your local system, copy the file to the J-EX Series switch and then load the file into the CLI. After you have loaded the configuration file, you can commit it to activate the configuration on the switch. You can also edit the configuration interactively using the CLI and commit it at a later time.

To upload a configuration file from your local system:

1. Create the configuration file using a text editor such as Notepad, making sure that the syntax of the configuration file is correct. For more information about testing the syntax of a configuration file see the *Junos OS System Basics and Services Command Reference*.
2. In the configuration text file, use an option to perform the required action when the file is loaded. Table 60 on page 348 lists and describes some options for the **load** command.

Table 60: Options for the load command

Options	Description
<b>merge</b>	Combines the current active configuration and the configuration in <i>filename</i> or the one that you type at the terminal. A <b>merge</b> operation is useful when you are adding a new section to an existing configuration. If the active configuration and the incoming configuration contain conflicting statements, the statements in the incoming configuration override those in the active configuration.
<b>override</b>	Discards the current candidate configuration and loads the configuration in <i>filename</i> or the one that you type at the terminal. When you use the <b>override</b> option and commit the configuration, all system processes reparse the configuration. You can use the <b>override</b> option at any level of the hierarchy.
<b>replace</b>	Searches for the <b>replace</b> tags, deletes the existing statements of the same name, if any, and replaces them with the incoming configuration. If there is no existing statement of the same name, the <b>replace</b> operation adds the statements marked with the <b>replace</b> tag to the active configuration.  <b>NOTE:</b> For this operation to work, you must include <b>replace</b> tags in the text file or in the configuration you type at the terminal.

3. Press Ctrl+A to select all the text in the configuration file.
4. Press Ctrl+C to copy the contents of the configuration text file to the Clipboard.



5. Log in to the switch using your username and password.

6. To enter configuration mode:

```
user@switch> configure
```

You will see this output, with the hash or pound mark indicating configuration mode.

```
Entering configuration mode
```

```
[edit]
```

```
user@switch#
```

7. Load the configuration file:

```
[edit]
```

```
user@switch# load merge terminal
```

8. At the cursor, paste the contents of the Clipboard using the mouse and the Paste icon:

```
[edit]
```

```
user@switch# load merge terminal
```

```
[Type ^D at a new line to end input]
```

```
>Cursor is here. Paste the contents of the clipboard here<
```

9. Press Enter.

10. Press Ctrl+D to set the end-of-file marker.

To view results of the configuration steps before committing the configuration, type the **show** command at the user prompt.

To commit these changes to the active configuration, type the **commit** command at the user prompt. You can also edit the configuration interactively using the CLI and commit it at a later time.

#### Related Documentation

- [Uploading a Configuration File \(J-Web Procedure\) on page 349](#)
- [Understanding Configuration Files for J-EX Series Switches on page 327](#)

### Uploading a Configuration File (J-Web Procedure)

You can create a configuration file on your local system, copy the file to the J-EX Series switch and then load the file into the CLI. After you have loaded the configuration file, you can commit it to activate the configuration on the switch. You can also edit the configuration interactively using the CLI and commit it at a later time.

To upload a configuration file from your local system:

1. Select **Maintain > Config Management > Upload**.

The main pane displays the File to Upload box.

2. Specify the name of the file to upload using one of the following methods:

- Type the absolute path and filename in the File to Upload box.
- Click **Browse** to navigate to the file.

3. Click **Upload and Commit** to upload and commit the configuration.

The switch checks the configuration for the correct syntax before committing it.

- Related Documentation**
- [Uploading a Configuration File \(CLI Procedure\) on page 348](#)
  - [Understanding J-Web Configuration Tools on page 155](#)
  - [Understanding Configuration Files for J-EX Series Switches on page 327](#)

## Managing Configuration Files Through the Configuration History (J-Web Procedure)

Use the Configuration History function to manage configuration files.

1. [Displaying Configuration History on page 350](#)
2. [Displaying Users Editing the Configuration on page 351](#)
3. [Comparing Configuration Files with the J-Web Interface on page 351](#)
4. [Downloading a Configuration File with the J-Web Interface on page 352](#)
5. [Loading a Previous Configuration File with the J-Web Interface on page 352](#)

### Displaying Configuration History

To manage configuration files with the J-Web interface, select **Maintain > Config Management > History**. The main pane displays History — Database Information page.

Table 61 on page 350 summarizes the contents of the display.

The configuration history display allows you to:

- View a configuration.
- Compare two configurations.
- Download a configuration file to your local system.
- Roll back the configuration to any of the previous versions stored on the switch.

**Table 61: J-Web Configuration History Summary**

Field	Description
Number	Version of the configuration file.
Date/Time	Date and time the configuration was committed.
User	Name of the user who committed the configuration.
Client	Method by which the configuration was committed: <ul style="list-style-type: none"> <li>• <b>cli</b>—A user entered a Junos OS CLI command.</li> <li>• <b>junoscript</b>—A Junos XML protocol client performed the operation. Commit operations performed by users through the J-Web interface are identified in this way.</li> <li>• <b>snmp</b>—An SNMP <b>set</b> request started the operation.</li> <li>• <b>other</b>—Another method was used to commit the configuration.</li> </ul>
Comment	Comment.

Table 61: J-Web Configuration History Summary (*continued*)

Field	Description
Log Message	Method used to edit the configuration: <ul style="list-style-type: none"> <li>Imported via paste— Configuration was edited and loaded with the <b>Configure &gt; CLI Tools &gt; Edit Configuration Text</b> option.</li> <li>Imported upload [<i>filename</i>]<i>—</i>Configuration was uploaded with the <b>Configure &gt; CLI Tools &gt; Point Click Editor</b> option.</li> <li>Modified via J-Web Configure — Configuration was modified with the J-Web Configure menu.</li> <li>Rolled back via <i>user-interface</i>— Configuration was rolled back to a previous version through the user interface specified by <i>user-interface</i>, which can be Web Interface or CLI.</li> </ul>
Action	Action to perform with the configuration file. The action can be <b>Download</b> or <b>Rollback</b> .

### Displaying Users Editing the Configuration

To display a list of users editing the switching platform configuration, select **Config Management > History**. The list is displayed as Database Information in the main pane. Table 62 on page 351 summarizes the Database Information display.

Table 62: J-Web Configuration Database Information Summary

Field	Description
User Name	Name of user editing the configuration.
Start Time	Time of day the user logged in to the switch.
Idle Time	Elapsed time since the user issued a configuration command from the CLI.
Terminal	Terminal on which the user is logged in.
PID	Process identifier assigned to the user by the switching platform.
Edit Flags	Designates a private or exclusive edit.
Edit Path	Level of the configuration hierarchy that the user is editing.

### Comparing Configuration Files with the J-Web Interface

To compare any two of the past 50 committed configuration files:

1. Select **Config Management > History**. A list of the current and the previous 49 configurations is displayed as Configuration History in the main pane.
2. Select the check boxes to the left of the two configuration versions you want to compare.
3. Click **Compare**.

The main pane displays the differences between the two configuration files at each hierarchy level as follows:

- Lines that have changed are highlighted side by side in green.
- Lines that exist only in the more recent configuration file are displayed in red on the left.
- Lines that exist only in the older configuration file are displayed in blue on the right.

### Downloading a Configuration File with the J-Web Interface

To download a configuration file from the switch to your local system:

1. Select **Config Management > History**. A list of current and previous 49 configurations is displayed as Configuration History in the main pane.
2. In the Action column, click **Download** for the version of the configuration you want to download.
3. Select the options your Web browser provides that allow you to save the configuration file to a target directory on your local system.

The file is saved as an ASCII file.

### Loading a Previous Configuration File with the J-Web Interface

To load (roll back) and commit a previous configuration file stored on the switching platform:

1. Select **Config Management > History**. A list of current and previous 49 configurations is displayed as Configuration History in the main pane.
2. In the Action column, click **Rollback** for the version of the configuration you want to load.

The main pane displays the results of the rollback operation.



**NOTE:** When you click **Rollback**, the switch loads and commits the selected configuration. This behavior is different from the switch's behavior that occurs after you enter the **rollback** configuration mode command from the CLI. In the latter case, the configuration is loaded but not committed.

#### **Related Documentation**

- Loading a Previous Configuration File (CLI Procedure) on page 352
- Understanding Configuration Files for J-EX Series Switches on page 327
- Understanding J-Web Configuration Tools on page 155

### **Loading a Previous Configuration File (CLI Procedure)**

You can return to a previously committed configuration file if you need to revert to a previous configuration. The J-EX Series switch saves the last 50 committed configurations, including the rollback number, date, time, and name of the user who issued the **commit** configuration command.

**Syntax**

**rollback** <*number*>

**Options**

- **none**— Return to the most recently saved configuration.
- **number**— Configuration to return to.
  - **Range:** 0 through 49. The most recently saved configuration is number 0, and the oldest saved configuration is number 49.
  - **Default:** 0

To return to a configuration prior to the most recently committed one:

1. Specify the rollback number (here, 1 is entered and the configuration returns to the previously committed configuration):

```
[edit]
user@switch# rollback 1
load complete
```

2. Activate the configuration you have loaded:

```
[edit]
user@switch# commit
```

**Related Documentation**

- Managing Configuration Files Through the Configuration History (J-Web Procedure) on page 350
- Configuration Files Terms on page 328
- For more information on rollback, see *Junos OS CLI User Guide*.

**Reverting to the Default Factory Configuration for the J-EX Series Switch**

If for any reason the current active configuration fails, you can revert to the default factory configuration. You can also roll back to a previous configuration, as described in “Loading a Previous Configuration File (CLI Procedure)” on page 352, or revert to the rescue configuration, as described in “Reverting to the Rescue Configuration for the J-EX Series Switch” on page 355.

The default factory configuration contains the basic configuration settings. This is the first configuration of the switch and it is loaded when the switch is first installed and powered on.

You can revert to the default factory configuration by using the **Menu** button to the right of the LCD on the front panel of the switch or by using the **load factory-default** configuration command.

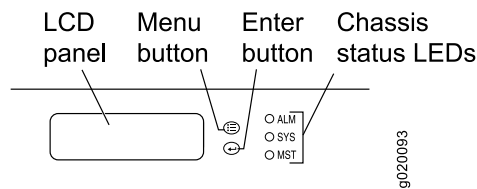
- Reverting to the Default Factory Configuration by Using the LCD Panel on page 354
- Reverting to the Default Factory Configuration by Using the load factory-default Command on page 354

## Reverting to the Default Factory Configuration by Using the LCD Panel

To set the switch to the default factory configuration, use the LCD panel and buttons on the front panel of the switch as shown in Figure 7 on page 354. If the switch model does not have an LCD panel, use the CLI command described in the following section.

Use the LCD panel to revert to the default factory configuration if you want to run EZsetup. When you use the CLI to revert to the default factory configuration, the configuration for the root password is retained and you cannot run EZSetup.

Figure 7: J-EX Series Switch LCD Panel



**NOTE:** If you want to convert a J-EX4200 or J-EX4500 switch from a member of a multimember Virtual Chassis configuration to a standalone switch, first disconnect the cables connected to the Virtual Chassis ports (VCPs). See [Disconnecting a Virtual Chassis Cable from a J-EX4200 Switch](#) or [Disconnecting a Virtual Chassis Cable from a J-EX4500 Switch](#) in the hardware guide for your switch. The Menu button procedure deletes all modified configuration parameters, including Virtual Chassis parameters such as member ID, mastership priority, and setting of VCP uplinks.

To revert to the default factory configuration by using the LCD panel:

1. Press the **Menu** button until you see MAINTENANCE MENU on the panel.
2. Press the **Enter** button.
3. Press **Menu** until you see FACTORY DEFAULT.
4. Press **Enter**. The display says RESTORE DEFAULT?
5. Press **Enter**. The screen flashes **FACTORY DEFAULT IN PROGRESS** and returns to the idle menu.

## Reverting to the Default Factory Configuration by Using the load factory-default Command

The **load factory-default** command is a standard Junos OS configuration command. Issuing this configuration command replaces the current active configuration with the default factory configuration.

Use the LCD panel to revert to the default factory configuration if you want to run EZSetup. When you use the CLI to revert to the default factory configuration, the configuration for the root password is retained and you cannot run EZSetup.



**NOTE:** The `load factory-default` command by itself is not supported on J-EX4200 and J-EX4500 switches configured in a Virtual Chassis with multiple members. In a multimember Virtual Chassis configuration, you can revert to the default factory configuration while retaining the Virtual Chassis parameters (member ID, mastership priority, or settings of VCP uplinks) using the `load factory-default` CLI command.

To revert to the default factory configuration by using the `load factory-default` command:

1. [edit]  
user@switch# **load factory-default**
2. [edit]  
user@switch# **delete system commit factory-settings**
3. [edit]  
user@switch# **set system root-authentication plain-text-password**
4. [edit]  
user@switch# **commit**
5. Check the member ID and mastership priority with the `show virtual-chassis status` command and check to see whether there are remaining settings for uplink VCPs by using the `show virtual-chassis vc-port` command.

#### Related Documentation

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- J-EX4200 Default Configuration on page 331
- J-EX4500 Default Configuration on page 336
- J-EX8200 Switch Default Configuration on page 341
- Understanding Configuration Files for J-EX Series Switches on page 327
- For more information about the `load factory-default` command, see the *Junos OS CLI User Guide*.

## Reverting to the Rescue Configuration for the J-EX Series Switch

If someone inadvertently commits a configuration that denies management access to a J-EX Series switch and the console port is not accessible, you can overwrite the invalid configuration and replace it with the rescue configuration by using the LCD panel on the switch. The rescue configuration is a previously committed, valid configuration.

You can also revert to the default factory configuration, as described in “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.

Before you begin to revert to the rescue configuration:

- Ensure that you have physical access to the switch.
- A rescue configuration for the switch must have been previously set.

To revert the switch to the rescue configuration:

1. At the LCD panel on the switch, press **Menu** until you see **MAINTENANCE MENU**.
2. Press **Enter**.
3. Press **Menu** until you see **Load Rescue**.
4. Press **Enter**.
5. When **Commit Rescue** is displayed, press **Enter**.

The LCD panel displays the message **Commit Rescue in Progress**. When the reversion is complete, it displays the idle menu.



**NOTE:** If there is no rescue configuration saved on the switch, the message **Commit rescue failed** is displayed.

#### Related Documentation

- Setting or Deleting the Rescue Configuration (CLI Procedure) on page 356
- Setting or Deleting the Rescue Configuration (J-Web Procedure) on page 357
- LCD Panel in J-EX4200 Switches
- LCD Panel in J-EX4500 Switches
- LCD Panel in a J-EX8200 Switch
- Configuration Files Terms on page 328

## Setting or Deleting the Rescue Configuration (CLI Procedure)

A rescue configuration is a well-known configuration that recovers a switch from a configuration that denies management access. You set a current committed configuration to be the rescue configuration through the J-Web interface or CLI.

If someone inadvertently commits a configuration that denies management access to a J-EX Series switch and the console port is not accessible, you can overwrite the invalid configuration and replace it with the rescue configuration by using the LCD panel on the switch. The rescue configuration is a previously committed, valid configuration. We recommend that the rescue configuration include the IP address (accessible from the network) for the management port.

To set the current active configuration as the rescue configuration:

```
user@switch> request system configuration rescue save
```

To delete an existing rescue configuration:

```
user@switch> request system configuration rescue delete
```

#### Related Documentation

- Setting or Deleting the Rescue Configuration (J-Web Procedure) on page 357
- Reverting to the Rescue Configuration for the J-EX Series Switch on page 355



- Loading a Previous Configuration File (CLI Procedure) on page 352
- Configuration Files Terms on page 328
- **show system configuration rescue on page 396**

## Setting or Deleting the Rescue Configuration (J-Web Procedure)

A rescue configuration is a well-known configuration that recovers a switch from a configuration that denies management access. You set a current committed configuration to be the rescue configuration through the J-Web interface or CLI.

If someone inadvertently commits a configuration that denies management access to a J-EX Series switch and the console port is not accessible, you can overwrite the invalid configuration and replace it with the rescue configuration by using the LCD panel on the switch. The rescue configuration is a previously committed, valid configuration. We recommend that the rescue configuration include the IP address (accessible from the network) for the management port.

To view, set, or delete the rescue configuration using the J-Web interface, select **Maintain > Config Management > Rescue**. On the Rescue page, you can perform the following tasks:

- View the current rescue configuration—Click **View rescue configuration**.
- Set the current running configuration as the rescue configuration—Click **Set rescue configuration**.
- Delete the current rescue configuration—Click **Delete rescue configuration**.

### Related Documentation

- Setting or Deleting the Rescue Configuration (CLI Procedure) on page 356
- Reverting to the Rescue Configuration for the J-EX Series Switch on page 355
- Configuration Files Terms on page 328

## Configuring Autoinstallation of Configuration Files (CLI Procedure)

Autoinstallation is the automatic configuration of a device over the network from a pre-existing configuration file that you create and store on a configuration server—typically a Trivial File Transfer Protocol (TFTP) server. You can use autoinstallation to automatically configure new devices and to deploy multiple devices from a central location in the network.

No configuration is required on a new switch (a switch that has the factory default configuration file), because it is an automated process. However, to specify autoinstallation to run when you power on a switch already installed in your network, you can enable it by specifying one or more interfaces, protocols, and configuration servers to be used for autoinstallation.

Before you explicitly enable and configure autoinstallation on the switch, perform these tasks as needed for your network's configuration:

- Have a service available—typically Dynamic Host Configuration Protocol (DHCP)—to assign an IP address to the switch
- Configure a DHCP server on your network to meet your network requirements. You can configure a J-EX Series switch to operate as a DHCP server. For more information, see “Configuring DHCP Services (J-Web Procedure)” on page 463.
- Create one of the following configuration files, and store it on a TFTP server (or HTTP server or FTP server) in the network:
  - A host-specific file with the name **hostname.conf** for each switch undergoing autoinstallation. Replace **hostname** with the name of a switch. The **hostname.conf** file typically contains all the configuration information necessary for the switch with this hostname.
  - A default configuration file named **switch.conf** with the minimum configuration necessary to enable you to telnet into the new switch for further configuration.
- Physically attach the switch to the network using a Gigabit Ethernet port.
- If you configure the DHCP server to provide only the TFTP server hostname, add an IP address-to-hostname mapping entry for the TFTP server to the DNS database file on the Domain Name System (DNS) server in the network.
- If the new switch is not on the same network segment as the DHCP server (or other device providing IP address resolution), configure an existing device as an intermediate device to receive TFTP and DNS requests and forward them to the TFTP server and the DNS server. You must configure the LAN or serial interface on the intermediate device with the IP addresses of the hosts providing TFTP and DNS services. Connect this interface to the new switch.
- If you are using **hostname.conf** files for autoinstallation, you must also complete the following tasks:
  - Configure the DHCP server to provide a **hostname.conf** filename to each new switch. Each switch uses its **hostname.conf** filename to request a configuration file from the TFTP server. Copy the necessary **hostname.conf** configuration files to the TFTP server.
  - Create a default configuration file named **network.conf**, and copy it to the TFTP server. This file contains IP-address-to-hostname mapping entries. If the DHCP server does not send a **hostname.conf** filename to a new switch, the switch uses **network.conf** to resolve its hostname based on its IP address.

Alternatively, you can add the IP-address-to-hostname mapping entry for the new switch to a DNS database file.

The switch uses the hostname to request a **hostname.conf** file from the TFTP server.

To configure autoinstallation:

1. Specify the URL address of one or more servers from which to obtain configuration files.

```
[edit system]
user@switch# set autoinstallation configuration-servers tftp://tftpconfig.sp.com
```



**NOTE:** You can also use an FTP address, for example, `ftp://user:password@sftpconfig.sp.com`.

2. Configure one or more Ethernet interfaces to perform autoinstallation and one or two procurement protocols for each interface. The switch uses the protocols to send a request for an IP address for the interface:

```
[edit system]
user@switch# set autoinstallation interfaces ge-0/0/0 bootp
```

**Related  
Documentation**

- Verifying Autoinstallation Status on a J-EX Series Switch on page 361
- Understanding Autoinstallation of Configuration Files on J-EX Series Switches on page 329
- DHCP Services for J-EX Series Switches Overview on page 457



# Verifying Configuration

- Verifying Autoinstallation Status on a J-EX Series Switch on page 361

## Verifying Autoinstallation Status on a J-EX Series Switch

---

**Purpose** Display the status of the autoinstallation feature on a J-EX Series switch.

**Action** From the CLI, enter the **show system autoinstallation status** command.

### Sample Output

```
user@switch> show system autoinstallation status
Autoinstallation status:
Master state: Active
Last committed file: None
Configuration server of last committed file: 10.25.100.1
Interface:
  Name: ge-0/0/0
  State: Configuration Acquisition
  Acquired:
    Address: 192.168.124.75
    Hostname: host-ge-000
    Hostname source: DNS
    Configuration filename: switch-ge-000.conf
    Configuration filename server: 10.25.100.3
  Address acquisition:
    Protocol: DHCP Client
    Acquired address: None
    Protocol: RARP Client
    Acquired address: None
Interface:
  Name: ge-0/0/1
  State: None
  Address acquisition:
    Protocol: DHCP Client
    Acquired address: None
    Protocol: RARP Client
    Acquired address: None
```

**Meaning** The output shows the settings configured for autoinstallation. Verify that the values displayed are correct for the switch when it is deployed on the network.

**Related Documentation** • Configuring Autoinstallation of Configuration Files (CLI Procedure) on page 357




# Configuration Statements for Configuration File Management

## archival

---

<b>Syntax</b>	<pre> archival {   configuration {     archive-sites {       ftp://username:&lt;password&gt;@&lt;host&gt;:&lt;port&gt;/&lt;url-path&gt;;       scp://&lt;username&gt;:&lt;password&gt;@&lt;host&gt;:&lt;port&gt;/&lt;url-path&gt;;     }     transfer-interval <i>interval</i>;     transfer-on-commit;   } } </pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure copying of the currently active configuration to an archive site.
<b>Options</b>	The remaining statements are explained separately.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site</li> </ul>

## archive-sites (Configuration File)

<b>Syntax</b>	<pre>archive-sites {   file://&lt;path&gt;/&lt;filename&gt;;   ftp://username@host:&lt;port&gt;url-path password password;   scp://username@host:&lt;port&gt;url-path password password; }</pre>
<b>Hierarchy Level</b>	[edit system archival configuration]
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Specify where to transfer the current configuration files. When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (" ") and enclose the IPv6 host address in brackets ([ ]). For example, <code>"scp://username&lt;:password&gt;@[ipv6-host-address]&lt;:port&gt;/url-path"</code></p> <p>If you specify more than one archive site, the router or switch attempts to transfer the configuration files to the first archive site in the list, moving to the next only if the transfer fails. The format for the destination filename is <code>router-name_juniper.conf[.gz]_YYYYMMDD_HHMMSS</code>.</p> <hr/> <p> <b>NOTE:</b> The time included in the destination filename is always in Coordinated Universal Time (UTC) regardless of whether the time on the router or switch is configured as UTC or the local time zone. The default time zone on the router or switch is UTC.</p> <hr/>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site</li> <li>• <a href="#">configuration on page 367</a></li> <li>• <a href="#">transfer-on-commit on page 371</a></li> </ul>



## autoinstallation

---

**Syntax**

```

autoinstallation {
  configuration-servers {
    url;
  }
  interfaces {
    interface-name {
      bootp;
      rarp;
    }
  }
}

```

**Hierarchy Level** [edit system]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** For J-EX Series switches. Download a configuration file automatically from an FTP, Hypertext Transfer Protocol (HTTP), or Trivial FTP (TFTP) server. When you power on a router or switch configured for autoinstallation, it requests an IP address from a Dynamic Host Configuration Protocol (DHCP) server. Once the router or switch has an address, it sends a request to a configuration server and downloads and installs a configuration.

**Options** The remaining statements are explained separately.

**Required Privilege Level**  
 system—To view this statement in the configuration.  
 system-control—To add this statement to the configuration.

**Related Documentation**

- [Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94](#)
- [configuration-servers on page 368](#)
- [idle-timeout on page 428](#)

## commit synchronize

---

<b>Syntax</b>	commit synchronize;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>For devices with multiple Routing Engines only. Configure a <b>commit</b> command to automatically result in a <b>commit synchronize</b> command. The Routing Engine on which you execute the <b>commit</b> command (the requesting Routing Engine) copies and loads its candidate configuration to the other (the responding) Routing Engines. All Routing Engines then perform a syntax check on the candidate configuration file being committed. If no errors are found, the configuration is activated and becomes the current operational configuration on all Routing Engines.</p> <p>Accounting of events and operations on a backup Routing Engine is not supported on accounting servers such as TACACS+ or RADIUS. Logging of accounting events is supported only for events and operations on a master Routing Engine.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically</li></ul>

## configuration

---

<b>Syntax</b>	<pre> configuration {   transfer-interval <i>interval</i>;   transfer-on-commit;   archive-sites {     file://&lt;path&gt;/&lt;filename&gt;;     ftp://&lt;username&gt;:&lt;password&gt;@&lt;host&gt;:&lt;port&gt;/&lt;url-path&gt; password <i>password</i>;     http://&lt;username&gt;@&lt;host&gt;:&lt;port&gt;/&lt;url-path&gt; password <i>password</i>;     scp://&lt;username&gt;@&lt;host&gt;:&lt;port&gt;/&lt;url-path&gt; password <i>password</i>;   } } </pre>
<b>Hierarchy Level</b>	[edit system archival]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the router or switch to transfer its currently active configuration by means of FTP periodically or after each commit.
<b>Options</b>	The remaining statements are explained separately.
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site</li> <li>archive</li> <li><a href="#">transfer-interval on page 370</a></li> <li><a href="#">transfer-on-commit on page 371</a></li> </ul>

## configuration-servers

---

<b>Syntax</b>	<pre>configuration-servers {     url; }</pre>
<b>Hierarchy Level</b>	[edit system autoinstallation]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>For J-EX Series switches, configure the URL address of a server from which to obtain configuration files. Examples of URLs:</p> <pre>tftp://hostname/path/filename</pre> <pre>ftp://username:prompt@ftp.hostname.net/filename /</pre>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94</li><li>• <b>autoinstallation on page 365</b></li><li>• <b>idle-timeout on page 428</b></li></ul>

---

## interfaces

---

<b>Syntax</b>	<pre>interfaces {   interface-name {     bootp;     rarp;     slarp;   } }</pre>
<b>Hierarchy Level</b>	[edit system autoinstallation]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Configure the interface on which to perform autoinstallation. A request for an IP address is sent from the interface. Specify the IP address procurement protocol.
<b>Options</b>	<b>bootp</b> —Send requests over serial interfaces with Frame Relay. <b>rarp</b> —Send requests over Ethernet interfaces.
<b>Required Privilege Level</b>	<b>system</b> —To view this statement in the configuration. <b>system-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94</li><li>• <b>autoinstallation on page 365</b></li></ul>


## transfer-interval (Configuration)

---

<b>Syntax</b>	<code>transfer-interval <i>interval</i>;</code>
<b>Hierarchy Level</b>	[edit system archival configuration]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the router or switch to periodically transfer its currently active configuration to an archive site.
<b>Options</b>	<b><i>interval</i></b> —Interval at which to transfer the current configuration to an archive site. <b>Range:</b> 15 through 2880 minutes
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site</li><li>• archive</li><li>• <a href="#">configuration on page 367</a></li><li>• <a href="#">transfer-on-commit on page 371</a></li></ul>

## transfer-on-commit

---

<b>Syntax</b>	transfer-on-commit;
<b>Hierarchy Level</b>	[edit system archival configuration]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the router or switch to transfer its currently active configuration to an archive site each time you commit a candidate configuration.
	<p> <b>NOTE:</b> When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (“ ”) and enclose the IPv6 host address in brackets ([ ]). For example, “ftp://username&lt;:password&gt;@[ipv6-host-address]&lt;:port&gt;/url-path”.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site</li> <li>archive</li> <li>configuration on page 367</li> <li>transfer-interval on page 370</li> </ul>





CHAPTER 22

# Operational Commands for Configuration File Management

## clear log

---

<b>Syntax</b>	<code>clear log <i>filename</i></code> <code>&lt;all&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Remove contents of a log file.
<b>Options</b>	<i>filename</i> —Name of the specific log file.  <code>all</code> —(Optional) Delete the specified log file and all archived versions of it.
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show log on page 673</a></li></ul>
<b>List of Sample Output</b>	<a href="#">clear log on page 374</a>
<b>Output Fields</b>	See <a href="#">file list</a> for an explanation of output fields.

## Sample Output

**clear log** The following sample commands list log file information, clear the contents of a log file, and then display the updated log file information:

```
user@host> file list lcc0-re0:/var/log/sampled detail
lcc0-re0:
-----
-rw-r----- 1 root wheel      26450 Jun 23 18:47 /var/log/sampled
total 1

user@host> clear log lcc0-re0:sampled
lcc0-re0:
-----

user@host> file list lcc0-re0:/var/log/sampled detail
lcc0-re0:
-----
-rw-r----- 1 root wheel      57 Sep 15 03:44 /var/log/sampled
total 1
```

## clear system commit

---

<b>Syntax</b>	clear system commit
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Clear any pending commit operation.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance (or the actual user who scheduled the commit)
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show system commit on page 393</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">clear system commit on page 375</a> <a href="#">clear system commit (None Pending) on page 375</a> <a href="#">clear system commit (User Does Not Have Required Privilege Level) on page 375</a> <a href="#">clear system commit (None Pending) on page 375</a> <a href="#">clear system commit (User Does Not Have Required Privilege Level) on page 375</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
clear system commit user@host> clear system commit
Pending commit cleared.
```

```
clear system commit user@host> clear system commit
(None Pending)      No commit scheduled.
```

```
clear system commit user@host> clear system commit
(User Does Not Have error: Permission denied
Required Privilege
Level)
```

### Sample Output

```
clear system commit user@switch> clear system commit
(None Pending)      No commit scheduled.
```

```
clear system commit user@switch> clear system commit
(User Does Not Have error: Permission denied
Required Privilege
Level)
```

## file archive

<b>Syntax</b>	<code>file archive destination <i>destination</i> source <i>source</i> &lt;compress&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Archive, and optionally compress, one or multiple local system files as a single file, locally or at a remote location.
<b>Options</b>	<p><code>destination <i>destination</i></code>—Destination of the archived file or files. Specify the destination as a URL or filename. The Junos OS adds one of the following suffixes if the destination filename does not already have it:</p> <ul style="list-style-type: none"> <li>• For archived files—The suffix <code>.tar</code></li> <li>• For archived and compressed files—The suffix <code>.tgz</code></li> </ul> <p><code>source <i>source</i></code>—Source of the original file or files. Specify the source as a URL or filename.</p> <p><code>compress</code>—(Optional) Compress the archived file with the GNU zip (gzip) compression utility. The compressed files have the suffix <code>.tgz</code>.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p><a href="#">file archive (Multiple Files) on page 376</a></p> <p><a href="#">file archive (Single File) on page 376</a></p> <p><a href="#">file archive (with Compression) on page 376</a></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

<b>file archive (Multiple Files)</b>	<p>The following sample command archives all message files in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tar</code>.</p> <pre>user@host&gt; file archive source /var/log/messages* destination /var/log/messages-archive.tar /usr/bin/tar: Removing leading / from absolute path names in the archive. user@host&gt;</pre>
<b>file archive (Single File)</b>	<p>The following sample command archives one message file in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tar</code>.</p> <pre>user@host&gt; file archive source /var/log/messages destination /var/log/messages-archive.tar /usr/bin/tar: Removing leading / from absolute path names in the archive. user@host</pre>
<b>file archive (with Compression)</b>	<p>The following sample command archives and compresses all message files in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tgz</code>.</p> <pre>user@host&gt; file archive compress source /var/log/messages* destination /var/log/messages-archive.tgz</pre>

/usr/bin/tar: Removing leading / from absolute path names in the archive.

## file checksum md5

---

<b>Syntax</b>	<code>file checksum md5 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Message Digest 5 (MD5) checksum of a file.
<b>Options</b>	<i>pathname</i> —(Optional) Path to a filename. <i>filename</i> —Name of a local file for which to calculate the MD5 checksum.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">file checksum sha-256 on page 380</a></li><li>• <a href="#">file checksum sha1 on page 379</a></li><li>• <a href="#">op on page 234</a></li></ul>
<b>List of Sample Output</b>	<a href="#">file checksum md5 on page 378</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum md5 user@host> file checksum md5 jbundle-5.3R2.4-export-signed.tgz
MD5 (jbundle-5.3R2.4-export-signed.tgz) = 2a3b69e43f9bd4893729cc16f505a0f5
```

## file checksum sha1

---

<b>Syntax</b>	<code>file checksum sha1 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Secure Hash Algorithm (SHA-1) checksum of a file.
<b>Options</b>	<p><i>pathname</i>—(Optional) Path to a filename.</p> <p><i>filename</i>—Name of a local file for which to calculate the SHA-1 checksum.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">file checksum md5 on page 378</a></li> <li>• <a href="#">file checksum sha-256 on page 380</a></li> <li>• <a href="#">op on page 234</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">file checksum sha1 on page 379</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum sha1 user@host> file checksum sha1 /var/db/scripts/opscript.slax
SHA1 (/var/db/scripts/commitscript.slax) = ba9e47120c7ce55cff29afd73eacd370e162c676
```

## file checksum sha-256

---

<b>Syntax</b>	<code>file checksum sha-256 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Secure Hash Algorithm 2 family (SHA-256) checksum of a file.
<b>Options</b>	<i>pathname</i> —(Optional) Path to a filename. <i>filename</i> —Name of a local file for which to calculate the SHA-256 checksum.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li><li>• Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li><li>• Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li><li>• Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></li><li>• <a href="#">file checksum md5 on page 378</a></li><li>• <a href="#">file checksum sha1 on page 379</a></li><li>• <a href="#">op on page 234</a></li></ul>
<b>List of Sample Output</b>	<a href="#">file checksum sha-256 on page 380</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum sha-256 user@host> file checksum sha-256 /var/db/scripts/commitscript.slax
SHA256 (/var/db/scripts/commitscript.slax) =
94c2b061fb55399e15babd2529453815601a602b5c98e5c12ed929c9d343dd71
```



## file compare

<b>Syntax</b>	<code>file compare (files <i>filename filename</i>) &lt; context   unified &gt; &lt;ignore-white-space &gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Compare two local files and describe the differences between them in default, context, or unified output styles:</p> <ul style="list-style-type: none"> <li>• <b>Default</b>—In the first line of output, <b>c</b> means lines were changed between the two files, <b>d</b> means lines were deleted between the two files, and <b>a</b> means lines were added between the two files. The numbers preceding this alphabetical marker represent the first file, and the lines after the alphabetical marker represent the second file. A left angle bracket (&lt;) in front of output lines refers to the first file. A right angle bracket (&gt;) in front of output lines refers to the second file.</li> <li>• <b>Context</b>—The display is divided into two parts. The first part is the first file; the second part is the second file. Output lines preceded by an exclamation point (!) have changed. Additions are marked with a plus sign (+), and deletions are marked with a minus sign (-).</li> <li>• <b>Unified</b>—The display is preceded by the line number from the first and the second file (<i>xx,xxx,x</i>). Before the line number, additions to the file are marked with a plus sign (+), and deletions to the file are marked with a minus sign (-). The body of the output contains the affected lines. Changes are viewed as additions plus deletions.</li> </ul>
<b>Options</b>	<p><code>files <i>filename</i></code>—Names of two local files to compare.</p> <p><code>context</code>—(Optional) Display output in context format.</p> <p><code>ignore-white-space</code>—(Optional) Ignore changes in the amount of white space.</p> <p><code>unified</code>—(Optional) Display output in unified format.</p>
<b>Required Privilege Level</b>	none
<b>List of Sample Output</b>	<p><b>file compare files on page 381</b></p> <p><b>file compare files context on page 382</b></p> <p><b>file compare files unified on page 382</b></p> <p><b>file compare files unified ignore-white-space on page 382</b></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
file compare files user@host> file compare files /tmp/one /tmp/two
100c100
<          full-name "File 1";
---
>          full-name "File 2";
```

```

102c102
<          class foo; # 'foo' is not defined
---
>          class super-user;

```

**file compare files context**

```

user@host> file compare files /tmp/one /tmp/two context
*** /tmp/one   Wed Dec  3 17:12:50 2003
--- /tmp/two   Wed Dec  3 09:13:14 2003
*****
*** 97,104 ****
        }
    }
    user bill {
!       full-name "Bill Smith";
!       class foo; # 'foo' is not defined
        authentication {
            encrypted-password SECRET;
        }
--- 97,105 ----
    }
    user bill {
!       full-name "Bill Smith";
!       uid 1089;
!       class super-user;
        authentication {
            encrypted-password SECRET;
        }

```

**file compare files unified**

```

user@host> file compare files /tmp/one /tmp/two unified
--- /tmp/one   Wed Dec  3 17:12:50 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -97,8 +97,9 @@
    }
}
user bill {
-   full-name "Bill Smith";
-   class foo; # 'foo' is not defined
+   full-name "Bill Smith";
+   uid 1089;
+   class super-user;
    authentication {
        encrypted-passwordSECRET;
    }
}

```

**file compare files unified ignore-white-space**

```

user@host> file compare files /tmp/one /tmp/two unified ignore-white-space
--- /tmp/one   Wed Dec  3 09:13:10 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -99,7 +99,7 @@
    user bill {
        full-name "Bill Smith";
        uid 1089;
-       class foo; # 'foo' is not defined
+       class super-user;
        authentication {
            encrypted-password <SECRET>; # SECRET-DATA
        }
    }

```

## file copy

<b>Syntax</b>	<code>file copy <i>source destination</i></code> <code>&lt;source-address <i>address</i>&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Copy files from one place to another on the local router or switch or between the local router or switch and a remote system.
<b>Options</b>	<p><i>source</i>—Source of the original file. Specify this as a URL or filename.</p> <p><i>destination</i>—Destination of the copied file. Specify this as a URL or filename. If you are copying a file to the current directory (your home directory on the local router or switch) and are not renaming the file, specify the destination with a period (.).</p> <p><i>source-address <i>address</i></i>—(Optional) Source IP host address. This option is useful for specifying the source address of a secure copy (scp) file transfer.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p><b>file copy (A File from the Router or Switch to a PC) on page 383</b></p> <p><b>file copy (A Configuration File Between Routing Engines) on page 383</b></p> <p><b>file copy (A Log File Between Routing Engines) on page 383</b></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

**file copy (A File from the Router or Switch to a PC)**

```
user@host> file copy /var/tmp/rpd.core.4 berry:/c/junipero/tmp
...transferring.file..... |           0 KB |   0.3 kB/s | ETA: 00:00:00 | 100%
```

**file copy (A Configuration File Between Routing Engines)**

The following sample command copies a configuration file from Routing Engine 0 to Routing Engine 1:

```
user@host> file copy /config/juniper.conf re1:/var/tmp/copied-juniper.conf
```

**file copy (A Log File Between Routing Engines)**

The following sample command copies a log file from Routing Engine 0 to Routing Engine 1:

```
user@host> file copy lcc0-re0:/var/log/chassisd lcc0-re1:/var/tmp
```

## file delete

---

<b>Syntax</b>	<code>file delete <i>filename</i></code> <code>&lt;purge&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Delete a file on the local router or switch.
<b>Options</b>	<i>filename</i> —Name of the file to delete.  <code>purge</code> —(Optional) Overwrite regular files before deleting them.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">file delete on page 384</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
file delete user@host> file list /var/tmp
            dcd.core
            rpd.core
            snmpd.core

            user@host> file delete /var/tmp/snmpd.core
            user@host> file list /var/tmp
            dcd.core
            rpd.core
```

## file list

---

<b>Syntax</b>	file list <detail   recursive> <filename>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display a list of files on the local router or switch.
<b>Options</b>	<p>none—Display a list of all files for the current directory.</p> <p>detail   recursive—(Optional) Display detailed output or descend recursively through the directory hierarchy, respectively.</p> <p>filename—(Optional) Display a list of files. For a routing matrix, the filename must include the chassis information.</p>
<b>Additional Information</b>	The default directory is the home directory of the user logged in to the router or switch. To view available directories, enter a space and then a backslash (/) after the <b>file list</b> command. To view files within a specific directory, include a backslash followed by the directory and, optionally, subdirectory name after the <b>file list</b> command.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>file list on page 385</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
file list user@host> file list /var/tmp
          dcd.core
          rpd.core
          snmpd.core
```

## file rename

---

<b>Syntax</b>	<code>file rename <i>source destination</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Rename a file on the local router or switch.
<b>Options</b>	<i>destination</i> —New name for the file.  <i>source</i> —Original name of the file. For a routing matrix, the filename must include the chassis information.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">file rename on page 386</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

**file rename** The following example lists the files in `/var/tmp`, renames one of the files, and then displays the list of files again to reveal the newly named file.

```
user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core

user@host> file rename /var/tmp/dcd.core /var/tmp/dcd.core.990413
user@host> file list /var/tmp
dcd.core.990413
rpd.core
snmpd.core
```

## file show

---

<b>Syntax</b>	<code>file show <i>filename</i></code> <code>&lt;encoding (base64   raw)&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the contents of a file.
<b>Options</b>	<p><i>filename</i>—Name of a file. For a routing matrix, the filename must include the chassis information.</p> <p><code>encoding (base64   raw)</code>—(Optional) Encode file contents with base64 encoding or show raw text.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">file show on page 387</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```

file show user@host> file show /var/log/messages
Apr 13 21:00:08 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:00:40 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:02:48 romney last message repeated 4 times
Apr 13 21:07:04 romney last message repeated 8 times
Apr 13 21:07:13 romney /kernel: so-1/1/0: Clearing SONET alarm(s) RDI-P
Apr 13 21:07:29 romney /kernel: so-1/1/0: Asserting SONET alarm(s) RDI-P
...

```

## request system configuration rescue delete

---

<b>Syntax</b>	request system configuration rescue delete
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Delete an existing rescue configuration.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• request system configuration rescue save on page 389</li><li>• request system software rollback on page 133</li><li>• show system commit on page 393</li></ul>
<b>List of Sample Output</b>	request system configuration rescue delete on page 388
<b>Output Fields</b>	This command produces no output.

### Sample Output

```
request system configuration rescue delete
user@switch> request system configuration rescue delete
delete
```



## request system configuration rescue save

---

<b>Syntax</b>	request system configuration rescue save
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Save the most recently committed configuration as the rescue configuration so that you can return to it at any time by using the <b>rollback</b> command.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• request system software delete on page 131</li> <li>• request system software rollback on page 133</li> <li>• show system commit on page 393</li> </ul>
<b>List of Sample Output</b>	<a href="#">request system configuration rescue save on page 389</a> <a href="#">request system configuration rescue save on page 389</a>
<b>Output Fields</b>	This command produces no output.

### Sample Output

```
request system user@host> request system configuration rescue save
configuration rescue
save
```

### Sample Output

```
request system user@switch> request system configuration rescue save
configuration rescue
save
```

## request system scripts refresh-from commit

<b>Syntax</b>	<code>request system scripts refresh-from commit file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard commit scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;commit&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from commit file config.txt url http://host1.juniper.net</code> on page 390

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from commit file config.txt url
refresh-from commit http://host1.juniper.net
file config.txt url user@switch>
http://host1.juniper.net
```

## request system scripts refresh-from event

<b>Syntax</b>	<code>request system scripts refresh-from event file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard event scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;event&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li>• <i>Junos OS Junos XML Management Protocol Guide</i></li> <li>• <i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from event file config.txt url http://host1.juniper.net</code> on page 391

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from event file config.txt url http://host1.juniper.net
refresh-from event file user@switch>
config.txt url
http://host1.juniper.net
```

## request system scripts refresh-from op

<b>Syntax</b>	<code>request system scripts refresh-from op file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard op scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;op&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from op file config.txt url http://host1.juniper.net</code> on page 392

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from op file config.txt url http://host1.juniper.net
refresh-from op file user@switch>
config.txt url
http://host1.juniper.net
```

## show system commit

<b>Syntax</b>	show system commit
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the pending commit operation (if any) and the commit history.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>clear system commit on page 375</li> </ul>
<b>List of Sample Output</b>	<p>show system commit on page 393</p> <p>show system commit (At a Particular Time) on page 394</p> <p>show system commit (At the Next Reboot) on page 394</p> <p>show system commit (Rollback Pending) on page 394</p>
<b>Output Fields</b>	Table 63 on page 393 describes the output fields for the <b>show system commit</b> command. Output fields are listed in the approximate order in which they appear.

Table 63: show system commit Output Fields

Field Name	Field Description
<b>Commit history</b>	Displays the last 50 commit operations listed, most recent to first. The identifier <b>rescue</b> designates a configuration created for recovery using the <b>request system configuration rescue save</b> command.
<b>Timestamp</b>	Date and time of the commit operation.
<b>Username</b>	User who executed the commit operation.
<b>Commit method</b>	Method used to execute the commit operation: <ul style="list-style-type: none"> <li><b>cli</b>—CLI interactive user performed the commit operation.</li> <li><b>Junos XML protocol</b>—Junos XML protocol client performed the commit operation.</li> <li><b>synchronize</b>—The <b>commit synchronize</b> command was performed on the other Routing Engine.</li> <li><b>snmp</b>—An SNMP <b>SET</b> request caused the commit operation.</li> <li><b>button</b>—A button on the router or switch was pressed to commit a rescue configuration for recovery.</li> <li><b>autoinstall</b>—A configuration obtained through autoinstallation was committed.</li> <li><b>other</b>—A method other than those identified was used to perform the commit operation.</li> </ul>

## Sample Output

```

show system commit user@host> show system commit
0 2003-07-28 19:14:04 PDT by root via other
1 2003-07-25 22:01:36 PDT by regress via cli
2 2003-07-25 22:01:32 PDT by regress via cli

```

```
3 2003-07-25 21:30:13 PDT by root via button
4 2003-07-25 13:46:48 PDT by regress via cli
5 2003-07-25 05:33:21 PDT by root via autoinstall
...
rescue 2002-05-10 15:32:03 PDT by root via other
```

```
show system commit      user@host> show system commit
(At a Particular Time) commit requested by root via cli at Tue May 7 15:59:00 2002
```

```
show system commit      user@host> show system commit
(At the Next Reboot)   commit requested by root via cli at reboot
```

```
show system commit      user@host> show system commit
(Rollback Pending)    0 2005-01-05 15:00:37 PST by root via cli commit confirmed, rollback in 3mins
```

## show system configuration archival

---

<b>Syntax</b>	show system configuration archival
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display directory and number of files queued for archival transfer.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">show system configuration archival on page 395</a>

### Sample Output

```
show system configuration archival user@host> show system configuration archival
/var/transfer/config/:
total 8
```

## show system configuration rescue

<b>Syntax</b>	show system configuration rescue
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display a rescue configuration, if one exists.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show system configuration archival on page 395</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show system configuration rescue on page 396</a>

### Sample Output

```

user@host> show system configuration rescue
show system configuration rescue
version "7.3"; groups {
  global {
    system {
      host-name router1;
      domain-name customer.net;
      domain-search [ customer.net ];
      backup-router 192.168.124.254;
      name-server {
        172.17.28.11;
        172.17.28.101;
        172.17.28.100;
        172.17.28.10;
      }
      login {
        user regress {
          uid 928;
          class ;
          shell csh;
          authentication {
            encrypted-password "$1$kPU..$w.4FGRAGanJ8U4Yq6sbj7."; ##
SECRET-DATA
          }
        }
      }
    }
  }
  services {
    ftp;
    rlogin;
    rsh;
    telnet;
  }
}
.....

```



## show system rollback

<b>Syntax</b>	<code>show system rollback <i>number</i></code> < <code>compare <i>number</i></code> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the contents of a previously committed configuration, or the differences between two previously committed configurations.
<b>Options</b>	<p><i>number</i>—Number of a configuration to view. The output displays the configuration. The range of values is 0 through 49.</p> <p><code>compare <i>number</i></code> —(Optional) Number of another previously committed (rollback) configuration to compare to rollback <i>number</i>. The output displays the differences between the two configurations. The range of values is 0 through 49.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show system rollback compare on page 397

### Sample Output

```

show system rollback compare user@host> show system rollback 3 compare 1
[edit]
+ interfaces {
+   ge-1/1/1 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 14.1.1.1/30;
+       }
+     }
+   }
+   ge-1/2/1 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 13.1.1.1/30;
+       }
+     }
+   }
+   ge-1/3/0 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 12.1.1.1/30;
+       }
+     }
+   }
+ }

```

```
+    }  
+}
```

## test configuration

---

<b>Syntax</b>	<code>test configuration filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Verify that the syntax of a configuration file is correct. If the configuration contains any errors, a message is displayed to indicate the line number and column number in which the error was found.
<b>Options</b>	<i>filename</i> —Name of the configuration file.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>test configuration on page 399</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

test configuration user@host> test configuration terminal
                    [Type ^D to end input]
                    system {
                    host-name bluesky;
                    paris-23;
                    login;
                    }
                    terminal:3:(8) syntax error: paris
                    [edit system]
                    'paris-23;'
                    syntax error
                    terminal:4:(11) statement must contain additional statements: ;
                    [edit system login]
                    'login ;'
                    statement must contain additional statements
                    configuration syntax failed

```



## PART 7

# User and Access Management on J-EX Series Switches

- User and Access Management on J-EX Series Switches Overview on page 403
- User and Access Management Configuration on page 407
- Troubleshooting User and Access Management on page 415
- Configuration Statements for User and Access Management on page 419
- Operational Commands for User and Access Management on page 445



# User and Access Management on J-EX Series Switches Overview

- J-EX Series Switch Software Features Overview on page 403
- Understanding Software Infrastructure and Processes on page 404

## J-EX Series Switch Software Features Overview

---

The following tables list the J-EX Series Switches software features, the Junos operating system (Junos OS) release in which they were introduced, and the first Junos OS release for each switch:

- Table 2 on page 4—First Junos OS Release for Each J-EX Series Switch
- Table 3 on page 4—Access Control Features
- Table 4 on page 5—Administration Features
- Table 5 on page 5—Class-of-Service (CoS) Features
- Table 6 on page 6—Device Security Features
- Table 7 on page 6—Fibre Channel over Ethernet Features
- Table 8 on page 7—High Availability and Resiliency Features
- Table 9 on page 8—Interfaces Features
- Table 10 on page 9—IP Address Management Features
- Table 11 on page 9—IPv6 Features
- Table 12 on page 10—Layer 2 Network Protocols Features
- Table 13 on page 10—Layer 3 Protocols Features
- Table 14 on page 12—MPLS Features
- Table 15 on page 12—Multicast Features
- Table 16 on page 13—Network Management and Monitoring Features
- Table 17 on page 14—Port Security Features
- Table 18 on page 15—Routing Policy and Packet Filtering Features

- Table 19 on page 15—Spanning-Tree Protocols Features
- Table 20 on page 16—System Management Features

The Junos OS release for software features on a switch cannot be earlier than the first Junos OS release for that switch.

**Related Documentation**

- J-EX4200 Switches Hardware Overview on page 29
- J-EX4500 Switches Hardware Overview on page 31
- J-EX8208 Switch Hardware Overview on page 35
- J-EX8216 Switch Hardware Overview on page 38
- Layer 3 Protocols Supported on J-EX Series Switches on page 17
- Layer 3 Protocols Not Supported on J-EX Series Switches on page 18

## Understanding Software Infrastructure and Processes

---

Each switch runs the Junos operating system (Junos OS) for J-EX Series Switches on its general-purpose processors. Junos OS includes processes for Internet Protocol (IP) routing and for managing interfaces, networks, and the chassis.

The Junos OS runs on the Routing Engine. The Routing Engine kernel coordinates communication among the Junos OS processes and provides a link to the Packet Forwarding Engine.

With the J-Web interface and the command-line interface (CLI) to the Junos OS, you configure switching features and routing protocols and set the properties of network interfaces on your switch. After activating a software configuration, use either the J-Web or CLI user interface to monitor the switch, manage operations, and diagnose protocol and network connectivity problems.

- Routing Engine and Packet Forwarding Engine on page 404
- Junos OS Processes on page 405

## Routing Engine and Packet Forwarding Engine

A switch has two primary software processing components:

- Packet Forwarding Engine—Processes packets; applies filters, routing policies, and other features; and forwards packets to the next hop along the route to their final destination.
- Routing Engine—Provides three main functions:
  - Creates the packet forwarding switch fabric for the switch, providing route lookup, filtering, and switching on incoming data packets, then directing outbound packets to the appropriate interface for transmission to the network
  - Maintains the routing tables used by the switch and controls the routing protocols that run on the switch.



- Provides control and monitoring functions for the switch, including controlling power and monitoring system status.

## Junos OS Processes

The Junos OS running on the Routing Engine and Packet Forwarding Engine consists of multiple processes that are responsible for individual functions.

The separation of functions provides operational stability, because each process accesses its own protected memory space. In addition, because each process is a separate software package, you can selectively upgrade all or part of the Junos OS, for added flexibility.

Table 23 on page 26 describes the primary Junos OS processes.

**Table 64: Junos OS Processes**

Process	Name	Description
Chassis process	chassisd	<p>Detects hardware on the system that is used to configure network interfaces.</p> <p>Monitors the physical status of hardware components and field-replaceable units (FRUs), detecting when environment sensors such as temperature sensors are triggered.</p> <p>Relays signals and interrupts—for example, when devices are taken offline, so that the system can close sessions and shut down gracefully.</p>
Ethernet switching process	eswd	<p>Handles Layer 2 switching functionality such as MAC address learning, Spanning Tree protocol and access port security. The process is also responsible for managing Ethernet switching interfaces, VLANs, and VLAN interfaces.</p> <p>Manages Ethernet switching interfaces, VLANs, and VLAN interfaces.</p>
Forwarding process	pfem	<p>Defines how routing protocols operate on the switch. The overall performance of the switch is largely determined by the effectiveness of the forwarding process.</p>
Interface process	dcd	<p>Configures and monitors network interfaces by defining physical characteristics such as link encapsulation, hold times, and keepalive timers.</p>
Management process	mgd	<p>Provides communication between the other processes and an interface to the configuration database.</p> <p>Populates the configuration database with configuration information and retrieves the information when queried by other processes to ensure that the system operates as configured.</p> <p>Interacts with the other processes when commands are issued through one of the user interfaces on the switch.</p> <p>If a process terminates or fails to start when called, the management process attempts to restart it a limited number of times to prevent thrashing and logs any failure information for further investigation.</p>
Routing protocol process	rpd	<p>Defines how routing protocols such as RIP, OSPF, and BGP operate on the device, including selecting routes and maintaining forwarding tables.</p>

- Related Documentation**
- For more information about processes, see the *Junos OS Network Operations Guide*.
  - For more information about basic system parameters, supported protocols, and software processes, see the *Junos OS System Basics Configuration Guide*.

# User and Access Management Configuration

- Configuring Management Access for the J-EX Series Switch (J-Web Procedure) on page 407
- Generating SSL Certificates to Be Used for Secure Web Access on page 410
- Configuring MS-CHAPv2 to Provide Password-Change Support (CLI Procedure) on page 411
- Managing Users (J-Web Procedure) on page 411

## Configuring Management Access for the J-EX Series Switch (J-Web Procedure)

You can manage a J-EX Series switch remotely through the J-Web interface. To communicate with the switch, the J-Web interface uses Hypertext Transfer Protocol (HTTP). HTTP allows easy Web access but no encryption. The data that is transmitted between the Web browser and the switch by means of HTTP is vulnerable to interception and attack. To enable secure Web access the switch supports HTTP over Secure Sockets Layer (HTTPS). You can enable HTTP or HTTPS access on specific interfaces and ports as needed.

Navigate to the Secure Access Configuration page by selecting **Configure > System Properties > Management Access**. On this page, you can enable HTTP and HTTPS access on interfaces for managing the J-EX Series switch through the J-Web interface. You can also install SSL certificates and enable Junos XML management protocol over SSL with the Secure Access page.

1. Click **Edit** to modify the configuration. Enter information into the Management Access Configuration page as described in Table 65 on page 408.
2. To verify that Web access is enabled correctly, connect to the switch using the appropriate method:
  - For HTTP access—In your Web browser, type **http://URL** or **http://IP address**.
  - For HTTPS access—In your Web browser, type **https://URL** or **https://IP address**.
  - For SSL Junos XML management protocol access—To use this option, you must have a Junos XML management protocol client such as Junos Scope.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

**Table 65: Secure Management Access Configuration Summary**

Field	Function	Your Action
<b>Management Access tab</b>		
Management Port IP/Management Port IPv6	Specifies the management port IP address. The software supports both IPv4 (displayed as IP) and IPv6 address.  <b>NOTE:</b> IPv6 is not supported on J-EX4500 switches.	To specify an IPv4 address:  <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv4 address</b>.</li> <li>2. Type an IP address—for example: <b>10.10.10.10</b>.</li> <li>3. Enter the subnet mask or address prefix. For example, 24 bits represents <b>255.255.255.0</b>.</li> <li>4. Click <b>OK</b>.</li> </ol> To specify an IPv6 address:  <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv6 address</b>.</li> <li>2. Type an IP address—for example: <b>2001:ab8:85a3::8a2e:370:7334</b>.</li> <li>3. Enter the subnet mask or address prefix.</li> <li>4. Click <b>OK</b>.</li> </ol>
Default Gateway	Defines a default gateway through which to direct packets addressed to networks that are not explicitly listed in the bridge table constructed by the switch.	For IPv4 address type a 32-bit IP address, in dotted decimal notation. Type a 128-bit IP address for IPv6 address type.
Loopback address	Specifies the IP address of the loopback interface.	Type an IP address.
Subnet Mask	Specifies the subnet mask for the loopback interface.	Enter the subnet mask or address prefix.
<b>Services tab</b>		
Services	Specifies services to be enabled: telnet and SSH.	Select to enable the required services.
Enable Junos XML management protocol over Clear Text	Enables clear text access to the Junos XML management protocol XML scripting API.	To enable clear text access, select the <b>Enable Junos XML management protocol over Clear Text</b> check box.
Enable Junos XML protocol over SSL	Enables secure SSL access to the Junos XML management protocol XML scripting API.	To enable SSL access, select the <b>Enable Junos XML management protocol over SSL</b> check box.

Table 65: Secure Management Access Configuration Summary (*continued*)

Field	Function	Your Action
Junos XML management protocol Certificate	Specifies SSL certificates to be used for encryption.  This field is available only after you create at least one SSL certificate.	To enable an SSL certificate, select a certificate from the Junos XML management protocol SSL Certificate list—for example, <b>new</b> .
Enable HTTP	Enables HTTP access on interfaces.	To enable HTTP access, select the <b>Enable HTTP access</b> check box.  Select and clear interfaces by clicking the direction arrows: <ul style="list-style-type: none"> <li>To enable HTTP access on an interface, add the interface to the HTTP Interfaces list. You can either select all interfaces or specific interfaces.</li> </ul>
Enable HTTPS	Enables HTTPS access on interfaces.	To enable HTTPS access, select the <b>Enable HTTPS access</b> check box.  Select and deselect interfaces by clicking the direction arrows: <ul style="list-style-type: none"> <li>To enable HTTPS access on an interface, add the interface to the HTTPS Interfaces list. You can either select all interfaces or specific interfaces.</li> </ul> <p><b>NOTE:</b> Specify the certificate to be used for HTTPS access.</p>

#### Certificates tab

Certificates	Displays digital certificates required for SSL access to the switch.  Allows you to add and delete SSL certificates.	To add a certificate: <ol style="list-style-type: none"> <li>Have a general SSL certificate available. For more information, see "Generating SSL Certificates to Be Used for Secure Web Access" on page 410.</li> <li>Click <b>Add</b>. The Add a Local Certificate page opens.</li> <li>Type a name in the Certificate Name box—for example, <b>new</b>.</li> <li>Open the certificate file and copy its contents.</li> <li>Paste the generated certificate and RSA private key in the Certificate box.</li> </ol> <p>To edit a certificate, select it and click <b>Edit</b>.</p> <p>To delete a certificate, select it and click <b>Delete</b>.</p>
--------------	--	---

- Related Documentation**
- Security Features for J-EX Series Switches Overview on page 20
  - Understanding J-Web User Interface Sessions on page 157

## Generating SSL Certificates to Be Used for Secure Web Access

---

You can set up secure Web access for a J-EX Series switch. To enable secure Web access, you must generate a digital Secure Sockets Layer (SSL) certificate and then enable HTTPS access on the switch.

To generate an SSL certificate:

1. Enter the following **openssl** command in your SSH command-line interface on a BSD or Linux system on which **openssl** is installed. The **openssl** command generates a self-signed SSL certificate in the privacy-enhanced mail (PEM) format. It writes the certificate and an unencrypted 1024-bit RSA private key to the specified file.

```
% openssl req -x509 -nodes -newkey rsa:1024 -keyout filename.pem -out filename.pem
```

where *filename* is the name of a file in which you want the SSL certificate to be written—for example, **my-certificate**.

2. When prompted, type the appropriate information in the identification form. For example, type **US** for the country name.
3. Display the contents of the file that you created.

```
cat my-certificate.pem
```

You can use the J-Web Configuration page to install the SSL certificate on the switch. To do this, copy the file containing the certificate from the BSD or Linux system to the switch. Then open the file, copy its contents, and paste them into the Certificate box on the J-Web Secure Access Configuration page.

You can also use the following CLI statement to install the SSL certificate on the switch:

```
[edit]  
user@switch# set security certificates local my-signed-cert load-key-file my-certificate.pem
```

- Related Documentation**
- Configuring Management Access for the J-EX Series Switch (J-Web Procedure) on page 407
  - Security Features for J-EX Series Switches Overview on page 20

## Configuring MS-CHAPv2 to Provide Password-Change Support (CLI Procedure)

Junos OS for J-EX Series switches enables you to configure the Microsoft Corporation implementation of the Challenge Handshake Authentication Protocol version 2 (MS-CHAPv2) on the switch to provide password-change support. Configuring MS-CHAPv2 on the switch provides users accessing a switch the option of changing the password when the password expires, is reset, or is configured to be changed at next login.

See RFC 2433 at [Microsoft PPP CHAP Extensions](#) for information about MS-CHAP.

Before you configure MS-CHAPv2 to provide password-change support, ensure that you have:

- Configured RADIUS server authentication. Configure users on the authentication server and set the **first-tried** option in the authentication order to **radius**. See Example: [Connecting a RADIUS Server for 802.1X to a J-EX Series Switch](#).

To configure MS-CHAPv2, specify the following:

```
[edit system radius-options]
user@switch# set password-protocol mschap-v2
```

You must have the required access permission on the switch in order to change your password.

### Related Documentation

- [Managing Users \(J-Web Procedure\)](#) on page 411
- For more about configuring user access, see the *Junos OS Access Privilege Configuration Guide*.

## Managing Users (J-Web Procedure)

You can use the Users Configuration page for user information to add new users to a J-EX Series switch. For each account, you define a login name and password for the user and specify a login class for access privileges.

To configure users:

1. Select **Configure > System Properties > User Management**.

The User Management page displays details of users, the authentication order, the RADIUS servers and TACACS servers present.

2. Click **Edit**.

3. Click any of the following options on the **Users** tab:

- **Add**—Select this option to add a user. Enter details as described in Table 66 on page 412.
- **Edit**—Select this option to edit an existing user's details. Enter details as described in Table 66 on page 412.

- **Delete**—Select this option to delete a user.
4. Click an option on the **Authentication Methods and Order** tab:
- **Authentication Order**—Drag and drop the authentication type from the Available Methods section to the Selected Methods. Click the up or down buttons to modify the authentication order.
  - **RADIUS server**—Click one:
    - **Add**—Select this option to add an authentication server. Enter details as described in Table 67 on page 413.
    - **Edit**—Select this option to modify the authentication server details. Enter details as described in Table 67 on page 413.
    - **Delete**—Select this option to delete an authentication server from the list.
  - **TACACS server**—Click one:
    - **Add**—Select this option to add an authentication server. Enter details as described in Table 67 on page 413.
    - **Edit**—Select this option to modify the authentication server details. Enter details as described in Table 67 on page 413.
    - **Delete**—Select this option to delete an authentication server from the list.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

**Table 66: User Management Configuration Page Summary**

Field	Function	Your Action
<b>User Information</b>		
Username (required)	Specifies the name that identifies the user.	Type the username. It must be unique within the switching platform. Do not include spaces, colons, or commas in the username.
User Id	Specifies the user identification.	Type the user's ID.
Full Name	Specifies the user's full name.	Type the user's full name. If the full name contains spaces, enclose it in quotation marks. Do not include colons or commas.



Table 66: User Management Configuration Page Summary (*continued*)

Field	Function	Your Action
Login Class (required)	Defines the user's access privilege.	Select the user's login class from the list: <ul style="list-style-type: none"> <li>• <b>operator</b></li> <li>• <b>read-only</b></li> <li>• <b>super-user/superuser</b></li> <li>• <b>unauthorized</b></li> </ul> This list also includes any user-defined login classes.
Password	Specifies the login password for this user.	Type the login password for this user. The login password must meet these criteria: <ul style="list-style-type: none"> <li>• The password must be at least 6 characters long.</li> <li>• It can include alphabetic, numeric, and special characters, but not control characters.</li> <li>• It must contain at least one change of case or character class.</li> </ul>
Confirm Password	Verifies the login password for this user.	Retype the login password for this user.

Table 67: Add an Authentication Server

Field	Function	Your Action
IP Address	Specifies the IP address of the server.	Type the server's 32-bit IP address, in dotted decimal notation.
Password	Specifies the password of the server.	Type the password of the server.
Confirm Password	Verifies that the password of the server is entered correctly.	Retype the password of the server.
Server Port	Specifies the port with which the server is associated.	Type the port number.
Source Address	Specifies the source address of the server.	Type the server's 32-bit IP address, in dotted decimal notation.
Retry Attempts	Specifies the number of login retries allowed after a login failure.	Type the number. <b>NOTE:</b> Only 1 retry is permitted for a TACACS server.
Time out	Specifies the time interval to wait before the connection to the server is closed.	Type the interval in seconds.

**Related Documentation** • [Configuring Management Access for the J-EX Series Switch \(J-Web Procedure\) on page 407](#)



# Troubleshooting User and Access Management

- Troubleshooting Loss of the Root Password on page 415

## Troubleshooting Loss of the Root Password

---

**Problem** If you forget the root password for the switch, you can use the password recovery procedure to reset the root password.

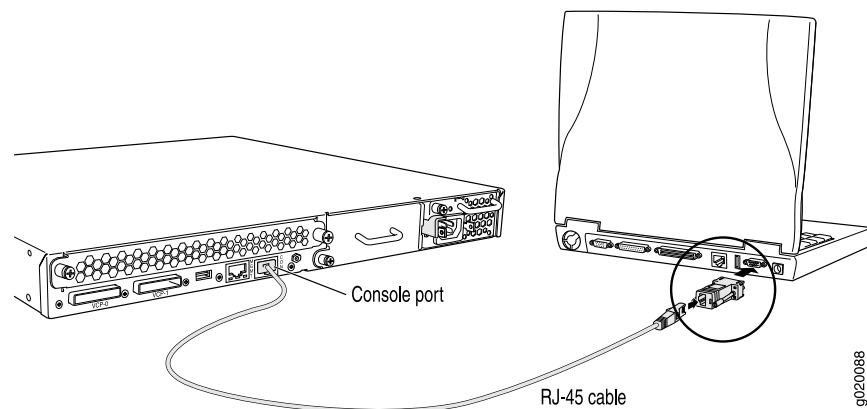


**NOTE:** You need physical access to the switch to recover the root password.

**Solution** To recover the root password:

1. Power off your switch by unplugging the power cord or turning off the power at the wall switch.
2. Insert one end of the Ethernet cable into the serial port on the management device and connect the other end to the console port on the back of the switch. See Figure 8 on page 415

**Figure 8: Connecting to the Console Port on the J-EX Series Switch**



3. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate **COM** port to use (for example, **COM1**).

4. Configure the port settings as follows:
  - Bits per second: 9600
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow control: None
5. Power on your switch by plugging in the power cord or turning on the power at the wall switch.
6. When the following prompt appears, press the Spacebar to access the switch's bootstrap loader command prompt:

```
Hit [Enter] to boot immediately, or space bar for command prompt.  
Booting [kernel] in 1 second...
```
7. At the following prompt, type **boot -s** to start up the system in single-user mode:

```
loader> boot -s
```
8. At the following prompt, type **recovery** to start the root password recovery procedure:

```
Enter full path name of shell or 'recovery' for root password recovery or RETURN for /bin/sh: recovery
```

A series of messages describe consistency checks, mounting of filesystems, and initialization and checkout of management services. Then the CLI prompt appears.
9. Enter configuration mode in the CLI:

```
user@switch> configure
```
10. Set the root password. For example:

```
user@switch# set system root-authentication plain-text-password
```
11. At the following prompt, enter the new root password. For example:

```
New password: juniper1
```

Retype new password:
12. At the second prompt, reenter the new root password.
13. If you are finished configuring the network, commit the configuration.

```
root@switch# commit
```

```
commit complete
```
14. Exit configuration mode in the CLI.

```
root@switch# exit
```
15. Exit operational mode in the CLI.

```
root@switch> exit
```
16. At the prompt, enter **y** to reboot the switch.

```
Reboot the system? [y/n] y
```

**Related  
Documentation**

- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187
- For information about configuring an encrypted root password, configuring SSH keys to authenticate root logins, and configuring special requirements for plain-text passwords, see the *Junos OS System Basics Configuration Guide*.



# Configuration Statements for User and Access Management

## allow-commands

---

<b>Syntax</b>	<code>allow-commands "regular-expression";</code>
<b>Hierarchy Level</b>	[edit system login class <i>class-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the operational mode commands that members of a login class can use.
<b>Default</b>	If you omit this statement and the <b>deny-commands</b> statement, users can issue only those commands for which they have access privileges through the <b>permissions</b> statement.
<b>Options</b>	<b>regular-expression</b> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Specifying Access Privileges for Junos OS Operational Mode Commands</li><li>• <b>deny-commands</b> on page 425</li><li>• <b>user</b> on page 443</li></ul>

## allow-configuration

---

<b>Syntax</b>	<code>allow-configuration "regular-expression";</code>
<b>Hierarchy Level</b>	[edit system login class <i>class-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Explicitly allow configuration access to the specified levels in the hierarchy even if the permissions set with the <b>permissions</b> statement do not grant such access by default.
<b>Default</b>	If you omit this statement and the <b>deny-configuration</b> statement, users can edit only those commands for which they have access privileges through the <b>permissions</b> statement.
<b>Options</b>	<b>regular-expression</b> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
<b>Required Privilege Level</b>	<b>admin</b> —To view this statement in the configuration. <b>admin-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Specifying Access Privileges for Junos OS Configuration Mode Hierarchies</li><li>• Regular Expressions for Allowing and Denying Junos OS Configuration Mode Hierarchies</li><li>• <b>deny-configuration on page 426</b></li><li>• <b>user on page 443</b></li></ul>

## announcement

---

<b>Syntax</b>	<code>announcement text;</code>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a system login announcement. This announcement appears after a user logs in.
<b>Options</b>	<b>text</b> —Text of the announcement. If the text contains any spaces, enclose it in quotation marks.
<b>Required Privilege Level</b>	<b>system</b> —To view this statement in the configuration. <b>system-control</b> —To add this statement to the configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Junos OS to Display a System Login Announcement</li><li>• <b>message on page 432</b></li></ul>



## authentication (Login)

---

<b>Syntax</b>	<pre>authentication {   (encrypted-password "password"   plain-text-password);   load-key-file file-name;   ssh-dsa "public-key";   ssh-rsa "public-key"; }</pre>
<b>Hierarchy Level</b>	[edit system login user <i>username</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Authentication methods that a user can use to log in to the router or switch. You can assign multiple authentication methods to a single user.
<b>Options</b>	<p><b>encrypted-password "password"</b>—Message Digest 5 (MD5) or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password for each user.</p> <p>You cannot configure a blank password for <b>encrypted-password</b> using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p><b>load-key-file</b>—Load RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys from a file. The file is a URL containing one or more SSH keys.</p> <p><b>plain-text-password</b>—Plain-text password. The command-line interface (CLI) prompts you for the password and then encrypts it.</p> <p><b>ssh-dsa "public-key"</b>—SSH version 2 authentication. Specify the SSH public key. You can specify one or more public keys for each user.</p> <p><b>ssh-rsa "public-key"</b>—SSH version 1 and SSH version 2 authentication. Specify the SSH public key. You can specify one or more public keys for each user.</p>
<b>Required Privilege Level</b>	<p><b>admin</b>—To view this statement in the configuration.</p> <p><b>admin-control</b>—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Junos OS User Accounts</li> <li><a href="#">root-authentication on page 437</a></li> </ul>

## authentication-order

---

<b>Syntax</b>	<code>authentication-order [ <i>authentication-methods</i> ];</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the order in which the software tries different user authentication methods when attempting to authenticate a user. For each login attempt, the software tries the authentication methods in order, starting with the first one, until the password matches.
<b>Default</b>	If you do not include the <b>authentication-order</b> statement, users are verified based on their configured passwords.
<b>Options</b>	<b><i>authentication-methods</i></b> —One or more authentication methods, listed in the order in which they should be tried. The method can be one or more of the following: <ul style="list-style-type: none"><li>• <b>password</b>—Use the password configured for the user with the <b>authentication</b> statement at the [edit system login user] hierarchy level.</li><li>• <b>radius</b>—Use RADIUS authentication services.</li><li>• <b>tacplus</b>—Use TACACS+ authentication services.</li></ul>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication</li><li>• <b>authentication on page 421</b></li></ul>

## change-type

---

<b>Syntax</b>	<code>change-type (character-sets   set-transitions);</code>
<b>Hierarchy Level</b>	[edit system login password]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set requirements for using character sets in plain-text passwords. When you combine this statement with the <b>minimum-changes</b> statement, you can check for the total number of character sets included in the password or for the total number of character-set changes in the password. Newly created passwords must meet these requirements.
<b>Options</b>	Specify one of the following: <ul style="list-style-type: none"> <li>• <b>character-sets</b>—The number of character sets in the password. Valid character sets include uppercase letters, lowercase letters, numbers, punctuation, and other special characters.</li> <li>• <b>set-transitions</b>—The number of transitions between character sets.</li> </ul>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Special Requirements for Junos OS Plain-Text Passwords</li> <li>• <b>minimum-changes on page 433</b></li> </ul>

## class (Assigning a Class to an Individual User)

---

<b>Syntax</b>	<code>class class-name;</code>
<b>Hierarchy Level</b>	[edit system login user username]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a user's login class. You must configure one class for each user.
<b>Options</b>	<b>class-name</b> —One of the classes defined at the [edit system login class] hierarchy level.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring Junos OS User Accounts</li> </ul>

## class (Defining Login Classes)

---

<b>Syntax</b>	<pre>class <i>class-name</i> {     allow-commands "<i>regular-expression</i>";     allow-configuration "<i>regular-expression</i>";     deny-commands "<i>regular-expression</i>";     deny-configuration "<i>regular-expression</i>";     idle-timeout <i>minutes</i>;     permissions [ <i>permissions</i> ]; }</pre>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Define a login class.
<b>Options</b>	<p><i>class-name</i>—A name you choose for the login class.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Defining Junos OS Login Classes</li><li><a href="#">user on page 443</a></li></ul>

---

## deny-commands

---

<b>Syntax</b>	<code>deny-commands "regular-expression";</code>
<b>Hierarchy Level</b>	[edit system login class]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the operational mode commands that the user is denied permission to issue even though the permissions set with the <b>permissions</b> statement would allow it.
<b>Default</b>	If you omit this statement and the <b>allow-commands</b> statement, users can issue only those commands for which they have access privileges through the <b>permissions</b> statement.
<b>Options</b>	<b>regular-expression</b> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
<b>Required Privilege Level</b>	<b>admin</b> —To view this statement in the configuration. <b>admin-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Specifying Access Privileges for Junos OS Operational Mode Commands</li><li>• <b>allow-commands</b> on page 419</li><li>• <b>user</b> on page 443</li></ul>

## deny-configuration

---

<b>Syntax</b>	<code>deny-configuration "regular-expression";</code>
<b>Hierarchy Level</b>	[edit system login class]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Explicitly deny configuration access to the specified levels in the hierarchy even if the permissions set with the <b>permissions</b> statement grant such access by default.
<b>Default</b>	If you omit this statement and the <b>allow-configuration</b> statement, users can edit those levels in the configuration hierarchy for which they have access privileges through the <b>permissions</b> statement.
<b>Options</b>	<i>regular-expression</i> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Specifying Access Privileges for Junos OS Configuration Mode Hierarchies</li><li>• <b>allow-configuration on page 420</b></li><li>• <b>user on page 443</b></li></ul>

## format

---

<b>Syntax</b>	format (des   md5   sha1);
<b>Hierarchy Level</b>	[edit system login password]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the authentication algorithm for plain-text passwords.
<b>Default</b>	For Junos OS, the default encryption format is <b>md5</b> . For Junos-FIPS software, the default encryption format is <b>sha1</b> .
<b>Options</b>	The hash algorithm that authenticates the password can be one of three algorithms: <ul style="list-style-type: none"> <li>• <b>des</b>—Has a block size of 8 bytes; its key size is 48 bits long.</li> <li>• <b>md5</b>—Produces a 128-bit digest.</li> <li>• <b>sha1</b>—Produces a 160-bit digest.</li> </ul>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Special Requirements for Junos OS Plain-Text Passwords</li> </ul>

## full-name

---

<b>Syntax</b>	full-name <i>complete-name</i> ;
<b>Hierarchy Level</b>	[edit system login user]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the complete name of a user.
<b>Options</b>	<i>complete-name</i> —Full name of the user. If the name contains spaces, enclose it in quotation marks.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring Junos OS User Accounts</li> <li>• <b>user on page 443</b></li> <li>• user</li> </ul>

## idle-timeout

---

<b>Syntax</b>	<code>idle-timeout <i>minutes</i>;</code>
<b>Hierarchy Level</b>	[edit system login class <i>class-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For a login class, configure the maximum time that a session can be idle before the user is logged off the router or switch. The session times out after remaining at the CLI operational mode prompt for the specified time.
<b>Default</b>	If you omit this statement, a user is never forced off the system after extended idle times.
<b>Options</b>	<i>minutes</i> —Maximum idle time. <b>Range:</b> 0 through 4294967295 minutes
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Timeout Value for Idle Login Sessions</li><li><a href="#">user on page 443</a></li></ul>



## login

<b>Syntax</b>	<pre>login {   announcement text;   class class-name {     allow-commands "regular-expression";     allow-configuration "regular-expression";     deny-commands "regular-expression";     deny-configuration "regular-expression";     idle-timeout minutes;     login-tip;     permissions [ permissions ];   }   message text;   password {     change-type (set-transitions   character-set);     format (md5   sha1   des);     maximum-length length;     minimum-changes number;     minimum-length length;   }   retry-options {     backoff-threshold number;     backoff-factor seconds;     minimum-time seconds;     tries-before-disconnect number;   }   user username {     full-name complete-name;     uid uid-value;     class class-name;     authentication authentication;     (encrypted-password "password"   plain-text-password);     ssh-rsa "public-key";     ssh-dsa "public-key";   } }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure user access to the router or switch.
<b>Options</b>	The remaining statements are explained separately.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Defining Junos OS Login Classes</li> </ul>

## login-alarms

---

<b>Syntax</b>	login-alarms;
<b>Hierarchy Level</b>	[edit system login class admin]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Show system alarms automatically when an <b>admin</b> user logs in to the router or switch.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

## login-tip

---

<b>Syntax</b>	login-tip;
<b>Hierarchy Level</b>	[edit system login class <i>class-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Enable CLI tips at login.
<b>Default</b>	Disabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring CLI Tips</a></li></ul>

---

## maximum-length

---

<b>Syntax</b>	maximum-length <i>length</i> ;
<b>Hierarchy Level</b>	[edit system login passwords]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the maximum number of characters allowed in plain-text passwords. Newly created passwords must meet this requirement.
<b>Default</b>	For Junos-FIPS software, the maximum number of characters for plain-text passwords is 20. For Junos OS, no maximum is set.
<b>Options</b>	<b>length</b> —The maximum number of characters the password can include. <b>Range:</b> 1 to 64 characters
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Special Requirements for Junos OS Plain-Text Passwords</li></ul>

## message

---

<b>Syntax</b>	<code>message text;</code>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure a system login message. This message appears before a user logs in.</p> <p>You can format the message using the following special characters:</p> <ul style="list-style-type: none"><li>• \n—New line</li><li>• \t—Horizontal tab</li><li>• \'—Single quotation mark</li><li>• \"—Double quotation mark</li><li>• \\—Backslash</li></ul>
<b>Options</b>	<code>text</code> —Text of the message.
<b>Required Privilege Level</b>	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring the Junos OS to Display a System Login Message</a></li><li>• <a href="#">announcement on page 420</a></li></ul>

## minimum-changes

---

<b>Syntax</b>	<code>minimum-changes</code> <i>number</i> ;
<b>Hierarchy Level</b>	[edit system login passwords]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Specify the minimum number of character sets (or character set changes) required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement is used in combination with the <b>change-type</b> statement. If the change-type is <b>character-sets</b>, then the number of character sets included in the password is checked against the specified minimum. If change-type is <b>set-transitions</b>, then the number of character set changes in the password is checked against the specified minimum.</p>
<b>Default</b>	For Junos OS, the minimum number of changes is 1. For Junos-FIPS Software, the minimum number of changes is 3.
<b>Options</b>	<i>number</i> —The minimum number of character sets (or character set changes) required for the password.
<b>Required Privilege Level</b>	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Special Requirements for Junos OS Plain-Text Passwords</li><li>• <b>change-type</b> on page 423</li></ul>

## minimum-length

---

<b>Syntax</b>	minimum-length <i>length</i> ;
<b>Hierarchy Level</b>	[edit system login passwords]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the minimum number of characters required in plain-text passwords. Newly created passwords must meet this requirement.
<b>Default</b>	For Junos OS, the minimum number of characters for plain-text passwords is six. For Junos-FIPS software, the minimum number of characters for plain-text passwords is 10.
<b>Options</b>	<b>length</b> —The minimum number of characters the password must include. <b>Range:</b> 6 to 20 characters
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Special Requirements for Junos OS Plain-Text Passwords</li><li>• <a href="#">maximum-length on page 431</a></li></ul>

## password (Login)

---

<b>Syntax</b>	<pre>password {   change-type (set-transitions   character-set);   format (md5   sha1   des);   maximum-length <i>length</i>;   minimum-changes <i>number</i>;   minimum-length <i>length</i>; }</pre>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure special requirements such as character length and encryption format for plain-text passwords. Newly created passwords must meet these requirements.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Special Requirements for Junos OS Plain-Text Passwords</li><li>• <a href="#">maximum-length on page 431</a></li></ul>

## permissions

---

<b>Syntax</b>	<code>permissions [ <i>permissions</i> ];</code>
<b>Hierarchy Level</b>	[edit system login class]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the login access privileges to be provided on the router or switch.
<b>Options</b>	<i>permissions</i> —Privilege type. For a list of permission flag types, see Junos OS Access Privilege Levels Overview.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Access Privilege Levels</li> <li><a href="#">user on page 443</a></li> </ul>

## radius-options

---

<b>Syntax</b>	<pre>radius-options {   attributes {     nas-ip-address <i>ip-address</i>;   }   password-protocol <i>mschap-v2</i>; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure RADIUS options for the NAS-IP address for outgoing RADIUS packets and password protocol used in RADIUS packets.
<b>Options</b>	<p><i>ip-address</i>—IP address of the network access server (NAS) that requests user authentication.</p> <p><i>mschap-v2</i>—Protocol MS-CHAPv2, used for password authentication and password changing.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring RADIUS Authentication</li> <li>Configuring RADIUS Authentication</li> </ul>

## retry-options

---

<b>Syntax</b>	<pre> retry-options {   backoff-threshold <i>number</i>;   backoff-factor <i>seconds</i>;   maximum-time <i>seconds</i>;   minimum-time <i>seconds</i>;   tries-before-disconnect <i>number</i>; } </pre>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Maximum number of times a user can attempt to enter a password while logging in through SSH or Telnet before being disconnected.
<b>Options</b>	<p><b>backoff-threshold <i>number</i></b>—Threshold for the number of failed login attempts before the user experiences a delay when attempting to reenter a password. Use the <b>backoff-factor</b> option to specify the length of delay, in seconds.</p> <p><b>Range:</b> 1 through 3 <b>Default:</b> 2</p> <p><b>backoff-factor <i>seconds</i></b>—Length of delay after each failed login attempt. The length of delay increases by this value for each subsequent login attempt after the value specified in the <b>backoff-threshold</b> option.</p> <p><b>Range:</b> 5 through 10 <b>Default:</b> 5</p> <p><b>maximum-time <i>seconds</i></b>—Maximum length of time that the connection remains open for the user to enter a username and password to log in. If the user remains idle and does not enter a username and password within the configured <b>maximum-time</b>, the connection is closed.</p> <p><b>Range:</b> 20 through 300 <b>Default:</b> 120</p> <p><b>minimum-time <i>seconds</i></b>—Minimum length of time that the connection remains open while the user is attempting to enter a password to log in.</p> <p><b>Range:</b> 20 through 60 <b>Default:</b> 20</p> <p><b>tries-before-disconnect <i>number</i></b>—Maximum number of times a user is allowed to attempt to enter a password to log in through SSH or Telnet.</p> <p><b>Range:</b> 1 through 10 <b>Default:</b> 10</p>
<b>Required Privilege Level</b>	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>



- Related Documentation**
- Limiting the Number of User Login Attempts for SSH and Telnet Sessions
  - [rate-limit on page 506](#)

## root-authentication

---

<b>Syntax</b>	<pre>root-authentication {   (encrypted-password "password"   plain-text-password);   ssh-dsa "public-key";   ssh-rsa "public-key"; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the authentication methods for the root-level user, whose username is <b>root</b> .
<b>Options</b>	<p><b>encrypted-password "password"</b>— MD5 or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password.</p> <p>You cannot configure a blank password for <b>encrypted-password</b> using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p><b>plain-text-password</b>—Plain-text password. The CLI prompts you for the password and then encrypts it. The CLI displays the encrypted version, and the software places the encrypted version in its user database. You can specify only one plain-text password.</p> <p><b>ssh-dsa "public-key"</b>—SSH version 2 authentication. Specify the DSA (SSH version 2) public key. You can specify one or more public keys.</p> <p><b>ssh-rsa "public-key"</b>—SSH version 1 authentication. Specify the RSA (SSH version 1 and SSH version 2) public key. You can specify one or more public keys.</p>
<b>Required Privilege Level</b>	<p><b>admin</b>—To view this statement in the configuration.</p> <p><b>admin-control</b>—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the Root Password</li> <li>• <a href="#">authentication on page 421</a></li> </ul>

## root-login

---

<b>Syntax</b>	root-login (allow   deny   deny-password);
<b>Hierarchy Level</b>	[edit system services ssh]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Control user access through SSH.
<b>Default</b>	Allow user access through SSH.
<b>Options</b>	<b>allow</b> —Allow users to log in to the router or switch as root through SSH. <b>deny</b> —Disable users from logging in to the router or switch as root through SSH. <b>deny-password</b> —Allow users to log in to the router or switch as root through SSH when the authentication method (for example, RSA authentication) does not require a password.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring SSH Service for Remote Access to the Router or Switch</li></ul>

## tacplus-options

---

<b>Syntax</b>	<pre>tacplus-options {   (exclude-cmd-attribute   no-cmd-attribute-value);   service-name <i>service-name</i>; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure TACACS+ options for authentication and accounting.
<b>Options</b>	<p><b>exclude-cmd-attribute</b>—Exclude the <b>cmd</b> attribute value completely from start and stop accounting records to enable logging of accounting records in the correct log file on a TACACS+ server.</p> <p><b>no-cmd-attribute-value</b>—Set the <b>cmd</b> attribute value to an empty string in the TACACS+ accounting start and stop requests to enable logging of accounting records in the correct log file on a TACACS+ server.</p> <p><b>service-name <i>service-name</i></b>—Name of the authentication service used when you configure multiple TACACS+ servers to use the same authentication service.</p> <p><b>Default:</b> junos-exec</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring TACACS+ Authentication</li> <li>• Configuring TACACS+ System Accounting</li> <li>• Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication</li> </ul>

## tacplus-server

---

<b>Syntax</b>	<pre>tacplus-server <i>server-address</i> {   secret <i>password</i>;   single-connection;   source-address <i>source-address</i>;   timeout <i>seconds</i>; }</pre>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the TACACS+ server.
<b>Options</b>	<p><i>server-address</i>—Address of the TACACS+ authentication server.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring TACACS+ Authentication</li></ul>

## traceoptions (Address-Assignment Pool)

<b>Syntax</b>	<pre> traceoptions {   file <i>filename</i> {     files <i>number</i>;     size <i>maximum-file-size</i>;     match <i>regex</i>;     (world-readable   no-world-readable);   }   flag address-assignment;   flag all;   flag configuration;   flag framework;   flag ldap;   flag local-authentication;   flag radius; } </pre>
<b>Hierarchy Level</b>	[edit system processes general-authentication-service]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure tracing options.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>address-assignment</b>—All address-assignment events</li> <li>• <b>all</b>—All tracing operations</li> <li>• <b>configuration</b>—Configuration events</li> <li>• <b>framework</b>—Authentication framework events</li> <li>• <b>ldap</b>—LDAP authentication events</li> <li>• <b>local-authentication</b>—Local authentication events</li> <li>• <b>radius</b>—RADIUS authentication events</li> </ul>

**match *regex***—(Optional) Refine the output to include lines that contain the regular expression.

**no-world-readable**—(Optional) Restrict access to the originator of the trace operation only.

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through 1 GB

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

**Required Privilege Level** admin—To view this statement in the configuration.  
admin-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Address-Assignment Pools

## uid

**Syntax** `uid uid-value;`

**Hierarchy Level** [edit system login user]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure a user identifier for a login account.

**Options** *uid-value*—Number associated with the login account. This value must be unique on the router or switch.

**Range:** 100 through 64000

**Required Privilege Level** admin—To view this statement in the configuration.  
admin-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Junos OS User Accounts

## user (Access)

---

<b>Syntax</b>	<pre>user <i>username</i> {   authentication {     class <i>class-name</i>;     (encrypted-password "<i>password</i>"   plain-text-password);     full-name <i>complete-name</i>;     ssh-dsa "<i>public-key</i>";     ssh-rsa "<i>public-key</i>";     uid <i>uid-value</i>;   } }</pre>
<b>Hierarchy Level</b>	[edit system login]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure access permission for individual users.
<b>Options</b>	The remaining statements are explained separately.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Junos OS User Accounts</li><li><b>class</b> on page 423</li></ul>





CHAPTER 27

# Operational Commands for User and Access Management

## request message

---

<b>Syntax</b>	<code>request message all message "text"</code> <code>request message message "text" (terminal <i>terminal-name</i>   user <i>user-name</i>)</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display a message on the screens of all users who are logged in to the router or switch or on specific screens.
<b>Options</b>	<code>all</code> —Display a message on the terminal of all users who are currently logged in. <code>message "text"</code> —Message to display. <code>terminal <i>terminal-name</i></code> —Name of the terminal on which to display the message. <code>user <i>user-name</i></code> —Name of the user to whom to direct the message.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">request message message on page 446</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request message user@host> request message message "Maintenance window in 10 minutes" user maria
message Message from user@host on tty0 at 20:27 ...
Maintenance window in 10 minutes
EOF
```

## show subscribers

---

**Syntax** show subscribers  
 <address *address*>  
 <client-type *client-type*>  
 <interface *interface*>  
 <logical-system *logical-system*>  
 <mac-address *mac-address*>  
 <profile-name *profile-name*>  
 <routing-instance *routing-instance*>  
 <stacked-vlan-id *stacked-vlan-id*>  
 <subscriber-state *subscriber-state*>  
 <vlan-id *vlan-id*>  
 <count | detail | extensive | summary (all | logical-system *logical-system* | routing-instance *routing-instance*) | terse>

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches. **client-type**, **mac-address**, **subscriber-state**, **extensive**, and **summary** options introduced in Junos OS Release 10.2. **count** option usage with other options introduced in Junos OS Release 10.2.

**Description** Display information for active subscribers.

**Options** *address*—(Optional) Display subscribers whose IP address matches the specified address.

*client-type*—(Optional) Display subscribers whose client type matches the specified client type (DHCP, L2TP, PPP, PPPOE, or VLAN).

**count**—(Optional) Display the count of total subscribers and active subscribers for any specified option. You can use the count option alone or with the **address**, **client-type**, **interface**, **logical-system**, **mac-address**, **profile-name**, **routing-instance**, **stacked-vlan-id**, **subscriber-state**, and **vlan-id** options.

*interface*—(Optional) Display subscribers whose interface matches the specified interface.

*logical system*—(Optional) Display subscribers whose logical system matches the specified logical system.

*mac-address*—(Optional) Display subscribers whose MAC address matches the specified MAC address.

*profile name*—(Optional) Display subscribers whose dynamic profile matches the specified profile name.

*routing instance*—(Optional) Display subscribers whose routing instance matches the specified routing instance.

*subscriber-state*—(Optional) Display subscribers whose subscriber state matches the specified subscriber state (ACTIVE, CONFIGURED, INIT, TERMINATED, or TERMINATING).

*vlan-id*—(Optional) Display subscribers whose VLAN ID matches the specified VLAN ID.

*stacked-vlan-id*—(Optional) Display subscribers whose stacked VLAN ID matches the specified stacked VLAN ID.

detail | extensive | terse—(Optional) Display the specified level of output.

summary—(Optional) Display summary output.



**NOTE:** Due to display limitations, logical system and routing instance output values are truncated when necessary.

**Required Privilege Level** view

**List of Sample Output**

- show subscribers on page 450
- show subscribers detail (IPv4) on page 450
- show subscribers detail (IPv6) on page 451
- show subscribers detail (Tunneled Subscriber) on page 451
- show subscribers logical-system on page 451
- show subscribers count on page 451
- show subscribers routing-instance inst1 count on page 451
- show subscribers vlan-id on page 451
- show subscribers vlan-id detail on page 451
- show subscribers stacked-vlan-id detail on page 452
- show subscribers stacked-vlan-id vlan-id detail (Combined Output) on page 452
- show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface) on page 452
- show subscribers client-type dhcp detail on page 452
- show subscribers extensive on page 452
- show subscribers summary on page 453
- show subscribers summary all on page 453
- show subscribers summary terse on page 454

**Output Fields** Table 68 on page 448 lists the output fields for the **show subscribers** command. Output fields are listed in the approximate order in which they appear.

**Table 68: show subscribers Output Fields**

Field Name	Field Description
User Name	Name of subscriber.
Type	Subscriber client type (DHCP, VLAN, PPP, PPPOE, or L2TP).
IP Address	Subscriber IPv4 address.
IP Netmask	Subscriber IP netmask.
IPv6 Address	Subscriber IPv6 address.
IPv6 Prefix	Subscriber IPv6 prefix.

Table 68: show subscribers Output Fields (*continued*)

Field Name	Field Description
IPv6 Prefix Length	Length of the subscriber IPv6 prefix.
Logical System	Logical system associated with the subscriber.
Routing Instance	Routing instance associated with the subscriber.
Interface	Interface associated with the subscriber. The router displays subscribers whose interface matches or begins with the specified interface.
Interface Type	Whether the subscriber interface is static or dynamic.
Dynamic Profile Name	Dynamic profile used for the subscriber.
MAC Address	MAC address associated with the subscriber.
State	Current state of the subscriber session (Init, Configured, Active, Terminating, Terminated, Tunneled).
VLAN Id	VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .
Stacked VLAN Id	Stacked VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .
RADIUS Accounting ID	RADIUS accounting ID associated with the subscriber.
Agent Circuit ID	Option 82 agent circuit ID associated with the subscriber.
Agent Remote ID	Option 82 agent remote ID associated with the subscriber.
DHCP Relay IP Address	IP address used by the DHCP relay agent.
Login Time	Date and time at which the subscriber logged in.
Session ID	ID number for a subscriber service session.
Service Sessions	Number of service sessions (that is, a service activated using RADIUS CoA) associated with the subscribers.
Service Session Name	Service session profile name.
Session Timeout (seconds)	Number of seconds of access provided to the subscriber before the session is automatically terminated.
Idle Timeout (seconds)	Number of seconds subscriber can be idle before the session is automatically terminated.
IPv4 Input Filter Name	Name assigned to the IPv4 input filter (client or service session).
IPv4 Output Filter Name	Name assigned to the IPv4 output filter (client or service session).

Table 68: show subscribers Output Fields (*continued*)

Field Name	Field Description
IPv6 Input Filter Name	Name assigned to the IPv6 input filter (client or service session).
IPv6 Output Filter Name	Name assigned to the IPv6 output filter (client or service session).
IFL Input Filter Name	Name assigned to the logical interface input filter (client or service session).
IFL Output Filter Name	Name assigned to the logical interface output filter (client or service session).
Subscribers by State	<p>Number of subscribers summarized by state. The summary information includes the following:</p> <ul style="list-style-type: none"> <li>• Init—Number of subscriber currently in the initialization state.</li> <li>• Configured—Number of configured subscribers.</li> <li>• Active—Number of active subscribers.</li> <li>• Terminating—Number of subscribers currently terminating.</li> <li>• Terminated—Number of terminated subscribers.</li> </ul> <p>Summary information includes subscriber counts per state and the total number of subscribers.</p>
Subscribers by Client Type	Number of subscribers summarized by client type. Client types can include DHCP, VLAN, PPP, PPPOE, and L2TP. Summary information includes subscriber counts per client type and the total number of subscribers.
Subscribers by LS:RI	Number of subscribers summarized by logical system:routing instance (LS:RI) combination. Summary information includes subscriber counts per LS:RI and the total number of subscribers.

## Sample Output

```

user@host> show subscribers
show subscribers
Interface          IP Address/VLAN ID  User Name          LS:RI
ge-1/3/0.1073741824 100                 WHOLESALE-CLIENT default:default
demux0.1073741824  100.0.0.10          RETAILER1-CLIENT  test1:retailer1
demux0.1073741825  101.0.0.3           RETAILER2-CLIENT  test1:retailer2
demux0.1073741826  102.0.0.3           RETAILER2-CLIENT  test1:retailer2

```

```

user@host> show subscribers detail
show subscribers detail (IPv4)
Type: DHCP
IP Address: 100.20.9.7
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:95:00:00:98
State: Active
Radius Accounting ID: jnpr :2304
Session Timeout (seconds): 3600
Idle Timeout (seconds): 600
Login Time: 2009-08-25 14:43:52 PDT
Service Sessions: 2

```

```

show subscribers detail (IPv6) user@host> show subscribers detail
Type: DHCP
IPv6 Address: 1080:0:0:0:8:800:200C:417A
IPv6 Prefix: fec0:1:1:1::/128
Logical System: default1
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:95:00:00:98
State: Active
Radius Accounting ID: jnpr :2304
Login Time: 2009-08-25 14:43:52 PDT
Service Sessions: 2

show subscribers detail (Tunneled Subscriber) user@host> show subscribers detail
Type: PPPoE
User Name: user1@example.com
Logical System: default
Routing Instance: default
Interface: pp0.1
State: Active, Tunneled
Radius Accounting ID: 512

show subscribers logical-system user@host> show subscribers logical-system test1 terse
Interface          IP Address/VLAN ID  User Name          LS:RI
demux0.1073741825  101.0.0.3           RETAILER1-CLIENT  test1:retailer1
demux0.1073741826  102.0.0.3           RETAILER2-CLIENT  test1:retailer2

show subscribers count user@host> show subscribers count
Total Subscribers: 188, Active Subscribers: 188

show subscribers routing-instance inst1 count user@host> show subscribers routing-instance inst1 count
Total Subscribers: 188, Active Subscribers: 183

show subscribers vlan-id user@host> show subscribers vlan-id 100
Interface          IP Address          User Name
ge-1/0/0.1073741824
ge-1/2/0.1073741825

show subscribers vlan-id detail user@host> show subscribers vlan-id 100 detail
Type: VLAN
Interface: ge-1/0/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

Type: VLAN
Interface: ge-1/2/0.1073741825
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

```

```

show subscribers stacked-vlan-id detail      user@host> show subscribers stacked-vlan-id 101 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

show subscribers stacked-vlan-id vlan-id detail (Combined Output)
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface)
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 interface ge-1/2/0.* detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT

show subscribers client-type dhcp detail      user@host> show subscribers client-type dhcp detail
Type: DHCP
IP Address: 100.20.9.7
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:95:00:00:98
State: Active
Radius Accounting ID: jnpr :2304
Login Time: 2009-08-25 14:43:52 PDT

Type: DHCP
IP Address: 100.20.10.7
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744383
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:94:00:01:f3
State: Active
Radius Accounting ID: jnpr :2560
Login Time: 2009-08-25 14:43:56 PDT

show subscribers extensive                  user@host> show subscribers extensive
Type: DHCP
IPv6 Prefix: 2001::40:0:0:0/74

```



```

IPv6 Prefix Length: 64
Logical System: default
  Routing Instance: default
  Interface: demux0.1073741825
  Interface type: Dynamic
  Dynamic Profile Name: dhcp-demux-prof
  State: Active
  Radius Accounting ID: jnpr :2
  Agent Circuit ID: abc
  Remote Circuit ID: xyz
  Login Time: 2010-03-31 14:27:19 PDT
  Service Sessions: 1
  IPv6 Input Filter Name: demux0-inet6-in
    Session ID: 213
    Service Session Name: service-profile
    IPv6 Input Filter Name: dfwd1-demux.1073741825-in

```

```

show subscribers user@host> show subscribers summary
summary

```

```

Subscribers by State
Init          3
Configured    2
Active       183
Terminating   2
Terminated    1

TOTAL        191

Subscribers by Client Type
DHCP         107
PPP          76
VLAN         8

TOTAL        191

```

```

show subscribers user@host> show subscribers summary all
summary all

```

```

Subscribers by State
Init          3
Configured    2
Active       183
Terminating   2
Terminated    1

TOTAL        191

Subscribers by Client Type
DHCP         107
PPP          76
VLAN         8

TOTAL        191

Subscribers by LS:RI
default:default  1
default:ri1      28
default:ri2      16
ls1:default     22
ls1:riA         38
ls1:riB         44
logsysX:routinstY 42

```

TOTAL 191

**show subscribers  
summary terse**

```
user@host> show subscribers summary terse
Interface          IP Address/VLAN ID  User Name          LS:RI
ge-1/3/0.1073741824 100                 WHOLESALE-CLIENT default:default
demux0.1073741824   100.0.0.10         RETAILER1-CLIENT test1:retailer1
demux0.1073741825   101.0.0.3          RETAILER2-CLIENT test1:retailer2
```

## PART 8

# Junos OS for J-EX Series Switches System Services

- System Services Overview on page 457
- System Services Configuration on page 463
- Monitoring System Services on page 469
- Configuration Statements for System Services on page 473
- Operational Commands for System Services on page 529



## CHAPTER 28

# System Services Overview

- DHCP Overview on page 457
- Understanding Public Key Cryptography on Switches on page 459
- Understanding Self-Signed Certificates on J-EX Series Switches on page 460

## DHCP Overview

---

- DHCP Services for J-EX Series Switches Overview on page 457
- DHCP/BOOTP Relay for J-EX Series Switches Overview on page 458

## DHCP Services for J-EX Series Switches Overview

A Dynamic Host Configuration Protocol (DHCP) server can automatically allocate IP addresses and also deliver configuration settings to client hosts on a subnet.

DHCP is particularly useful for managing a pool of IP addresses among hosts. An IP address can be leased to a host for a limited period of time, allowing the DHCP server to share a limited number of IP addresses among a group of hosts that do not need permanent IP addresses.

DHCP, through the use of the automatic software download feature, can also be used to install software packages on J-EX Series Switches. Users can define a path to a software package on the DHCP server, and then the DHCP server communicates this path to J-EX Series switches acting as DHCP clients as part of the DHCP message exchange process. The DHCP clients that have been configured for automatic software download receive these messages and, when the software package name in the DHCP server message is different from that of the software package that booted the DHCP client switch, download and install the software package. See “Upgrading Software Using Automatic Software Download on J-EX Series Switches” on page 94.

To configure DHCP access service for a J-EX Series switch, you can use either the Junos operating system (Junos OS) command-line interface (CLI) or the J-Web user interface.

For detailed information about configuring DHCP services, see the *Junos OS System Basics Configuration Guide*. The configuration for DHCP service on the J-EX Series switch includes the **dhcp** statement at the **[edit system services]** hierarchy level.

You can monitor DHCP services for the switch by using either operational-mode CLI commands or the J-Web interface.

- Related Documentation**
- For information about configuring DHCP services with the CLI, see the *Junos OS System Basics Configuration Guide*.
  - Configuring DHCP Services (J-Web Procedure) on page 463
  - Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94
  - Monitoring DHCP Services on page 469

## DHCP/BOOTP Relay for J-EX Series Switches Overview

You can configure the J-EX Series Switch to act as a Dynamic Host Configuration Protocol (DHCP) or Bootstrap Protocol (BOOTP) relay agent. This means that a locally attached host can issue a DHCP or BOOTP request as a broadcast message. If the switch sees this broadcast message, it relays the message to a specified DHCP or BOOTP server. You should configure the switch to be a DHCP/BOOTP relay agent if you have locally attached hosts and a distant DHCP or BOOTP server.

For detailed information about configuring a DHCP/BOOTP relay agent, see the *Junos OS Policy Framework Configuration Guide*.

You can configure a J-EX Series Switch to use the gateway IP address (`giaddr`) as the source IP address of the switch for relayed DHCP packets when the switch is used as the DHCP relay agent. For information on configuring this option, see the `source-address-giaddr` configuration statement.



**NOTE:** Because DHCP/BOOTP messages are broadcast and are not directed to a specific server, switch, or router, J-EX Series switches cannot function as both a DHCP server and a DHCP/BOOTP relay agent at the same time. The Junos operating system (Junos OS) generates a commit error if both options are configured at the same time, and the commit will not succeed until one of the options is removed.

- Related Documentation**
- For information about configuring the switch as a DHCP/BOOTP relay agent, see the *Junos OS Policy Framework Configuration Guide*.
  - DHCP Services for J-EX Series Switches Overview on page 457

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## Understanding Public Key Cryptography on Switches

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Cryptography describes the techniques related to the following aspects of information security:

- Privacy or confidentiality
- Integrity of data
- Authentication
- Nonrepudiation or nonrepudiation of origin—Nonrepudiation of origin means that signers cannot claim that they did not sign a message while claiming that their private key remains secret. In some nonrepudiation schemes used in digital signatures, a timestamp is attached to the digital signature, so that even if the private key is exposed, the signature remains valid. Public and private keys are described in the following text.

In practice, cryptographic methods protect the data transferred from one system to another over public networks by encrypting the data using an encryption key. Public key cryptography (PKC), which is used on J-EX Series Switches, uses a pair of encryption keys: a public key and a private key. The public and private keys are created simultaneously using the same encryption algorithm. The private key is held by a user secretly and the public key is published. Data encrypted with a public key can be decrypted only with the corresponding private key and vice versa. When you generate a public/private key pair, the switch automatically saves the key pair in a file in the certificate store, from which it is subsequently used in certificate request commands. The generated key pair is saved as *certificate-id.priv*.



**NOTE:** The default RSA and DSA key size is 1024 bits. If you are using the Simple Certificate Enrollment Protocol (SCEP), the Junos operating system (Junos OS) supports RSA only.

This topic describes:

- Public Key Infrastructure (PKI) and Digital Certificates on page 459

### Public Key Infrastructure (PKI) and Digital Certificates

Public key infrastructure (PKI) allows the distribution and use of the public keys in public key cryptography with security and integrity. PKI manages the public keys by using digital certificates. A digital certificate provides an electronic means of verifying the identity of an individual, an organization, or a directory service that can store digital certificates.

A PKI typically consists of a Registration Authority (RA) that verifies the identities of entities, authorizes their certificate requests, and generates unique asymmetric key pairs (unless the users' certificate requests already contain public keys); and a Certificate Authority (CA) that issues corresponding digital certificates for the requesting entities. Optionally, you can use a Certificate Repository that stores and distributes certificates and a certificate revocation list (CRL) identifying the certificates that are no longer valid.

Each entity possessing the authentic public key of a CA can verify the certificates issued by that CA.

Digital signatures exploit the public key cryptographic system as follows:

1. A sender digitally signs data by applying a cryptographic operation, involving its private key, on a digest of the data.
2. The resulting signature is attached to the data and sent to the receiver.
3. The receiver obtains the digital certificate of the sender, which provides the sender's public key and confirmation of the link between its identity and the public key. The sender's certificate is often attached to the signed data.
4. The receiver either trusts this certificate or attempts to verify it. The receiver verifies the signature on the data by using the public key contained in the certificate. This verification ensures the authenticity and integrity of the received data.

As an alternative to using a PKI, an entity can distribute its public key directly to all potential signature verifiers, so long as the key's integrity is protected. The switch does it by using a self-signed certificate as a container for the public key and the corresponding entity's identity.

**Related  
Documentation**

- Understanding Self-Signed Certificates on J-EX Series Switches on page 460

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## Understanding Self-Signed Certificates on J-EX Series Switches

---

When you initialize a J-EX Series Switch with the factory default configuration, the switch generates a self-signed certificate, allowing secure access to the switch through the Secure Sockets Layer (SSL) protocol. Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) and XML Network Management over Secure Sockets Layer (XNM-SSL) are the two services that can make use of the self-signed certificates.



**NOTE:** Self-signed certificates do not provide additional security as do those generated by Certificate Authorities (CAs). This is because a client cannot verify that the server he or she has connected to is the one advertised in the certificate.

The switches provide two methods for generating a self-signed certificate:

- Automatic generation

In this case, the creator of the certificate is the switch. An automatically generated (also called "system-generated") self-signed certificate is configured on the switch by default.

After the switch is initialized, it checks for the presence of an automatically generated self-signed certificate. If it does not find one, the switch generates one and saves it in the file system.



A self-signed certificate that is automatically generated by the switch is similar to an SSH host key. It is stored in the file system, not as part of the configuration. It persists when the switch is rebooted, and it is preserved when a **request system snapshot** command is issued.

The switch uses the following distinguished name for the automatically generated certificate:

**“CN=<device serial number>, CN=system generated, CN=self-signed”**

If you delete the system-generated self-signed certificate on the switch, the switch generates a self-signed certificate automatically.

- Manual generation

In this case, you create the self-signed certificate for the switch. At any time, you can use the CLI to generate a self-signed certificate. Manually generated self-signed certificates are stored in the file system, not as part of the configuration.

Self-signed certificates are valid for five years from the time they are generated. When the validity of an automatically generated self-signed certificate expires, you can delete it from the switch so that the switch generates a new self-signed certificate.

System-generated self-signed certificates and manually generated self-signed certificates can coexist on the switch.

**Related  
Documentation**

- Understanding Public Key Cryptography on Switches on page 459
- Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466



# System Services Configuration

- Configuring DHCP Services (J-Web Procedure) on page 463
- Configuring a DHCP SIP Server (CLI Procedure) on page 466
- Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466
- Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure) on page 467
- Deleting Self-Signed Certificates (CLI Procedure) on page 468

## Configuring DHCP Services (J-Web Procedure)

---

Use the J-Web DHCP Configuration pages to configure DHCP pools for subnets and static bindings for DHCP clients on a J-EX Series switch. If DHCP pools or static bindings are already configured, use the Configure Global DHCP Parameters Configuration page to add settings for these pools and static bindings. Settings that have been previously configured for DHCP pools or static bindings are not overridden when you use the Configure Global DHCP Parameters Configuration page.

To configure the DHCP server:

1. Select **Configure > Services > DHCP**.
2. Access a DHCP Configuration page:
  - To configure a DHCP pool for a subnet, click **Add** in the DHCP Pools box.
  - To configure a static binding for a DHCP client, click **Add** in the DHCP Static Binding box.
  - To globally configure settings for existing DHCP pools and static bindings, click **Configure Global DHCP Parameters**.
3. Enter information into the DHCP Configuration pages as described in Table 69 on page 464.
4. To apply the configuration, click **Apply**.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

Table 69: DHCP Server Configuration Pages Summary

Field	Function	Your Action
<b>DHCP Pool Information</b>		
DHCP Subnet (required)	Specifies the subnet on which DHCP is configured.	Type an IP address prefix.
Address Range (Low) (required)	Specifies the lowest address in the IP address pool range.	Type an IP address that is part of the subnet specified in DHCP Subnet.
Address Range (High) (required)	Specifies the highest address in the IP address pool range.	Type an IP address that is part of the subnet specified in DHCP Subnet. This address must be greater than the address specified in Address Range (Low).
Exclude Addresses	Specifies addresses to exclude from the IP address pool.	<ul style="list-style-type: none"> <li>To add an excluded address, type the address next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To delete an excluded address, select the address in the Exclude Addresses box, and click <b>Delete</b>.</li> </ul>
<b>Lease Time</b>		
Maximum Lease Time (Seconds)	Specifies the maximum length of time a client can hold a lease. (Dynamic BOOTP lease lengths can exceed this maximum time.)	Type a number from 60 through 4,294,967,295 (seconds). You can also type <b>infinite</b> to specify a lease that never expires.
Default Lease Time (Seconds)	Specifies the length of time a client can hold a lease for clients that do not request a specific lease length.	Type a number from 60 through 2,147,483,647 (seconds). You can also type <b>infinite</b> to specify a lease that never expires.
<b>Server Information</b>		
Server Identifier	Specifies the IP address of the DHCP server reported to a client.	Type the IP address of the server. If you do not specify a server identifier, the primary address of the interface on which the DHCP exchange occurs is used.
Domain Name	Specifies the domain name that clients must use to resolve hostnames.	Type the name of the domain.
Domain Search	Specifies the order—from top to bottom—in which clients must append domain names when resolving hostnames using DNS.	<ul style="list-style-type: none"> <li>To add a domain name, type the name next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To delete a domain name, select the name in the Domain Search box, and click <b>Delete</b>.</li> </ul>

Table 69: DHCP Server Configuration Pages Summary (*continued*)

Field	Function	Your Action
DNS Name Servers	Defines a list of DNS servers the client can use, in the specified order—from top to bottom.	<ul style="list-style-type: none"> <li>To add a DNS server, type an IP address next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To remove a DNS server, select the IP address in the DNS Name Servers box, and click <b>Delete</b>.</li> </ul>
Gateway Routers	Defines a list of relay agents on the subnet, in the specified order—from top to bottom.	<ul style="list-style-type: none"> <li>To add a relay agent, type an IP address next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To remove a relay agent, select the IP address in the Gateway Routers box, and click <b>Delete</b>.</li> </ul>
WINS Servers	Defines a list of NetBIOS name servers, in the specified order—from top to bottom.	<ul style="list-style-type: none"> <li>To add a NetBIOS name server, type an IP address next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To remove a NetBIOS name server, select the IP address in the WINS Servers box, and click <b>Delete</b>.</li> </ul>
<b>Boot Options</b>		
Boot File	Specifies the path and filename of the initial boot file to be used by the client.	Type a path and filename.
Boot Server	Specifies the TFTP server that provides the initial boot file to the client.	Type the IP address or hostname of the TFTP server.
<b>DHCP Static Binding Information</b>		
DHCP MAC Address (required)	Specifies the MAC address of the client to be permanently assigned a static IP address.	Type the hexadecimal MAC address of the client.
Fixed IP Addresses (required)	Defines a list of IP addresses permanently assigned to the client. A static binding must have at least one fixed address assigned to it, but multiple addresses are also allowed.	<ul style="list-style-type: none"> <li>To add an IP address, type it next to the <b>Add</b> button, and click <b>Add</b>.</li> <li>To remove an IP address, select it in the Fixed IP Addresses box, and click <b>Delete</b>.</li> </ul>
Host Name	Specifies the name of the client used in DHCP messages exchanged between the server and the client. The name must be unique to the client within the subnet on which the client resides.	Type a client hostname.
Client Identifier	Specifies the name of the client used by the DHCP server to index its database of address bindings. The name must be unique to the client within the subnet on which the client resides.	Type a client identifier in string form.
Hexadecimal Client Identifier	Specifies the name of the client, in hexadecimal form, used by the DHCP server to index its database of address bindings. The name must be unique to the client within the subnet on which the client resides.	Type a client identifier in hexadecimal form.

- Related Documentation**
- DHCP Services for J-EX Series Switches Overview on page 457
  - Monitoring DHCP Services on page 469

## Configuring a DHCP SIP Server (CLI Procedure)

---

You can use the **sip-server** statement on the J-EX Series switch to configure option 120 on a DHCP server. The DHCP server sends configured option values—Session Initiation Protocol (SIP) server addresses or names—to DHCP clients when they request them. Previously, you were only allowed to specify a SIP server by address using **[edit system services dhcp option 120]**. You specify either an IPv4 address or a fully qualified domain name to be used by SIP clients to locate a SIP server. You cannot specify both an address and name in the same statement.

To configure a SIP server using the **address** option:

```
[edit system services dhcp]
user@switch# set sip-server address
```

For example, to configure one address:

```
[edit system services dhcp]
user@switch set sip-server 172.168.0.11
```

To configure a SIP server using the **name** option:

```
[edit system services dhcp]
user@switch# set sip-server name
```

For example, to configure a name:

```
[edit system services dhcp]
user@switch set sip-server abc.example.com
```

- Related Documentation**
- DHCP Services for J-EX Series Switches Overview on page 457
  - *Junos OS System Basics Configuration Guide*

## Manually Generating Self-Signed Certificates on Switches (CLI Procedure)

---

J-EX Series switches allow you to generate custom self-signed certificates and store them in the file system. The certificate you generate manually can coexist with the automatically generated self-signed certificate on the switch. To enable secure access to the switch over SSL, you can use either the system-generated self-signed certificate or a certificate you have generated manually.

To generate self-signed certificates manually, you must complete the following tasks:

- Generating a Public-Private Key Pair on Switches on page 467
- Generating Self-Signed Certificates on Switches on page 467

## Generating a Public-Private Key Pair on Switches

A digital certificate has an associated cryptographic key pair that is used to sign the certificate digitally. The cryptographic key pair comprises a public key and a private key. When you generate a self-signed certificate, you must provide a public-private key pair that can be used to sign the self-signed certificate. Therefore, you must generate a public-private key pair before you can generate a self-signed certificate.

To generate a public-private key pair:

```
user@switch> request security pki generate-key-pair certificate-id certificate-id-name
```



**NOTE:** Optionally, you can specify the encryption algorithm and the size of the encryption key. If you do not specify the encryption algorithm and encryption key size, default values are used. The default encryption algorithm is RSA, and the default encryption key size is 1024 bits.

After the public-private key pair is generated, the switch displays the following:

```
generated key pair certificate-id-name, key size 1024 bits
```

## Generating Self-Signed Certificates on Switches

To generate the self-signed certificate manually, include the certificate ID name, the subject of the distinguished name (DN), the domain name, the IP address of the switch, and the e-mail address of the certificate holder:

```
user@switch> request security pki local-certificate generate-self-signed certificate-id
certificate-id-name domain-name domain-name email email-address ip-address switch-ip-address
subject subject-of-distinguished-name
```

The certificate you have generated is stored in the switch's file system. The certificate ID you have specified while generating the certificate is a unique identifier that you can use to enable the HTTPS or XNM-SSL services.

To verify that the certificate was generated and loaded properly, enter the **show security pki local-certificate** operational command.

### Related Documentation

- Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure) on page 467
- Understanding Self-Signed Certificates on J-EX Series Switches on page 460

## Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure)

You can use the system-generated self-signed certificate or a manually generated self-signed certificate to enable Web management HTTPS and XNM-SSL services.

- To enable HTTPS services using the automatically generated self-signed certificate:

```
[edit]
```

```
user@switch# set system services web-management https system-generated-certificate
```

- To enable HTTPS services using a manually generated self-signed certificate:

```
[edit]
```

```
user@switch# set system services web-management https pki-local-certificate
certificate-id-name
```



**NOTE:** The value of the *certificate-id-name* must match the name you specified when you generated the self-signed certificate manually.

- To enable XNM-SSL services using a manually generated self-signed certificate:

```
[edit]
```

```
user@switch# set system services xnm-ssl local-certificate certificate-id-name
```



**NOTE:** The value of the *certificate-id-name* must match the name you specified when you generated the self-signed certificate manually.

#### Related Documentation

- Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466
- Understanding Self-Signed Certificates on J-EX Series Switches on page 460

## Deleting Self-Signed Certificates (CLI Procedure)

You can delete a self-signed certificate that is automatically or manually generated from the J-EX Series switch. When you delete the automatically generated self-signed certificate, the switch generates a new self-signed certificate and stores it in the file system.

- To delete the automatically generated certificate and its associated key pair from the switch:

```
user@switch> clear security pki local-certificate system-generated
```

- To delete a manually generated certificate and its associated key pair from the switch:

```
user@switch> clear security pki local-certificate certificate-id certificate-id-name
```

- To delete all manually generated certificates and their associated key pairs from the switch:

```
user@switch> clear security pki local-certificate all
```

#### Related Documentation

- Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466
- Understanding Self-Signed Certificates on J-EX Series Switches on page 460



# Monitoring System Services

- Monitoring DHCP Services on page 469

## Monitoring DHCP Services

**Purpose** A switch or router can operate as a DHCP server. Use the monitoring functionality to view information about dynamic and static DHCP leases, conflicts, pools, and statistics.

**Action** To monitor the DHCP server in the J-Web interface, select **Monitor > Services > DHCP**.

To monitor the DHCP server in the CLI, enter the following CLI commands:

- `show system services dhcp binding`
- `show system services dhcp conflict`
- `show system services dhcp pool`
- `show system services dhcp statistics`
- `show system services dhcp relay-statistics`
- `show system services dhcp global`
- `show system services dhcp client`

**Meaning** Table 70 on page 469 summarizes the output fields in DHCP displays in the J-Web interface.

**Table 70: Summary of DHCP Output Fields**

Field	Values	Additional Information
Global tab		

Table 70: Summary of DHCP Output Fields (*continued*)

Field	Values	Additional Information
Name	This column displays the following information: <ul style="list-style-type: none"> <li>• Boot lease length</li> <li>• Domain Name</li> <li>• Name servers</li> <li>• Server identifier</li> <li>• Domain search</li> <li>• Gateway routers</li> <li>• WINS server</li> <li>• Boot file</li> <li>• Boot server</li> <li>• Default lease time</li> <li>• Minimum lease time</li> <li>• Maximum lease time</li> </ul>	
Value	Displays the value for each of the parameters in the Name column.	
<b>Bindings tab</b>		
Allocated Address	List of IP addresses the DHCP server has assigned to clients.	
MAC Address	Corresponding media access control (MAC) address of the client.	
Binding Type	Type of binding assigned to the client: <b>dynamic</b> or <b>static</b> .	DHCP servers can assign a dynamic binding from a pool of IP addresses or a static binding to one or more specific IP addresses.
Lease Expires	Date and time the lease expires, or <b>never</b> for leases that do not expire.	
<b>Pools tab</b>		
Pool Name	Subnet on which the IP address pool is defined.	
Low Address	Lowest address in the IP address pool.	
High Address	Highest address in the IP address pool.	
Excluded Addresses	Addresses excluded from the address pool.	
<b>Clients tab</b>		
Interface Name	Name of the logical interface.	

Table 70: Summary of DHCP Output Fields (*continued*)

Field	Values	Additional Information
Hardware Address	Vendor identification.	
Status	State of the client binding.	
Address Obtained	IP address obtained from the DHCP server.	
Update Server	Indicates whether server update is enabled.	
Lease Obtained	Date and time the lease was obtained.	
Lease Expires	Date and time the lease expires.	
Renew	Reacquires an IP address from the server for the interface. When you click this option, the command sends a discover message if the client state is INIT and a renew request message if the client state is BOUND. For all other states it performs no action.	
Release	Clears other resources received earlier from the server, and reinitializes the client state to INIT for the particular interface.	

---

#### Conflicts tab

Detection Time	Date and time the client detected the conflict.	
Detection Method	How the conflict was detected.	Only client-detected conflicts are displayed.
Address	IP address where the conflict occurs.	The addresses in the conflicts list remain excluded until you use the <code>clear system services dhcp conflict</code> command to manually clear the list.

---

#### DHCP Statistics

---

##### Relay Statistics tab

Packet Counters	Displays the number of packet counters.	
Dropped Packet Counters	Graphically displays the number of dropped packet counters.	

---

#### Statistics tab

**Table 70: Summary of DHCP Output Fields (continued)**

Field	Values	Additional Information
Packets dropped	Total number of packets dropped and the number of packets dropped due to a particular condition.	
Messages received	Number of BOOTREQUEST, DHCPDECLINE, DHCPDISCOVER, DHCPINFORM, DHCPRELEASE, and DHCPREQUEST messages sent from DHCP clients and received by the DHCP server.	
Messages sent	Number of BOOTREPLY, DHCPACK, DHCPOFFER, and DHCPNAK messages sent from the DHCP server to DHCP clients.	

- Related Documentation**
- [Configuring DHCP Services \(J-Web Procedure\) on page 463](#)
  - [DHCP Services for J-EX Series Switches Overview on page 457](#)

# Configuration Statements for System Services

## boot-file

---

<b>Syntax</b>	<code>boot-file <i>filename</i>;</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Set the boot file advertised to DHCP clients. After the client receives an IP address and the boot file location from the DHCP server, the client uses the boot image stored in the boot file to complete DHCP setup.
<b>Options</b>	<i>filename</i> —The location of the boot file on the boot server. The filename can include a pathname.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li><li><b>boot-server on page 474</b></li></ul>

## boot-server (DHCP)

---

<b>Syntax</b>	<code>boot-server (address   hostname);</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Configure the name of the boot server advertised to DHCP clients. The client uses a boot file located on the boot server to complete DHCP setup.
<b>Options</b>	<ul style="list-style-type: none"><li>• <b>address</b>—IP address of a DHCP boot server.</li><li>• <b>hostname</b>—Hostname of a DHCP boot server.</li></ul>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li><li>• <b>boot-file on page 473</b></li></ul>

## bootp

```

Syntax  bootp {
            client-response-ttl number;
            description text-description;
            interface (interface-name | interface-group) {
                client-response-ttl number;
                description text-description;
                maximum-hop-count number;
                minimum-wait-time seconds;
                no-listen;
                server address {
                    logical-system logical-system-name <routing-instance [ <default>
                        routing-instance-names ]>;
                    routing-instance [ <default> routing-instance-names ];
                }
            }
            maximum-hop-count number;
            minimum-wait-time seconds;
            relay-agent-option;
            server address {
                <logical-system logical-system-name> <routing-instance
                    [ routing-instance-names ]>;
            }
        }

```

**Hierarchy Level** [edit forwarding-options helpers]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configures a router, switch, or interface to act as a Dynamic Host Configuration Protocol (DHCP) or bootstrap protocol (BOOTP) relay agent.

DHCP relaying is disabled.

**Options** The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents
- Setting Up DHCP Option 82 with the Switch as a Relay Agent Between Clients and DHCP Server (CLI Procedure)


## ca-name

---

<b>Syntax</b>	<code>ca-name <i>ca-identity</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates certification-authority]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Specify the certificate authority (CA) identity to use in the certificate request.
<b>Options</b>	<i>ca-identity</i> —CA identity to use in the certificate request.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Digital Certificates for an ES PIC</li></ul>

## cache-size

---


<b>Syntax</b>	<code>cache-size <i>bytes</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Configure the cache size for digital certificates.
<b>Options</b>	<i>bytes</i> —Cache size for digital certificates. <b>Range:</b> 64 through 4,294,967,295 <b>Default:</b> 2 megabytes (MB)
	<hr/>  <b>NOTE:</b> We recommend that you limit your cache size to 4 MB. <hr/>
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Digital Certificates for an ES PIC</li></ul>



---

## cache-timeout-negative

---

<b>Syntax</b>	cache-timeout-negative <i>seconds</i> ;
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Configure a negative cache for digital certificates.
<b>Options</b>	<b>seconds</b> —Negative time to cache digital certificates, in seconds. <b>Range:</b> 10 through 4,294,967,295 <b>Default:</b> 20
	<hr/>  <b>CAUTION:</b> Configuring a large negative cache value can lead to a denial-of-service attack. <hr/>
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration

## certificates

---

**Syntax** certificates {  
    cache-size *bytes*;  
    cache-timeout-negative *seconds*;  
    certification-authority *ca-profile-name* {  
        ca-name *ca-identity*;  
        crl *file-name*;  
        encoding (binary | pem);  
        enrollment-url *url-name*;  
        file *certificate-filename*;  
        ldap-url *url-name*;  
    }  
    enrollment-retry *attempts*;  
    local *certificate-name* {  
        certificate-key-string;  
        load-key-file *URL-or-path*;  
    }  
    maximum-certificates *number*;  
    path-length *certificate-path-length*;  
}

**Hierarchy Level** [edit security]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** (Encryption interface on J-EX Series switches) Configure the digital certificates for IPsec.  
  
The remaining statements are explained separately.

**Required Privilege Level** admin—To view this statement in the configuration.  
admin-control—To add this statement to the configuration.

## certification-authority

---

<b>Syntax</b>	certification-authority <i>ca-profile-name</i> { ca-name <i>ca-identity</i> ; crl <i>file-name</i> ; encoding (binary   pem); enrollment-url <i>url-name</i> ; file <i>certificate-filename</i> ; ldap-url <i>url-name</i> ; }
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface J-EX Series switches) Configure a certificate authority profile name.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration

## client-identifier

---

<b>Syntax</b>	client-identifier (ascii <i>client-id</i>   hexadecimal <i>client-id</i> );
<b>Hierarchy Level</b>	[edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Configure the client's unique identifier. This identifier is used by the DHCP server to index its database of address bindings. Either a client identifier or the client's MAC address is required to uniquely identify the client on the network.
<b>Options</b>	<i>client-id</i> —A name or number that uniquely identifies the client on the network. The client identifier can be an ASCII string or hexadecimal digits.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>

## connection-limit

---

<b>Syntax</b>	connection-limit <i>limit</i> ;
<b>Hierarchy Level</b>	[edit system services finger], [edit system services ftp], [edit system services ssh], [edit system services telnet], [edit system services xnm-clear-text], [edit system services xnm-ssl]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the maximum number of connections sessions for each type of system services (finger, ftp, ssh, telnet, xnm-clear-text, or xnm-ssl) per protocol (either IPv6 or IPv4).
<b>Options</b>	<b>limit</b> —(Optional) Maximum number of established connections per protocol (either IPv6 or IPv4). <b>Range:</b> 1 through 250 <b>Default:</b> 75
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring clear-text or SSL Service for Junos XML Protocol Client Applications</li><li>• Configuring DTCP-over-SSH Service for the Flow-Tap Application</li><li>• Configuring Finger Service for Remote Access to the Router</li><li>• Configuring FTP Service for Remote Access to the Router or Switch</li><li>• Configuring SSH Service for Remote Access to the Router or Switch</li><li>• Configuring Telnet Service for Remote Access to a Router or Switch</li></ul>

## crl (Encryption Interface)

---

<b>Syntax</b>	<code>crl <i>file-name</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Configure the certificate revocation list (CRL). A CRL is a time-stamped list identifying revoked certificates, which is signed by a CA and made available to the participating IPsec peers on a regular periodic basis.
<b>Options</b>	<i>file-name</i> —Specify the file from which to read the CRL.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration

## default-lease-time

---

<b>Syntax</b>	<code>default-lease-time <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Specify the length of time in seconds that a client holds the lease for an IP address assigned by a DHCP server. This setting is used if a lease time is not requested by the client.
<b>Options</b>	<i>seconds</i> —Number of seconds the lease can be held. <b>Default:</b> 86400 (1 day)
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> <li><b>maximum-lease-time on page 498</b></li> </ul>

## description

---

<b>Syntax</b>	<code>description text-description;</code>
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootpinterface], [edit forwarding-options helpers bootpinterface ( <i>interface-name</i>   <i>interface-group</i> )], [edit forwarding-options helpers domain], [edit forwarding-options helpers domain interface <i>interface-name</i> ], [edit forwarding-options helpers tftp], [edit forwarding-options helpers tftpinterface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Describe a BOOTP, DHCP, Domain Name System (DNS), or Trivial File Transfer Protocol (TFTP) service, or an interface that is configured for the service.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring DNS and TFTP Packet Forwarding</li><li>• Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</li></ul>

## dhcp

```

Syntax  dhcp {
        boot-file filename;
        boot-server (address | hostname);
        default-lease-time seconds;
        domain-name domain-name;
        domain-search [domain-list];
        maximum-lease-time seconds;
        name-server {
            address;
        }
        option {
            [ (id-number option-type option-value) | (id-number array option-type option-value) ];
        }
        pool address/prefix-length {
            address-range {
                low address;
                high address;
            }
            exclude-address {
                address;
            }
        }
        router {
            address;
        }
        static-binding mac-address {
            fixed-address {
                address;
            }
            host-name hostname;
            client-identifier (ascii client-id | hexadecimal client-id);
        }
        server-identifier address;
        wins-server {
            address;
        }
    }

```

**Hierarchy Level** [edit system services]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** For J-EX Series switches. Configure a router, switch, or interface as a DHCP server. A DHCP server can allocate network addresses and deliver configuration information to client hosts on a TCP/IP network.

The remaining statements are explained separately.

**Required Privilege Level** system—To view this statement in the configuration.  
 system-control—To add this statement to the configuration.

- Related Documentation**
- Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches
  - System Management Configuration Statements

## domain

---

**Syntax**

```
domain {
  description text-description;
  interface interface-name {
    broadcast;
    description text-description;
    no-listen;
    server address <logical-system logical-system-name> <routing-instance
      routing-instance-name>;
  }
  server address <logical-system logical-system-name> <routing-instance
    routing-instance-name>;
}
```

**Hierarchy Level** [edit forwarding-options helpers]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Enable DNS request packet forwarding.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

- Related Documentation**
- Configuring DNS and TFTP Packet Forwarding



## domain-name (DHCP)

---

<b>Syntax</b>	<code>domain-name <i>domain-name</i>;</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Configure the name of the domain in which clients search for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified.
<b>Options</b>	<i>domain-name</i> —Name of the domain.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>

## domain-search

---

<b>Syntax</b>	<code>domain-search [ <i>domain-list</i> ];</code>
<b>Hierarchy Level</b>	[edit system], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a list of domains to be searched.
<b>Options</b>	<i>domain-list</i> —A list of domain names to search. The list can contain up to six domain names, with a total of up to 256 characters.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains</li> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>

## encoding

---

<b>Syntax</b>	encoding (binary   pem);
<b>Hierarchy Level</b>	[edit security ike policy <i>ike-peer-address</i> ], [edit security certificates certification-authority <i>ca-profile-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Specify the file format used for the <b>local-certificate</b> and <b>local-key-pair</b> statements.
<b>Options</b>	<b>binary</b> —Binary file format.  <b>pem</b> —Privacy-enhanced mail (PEM), an ASCII base 64 encoded format. <b>Default:</b> binary
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Digital Certificates for an ES PIC</li><li>Configuring an IKE Policy for Digital Certificates for an ES PIC</li></ul>

## enrollment-retry

---

<b>Syntax</b>	enrollment-retry <i>attempts</i> ;
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Specify how many times a router or switch can resend a digital certificate request.
<b>Options</b>	<b>attempts</b> —Number of enrollment retries. <b>Range:</b> 0 through 100 <b>Default:</b> 0
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

## enrollment-url

---

<b>Syntax</b>	<code>enrollment-url <i>url-name</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates <b>certification-authority</b> <i>ca-profile-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Specify where your router or switch sends Simple Certificate Enrollment Protocol-based (SCEP-based) certificate enrollment requests (certificate authority URL).
<b>Options</b>	<i>url-name</i> —Certificate authority URL.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

## file

---

<b>Syntax</b>	<code>file <i>certificate-filename</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates <b>certification-authority</b> <i>ca-profile-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Specify the file from which to read the digital certificate.
<b>Options</b>	<i>certificate-filename</i> —File from which to read the digital certificate.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

## ftp

---

<b>Syntax</b>	<pre>ftp {     connection-limit <i>limit</i>;     rate-limit <i>limit</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Allow FTP requests from remote systems to the local router or switch.
<b>Options</b>	The remaining statements are explained separately.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring FTP Service for Remote Access to the Router or Switch</li></ul>

## helpers

```

Syntax  helpers {
        bootp {
            client-response-ttl number;
            description text-description;
            interface interface-group {
                client-response-ttl number;
                description text-description;
                maximum-hop-count number;
                minimum-wait-time seconds;
                no-listen;
                server address {
                    logical-system logical-system-name <routing-instance [ <default>
                        routing-instance-names ]>;
                    routing-instance [ <default> routing-instance-names ];
                }
            }
            maximum-hop-count number;
            minimum-wait-time seconds;
            relay-agent-option;
            server address {
                logical-system logical-system-name <routing-instance [ <default>
                    routing-instance-names ]>;
                routing-instance [ <default> routing-instance-names ];
            }
        }
        domain {
            description text-description;
            interface interface-name {
                broadcast;
                description text-description;
                no-listen;
                server address <logical-system logical-system-name> <routing-instance
                    routing-instance-name>;
            }
            server address <logical-system logical-system-name> <routing-instance
                routing-instance-name>;
        }
        port port-number {
            description text-description;
            interface interface-name {
                broadcast;
                description text-description;
                no-listen;
                server address <logical-system logical-system-name> <routing-instance
                    routing-instance-name>;
            }
            server address <logical-system logical-system-name> <routing-instance
                routing-instance-name>;
        }
        tftp {
            description text-description;
            interface interface-name {

```

```
        broadcast;
        description text-description;
        no-listen;
        server address <logical-system logical-system-name> <routing-instance
            routing-instance-name>;
    }
    server address <logical-system logical-system-name> <routing-instance
        routing-instance-name>;
}
traceoptions {
    file filename <files number> <match regular-expression> <size bytes> <world-readable |
        no-world-readable>;
    flag flag;
    level level;
    no-remote-trace level;
}
}
```

**Hierarchy Level** [edit forwarding-options]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Enable TFTP or DNS request packet forwarding, or configure the router, switch, or interface to act as a DHCP/BOOTP relay agent. Use only one server address per interface or global configuration.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring DNS and TFTP Packet Forwarding
- Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents

## http

---

<b>Syntax</b>	<pre>http {   interfaces [ <i>interface-names</i> ];   port <i>port</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services web-management]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the port and interfaces for HTTP service, which is unencrypted.
<b>Options</b>	<p><b>interfaces [ <i>interface-names</i> ]</b>—Name of one or more interfaces on which to allow the HTTP service. By default, HTTP access is allowed through built-in Fast Ethernet or Gigabit Ethernet interfaces only.</p> <p>The remaining statement is explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring Management Access for the J-EX Series Switch (J-Web Procedure) on page 407</li> <li>• <i>Junos OS J-Web Interface User Guide</i></li> <li>• <b>https</b> on page 492</li> <li>• <b>port</b> on page 505</li> <li>• <b>web-management</b> on page 526</li> </ul>

## https

---

<b>Syntax</b>	<pre>https {   interfaces [ <i>interface-names</i> ];   local-certificate <i>name</i>;   port <i>port</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services web-management]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the secure version of HTTP (HTTPS) service, which is encrypted.
<b>Options</b>	<p><b>interfaces [ <i>interface-names</i> ]</b>—Name of one or more interfaces on which to allow the HTTPS service. By default, HTTPS access is allowed through any ingress interface, but HTTP access is allowed through built-in Fast Ethernet or Gigabit Ethernet interfaces only.</p> <p><b>local-certificate <i>name</i></b>—Name of the X.509 certificate for a Secure Sockets Layer (SSL) connection. An SSL connection is configured at the [edit security certificates local] hierarchy.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring Management Access for the J-EX Series Switch (J-Web Procedure) on page 407</li><li>• <i>Junos OS J-Web Interface User Guide</i></li><li>• <b>http on page 491</b></li><li>• <b>port on page 505</b></li><li>• <b>web-management on page 526</b></li></ul>



## interface (BOOTP)

---

**Syntax** `interface (interface-name | interface-group) {`  
     `client-response-ttl number;`  
     `description text-description;`  
     `maximum-hop-count number;`  
     `minimum-wait-time seconds;`  
     `no-listen;`  
     `server address {`  
         `logical-system logical-system-name <routing-instance [ <default>`  
             `routing-instance-names ]>;`  
         `routing-instance [ <default> routing-instance-names ];`  
     `}`  
`}`

**Hierarchy Level** [edit forwarding-options helpers bootp]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Specify the interface for a DHCP and BOOTP relay agent.

**Options** *interface-group*—Sets a logical interface or group of logical interfaces with a specific DHCP relay configuration.

The remaining statements are explained separately.

**Required Privilege** interface—To view this statement in the configuration.

**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents
- Setting Up DHCP Option 82 with the Switch as a Relay Agent Between Clients and DHCP Server (CLI Procedure)

## interface (DNS and TFTP Packet Forwarding or Relay Agent)

---

<b>Syntax</b>	<pre>interface <i>interface-name</i> {     broadcast;     description <i>text-description</i>;     no-listen;     server address &lt;logical-system <i>logical-system-name</i>&gt; &lt;routing-instance         <i>routing-instance-name</i>&gt;; }</pre>
<b>Hierarchy Level</b>	[edit forwarding-options helpers domain], [edit forwarding-options helpers tftp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the interface for monitoring and forwarding DNS or TFTP requests.
<b>Options</b>	<i>interface-name</i> —Name of the interface.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring DNS and TFTP Packet Forwarding</li></ul>

## ldap-url

---

<b>Syntax</b>	<ldap-url <i>url-name</i> >;
<b>Hierarchy Level</b>	[edit security certificates certification-authority <i>ca-profile-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) (Optional) Specify the Lightweight Directory Access Protocol (LDAP) URL for digital certificates.
<b>Options</b>	<i>url-name</i> —Name of the LDAP URL.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Digital Certificates for an ES PIC</li></ul>

## load-key-file

---

<b>Syntax</b>	load-key-file;
<b>Hierarchy Level</b>	[edit system root-authentication], [edit system login user <i>username</i> authentication]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Load RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys from a file. The file is a URL containing one or more SSH keys.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Root Password</li><li>• Configuring Junos OS User Accounts</li></ul>

## local

---

<b>Syntax</b>	<pre>local <i>certificate-name</i> {     <i>certificate-key-string</i>;     load-key-file <i>URL-or-path</i>; }</pre>
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Import a paired X.509 private key and authentication certificate, to enable Junos XML protocol client applications to establish Secure Sockets Layer (SSL) connections to the router or switch.
<b>Options</b>	<p><i>certificate-key-string</i>—String of alphanumeric characters that constitute the private key and certificate.</p> <p><i>certificate-name</i>—Name that uniquely identifies the certificate.</p> <p><i>load-key-file URL-or-path</i>—File that contains the private key and certificate. It can be one of two types of values:</p> <ul style="list-style-type: none"><li>• Pathname of a file on the local disk (assuming you have already used another method to copy the certificate file to the router's or switch's local disk)</li><li>• URL to the certificate file location (for instance, on the computer where the Junos XML protocol client application runs)</li></ul>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Importing SSL Certificates for Junos XML Protocol Support</li></ul>

## local-certificate

---

<b>Syntax</b>	local-certificate;
<b>Hierarchy Level</b>	[edit system services service-deployment], [edit system services web-management https], [edit system services xnm-ssl]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Import or reference an SSL certificate.
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring clear-text or SSL Service for Junos XML Protocol Client Applications</li> <li>Generating SSL Certificates to Be Used for Secure Web Access on page 410</li> <li>Importing SSL Certificates for Junos XML Protocol Support</li> </ul>

## maximum-certificates

---

<b>Syntax</b>	maximum-certificates <i>number</i> ;
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Configure the maximum number of peer digital certificates to be cached.
<b>Options</b>	<p><i>number</i>—Maximum number of peer digital certificates to be cached.</p> <p><b>Range:</b> 64 through 4,294,967,295 peer certificates</p> <p><b>Default:</b> 1024 peer certificates</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

## maximum-hop-count

---

<b>Syntax</b>	maximum-hop-count <i>number</i> ;
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootp], [edit forwarding-options helpers bootpinterface ( <i>interface-name</i>   <i>interface-group</i> )]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the maximum number of hops allowed.
<b>Options</b>	<i>number</i> —Maximum number of hops. <b>Default:</b> 4 hops
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</li></ul>

## maximum-lease-time

---

<b>Syntax</b>	maximum-lease-time <i>seconds</i> ;
<b>Hierarchy Level</b>	[edit system services dhcp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Specify the maximum length of time in seconds for which a client can request and hold a lease on a DHCP server.  An exception is that the dynamic BOOTP lease length can exceed the maximum lease length specified.
<b>Options</b>	<i>seconds</i> —The maximum number of seconds the lease can be held.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li><li><b>default-lease-time on page 481</b></li></ul>

## minimum-wait-time

---

<b>Syntax</b>	<code>minimum-wait-time <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootp], [edit forwarding-options helpers bootpinterface ( <i>interface-name</i>   <i>interface-group</i> )]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the minimum time allowed.
<b>Options</b>	<i>seconds</i> —Minimum time. <b>Default:</b> 0 seconds
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</li> </ul>

## name-server

---

<b>Syntax</b>	<code>name-server {     <i>address</i>; }</code>
<b>Hierarchy Level</b>	[edit system], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure one or more Domain Name System (DNS) name servers.
<b>Options</b>	<i>address</i> —Address of the name server. To configure multiple name servers, include multiple <i>address</i> options.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring a DNS Name Server for Resolving a Hostname into Addresses</li> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>

## no-listen

---

<b>Syntax</b>	no-listen;
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootp interface ( <i>interface-name</i>   <i>interface-group</i> )], [edit forwarding-options helpers domain interface <i>interface-name</i> ], [edit forwarding-options helpers tftp interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable recognition of DNS requests or stop packets from being forwarded on a logical interface, a group of logical interfaces, a router, or a switch.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring DNS and TFTP Packet Forwarding</li><li>• Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</li></ul>



## outbound-ssh

```

Syntax [edit system services]
outbound-ssh {
  client client-id {
    address {
      port port-number;
      retry number;
      timeout seconds;
    }
    device-id device-id;
    keep-alive {
      retry number;
      timeout seconds;
    }
    reconnect-strategy (in-order | sticky);
    secret password;
    services netconf;
  }
  traceoptions {
    file filename <files number> <match regex> <size size> <world-readable |
      no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}

```

**Hierarchy Level** [edit system services]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure a router or switch running the Junos OS behind a firewall to communicate with client management applications on the other side of the firewall.

**Default** To configure transmission of the router's or switch's device ID to the application, include the **device-id** statement at the [edit system services] hierarchy level.

**Options** **client-id**—Identifies the **outbound-ssh** configuration stanza on the router or switch. Each **outbound-ssh** stanza represents a single outbound SSH connection. This attribute is not sent to the client.

**device-id**—Identifies the router or switch to the client during the initiation sequence.

**keep-alive**—(Optional) When configured, specifies that the router or switch send keepalive messages to the management server. To configure the keepalive message, you must set both the **timeout** and **retry** attributes.

**reconnect-strategy**—(Optional) Specify the method the router or switch uses to reestablish a disconnected outbound SSH connection. Two methods are available:

- **in-order**—Specify that the router or switch first attempt to establish an outbound SSH session based on the management server address list. The router or switch attempts

to establish a session with the first server on the list. If this connection is not available, the router or switch attempts to establish a session with the next server, and so on down the list until a connection is established.

- **sticky**—Specify that the router or switch first attempt to reconnect to the management server that it was last connected to. If the connection is unavailable, it attempts to establish a connection with the next client on the list and so forth until a connection is made.

**retry**—Number of keepalive messages the router or switch sends without receiving a response from the client before the current SSH connection is disconnected. The default is three messages.

**secret**—(Optional) Router's or switch's public SSH host key. If added to the **outbound-ssh** statement, during the initialization of the outbound SSH service, the router or switch passes its public key to the management server. This is the recommended method of maintaining a current copy of the router's or switch's public key.

**timeout**—Length of time that the Junos server waits for data before sending a keep alive signal. The default is 15 seconds.

When reconnecting to a client, the router or switch attempts to reconnect to the client based on the **retry** and **timeout** values for each client listed.

**address**—Hostname or the IPv4 address of the NSM application server. You can list multiple clients by adding each client's IP address or hostname along with the following connection parameters:

- **port**—Outbound SSH port for the client. The default is port 22.
- **retry**—Number of times the router or switch attempts to establish an outbound SSH connection before giving up. The default is three tries.
- **timeout**—Length of time that the router or switch attempts to establish an outbound SSH connection before giving up. The default is fifteen seconds.

**filename**—(Optional) By default, the filename of the log file used to record the trace options is the name of the traced process (for example, **mib2d** or **snmpd**). Use this option to override the default value.

**files**—(Optional) Maximum number of trace files generated. By default, the maximum number of trace files is 10. Use this option to override the default value.

When a trace file reaches its maximum size, the system archives the file and starts a new file. The system archives trace files by appending a number to the filename in sequential order from 1 to the maximum value (specified by the default value or the options value set here). Once the maximum value is reached, the numbering sequence is restarted at 1, overwriting the older file.

**size**—(Optional) Maximum size of the trace file in kilobytes (KB). Once the maximum file size is reached, the system archives the file. The default value is 1000 KB. Use this option to override the default value.

**match**—(Optional) When used, the system only adds lines to the trace file that match the regular expression specified. For example, if the match value is set to **=error**, the system only records lines to the trace file that include the string **error**.

**services**—Services available for the session. Currently, NETCONF is the only service available.

**world-readable | no-world-readable**—(Optional) Whether the files are accessible by the originator of the trace operation only or by any user. By default, log files are only accessible by the user that started the trace operation (**no-world-readable**).

**all | configuration | connectivity**—(Optional) Type of tracing operation to perform.

**all**—Log all events.

**configuration**—Log all events pertaining to the configuration of the router or switch.

**connectivity**—Log all events pertaining to the establishment of a connection between the client server and the router or switch.

**no-remote-trace**—(Optional) Disable remote tracing.

<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Outbound SSH Service</li> <li>System Management Configuration Statements</li> </ul>

## path-length

<b>Syntax</b>	<code>path-length <i>certificate-path-length</i>;</code>
<b>Hierarchy Level</b>	[edit security certificates]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Configure the digital certificate path length.
<b>Options</b>	<p><b><i>certificate-path-length</i></b>—Digital certificate path length.</p> <p><b>Range:</b> 2 through 15 certificates</p> <p><b>Default:</b> 15 certificates</p>
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Digital Certificates for an ES PIC</li> </ul>

## pool

---

<b>Syntax</b>	<pre>pool address/prefix-length {   address-range {     low address;     high address;   }   exclude-address {     address;   } }</pre>
<b>Hierarchy Level</b>	[edit system services dhcp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Configure a pool of IP addresses for DHCP clients on a subnet. When a client joins the network, the DHCP server dynamically allocates an IP address from this pool.
<b>Options</b>	<p><b>address-range</b>—Lowest and highest IP addresses in the pool that are available for dynamic address assignment. If no range is specified, the pool will use all available addresses within the subnet specified. (Broadcast addresses, interface addresses, and excluded addresses are not available.)</p> <p><b>exclude-address</b>—Addresses within the range that are not used for dynamic address assignment. You can exclude one or more addresses within the range.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li></ul>

## port (HTTP/HTTPS)

---

<b>Syntax</b>	<code>port port-number;</code>
<b>Hierarchy Level</b>	[edit system services web-management]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the port on which the HTTP or HTTPS service is connected.
<b>Options</b>	<i>port-number</i> —The TCP port number on which the specified service listens.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Table 65 on page 408</li> <li>• <i>Junos OS J-Web Interface User Guide</i></li> <li>• <a href="#">http on page 491</a></li> <li>• <a href="#">https on page 492</a></li> <li>• <a href="#">web-management on page 526</a></li> </ul>

## port (SRC Server)

---

<b>Syntax</b>	<code>port port-number;</code>
<b>Hierarchy Level</b>	[edit system services service-deployment servers <i>server-address</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the port number on which to contact the SRC server.
<b>Options</b>	<i>port-number</i> —(Optional) The TCP port number for the SRC server. <b>Default:</b> 3333
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring the Junos OS to Work with SRC Software</li> </ul>

## protocol-version

---

<b>Syntax</b>	<code>protocol-version <i>version</i>;</code>
<b>Hierarchy Level</b>	<code>[edit system services ssh]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the secure shell (SSH) protocol version.
<b>Options</b>	<b><i>version</i></b> —SSH protocol version <b>Values:</b> <code>v1, u2, or [ v1 v2 ]</code> <b>Default:</b> <code>[v1 v2]</code>
<b>Required Privilege Level</b>	<code>admin</code> —To view this statement in the configuration. <code>admin-control</code> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring SSH Service for Remote Access to the Router or Switch</li></ul>

## rate-limit

---

<b>Syntax</b>	<code>rate-limit <i>limit</i>;</code>
<b>Hierarchy Level</b>	<code>[edit system services finger],</code> <code>[edit system services ftp],</code> <code>[edit system services ssh],</code> <code>[edit system services telnet],</code> <code>[edit system services xnm-clear-text],</code> <code>[edit system services xnm-ssl]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the maximum number of connections attempts per protocol (either IPv6 or IPv4) on an access service.
<b>Options</b>	<b><code>rate-limit <i>limit</i></code></b> —(Optional) Maximum number of connection attempts allowed per minute, per IP protocol (either IPv4 or IPv6). <b>Range:</b> 1 through 250 <b>Default:</b> 150
<b>Required Privilege Level</b>	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring clear-text or SSL Service for Junos XML Protocol Client Applications</li></ul>

## server (DHCP and BOOTP Relay Agent)

---

<b>Syntax</b>	<pre>server <i>address</i> {     logical-system <i>logical-system-name</i> &lt;routing-instance [ &lt;default&gt;         <i>routing-instance-names</i> ]&gt;;     routing-instance [ &lt;default&gt; <i>routing-instance-names</i> ]; }</pre>
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootp], [edit forwarding-options helpers bootp interface ( <i>interface-name</i>   <i>interface-group</i> )]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the router or switch to act as a DHCP and BOOTP relay agent.
<b>Options</b>	<ul style="list-style-type: none"> <li>• <b>address</b>—One or more addresses of the server.</li> <li>• <b>logical-system <i>logical-system-name</i></b>—(Optional) Logical system of the server.</li> <li>• <b>routing-instance <i>routing-instance-names</i></b>—(Optional) Routing instance name that belong to the DHCP or BOOTP relay agent.</li> </ul>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</li> </ul>

## server (DNS and TFTP Service)

---

<b>Syntax</b>	<code>server address &lt;logical-system <i>logical-system-name</i>&gt; &lt;routing-instance <i>routing-instance-name</i>&gt;;</code>
<b>Hierarchy Level</b>	[edit forwarding-options helpers domain], [edit forwarding-options helpers domain interface <i>interface-name</i> ], [edit forwarding-options helpers tftp], [edit forwarding-options helpers tftp interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the DNS or TFTP server for forwarding DNS or TFTP requests. Only one server can be specified for each interface.
<b>Options</b>	<b>address</b> —Address of the server.  <b>logical-system <i>logical-system-name</i></b> —(Optional) Logical system of the server.  <b>routing-instance [ <i>routing-instance-names</i> ]</b> —(Optional) Set the routing instance name or names that belong to the DNS server or TFTP server.
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring DNS and TFTP Packet Forwarding</li></ul>



## server-identifier

---

<b>Syntax</b>	<code>server-identifier <i>address</i>;</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>For J-EX Series switches. Configure a server identifier. The identifier can be used to identify a DHCP server in a DHCP message. It can also be used as a destination address from clients to servers (for example, when the boot file is set, but not the boot server).</p> <p>Servers include the server identifier in <b>DHCPOFFER</b> messages so that clients can distinguish between multiple lease offers. Clients include the server identifier in <b>DHCPREQUEST</b> messages to select a lease and indicate which offer is accepted from multiple lease offers. Also, clients can use the server identifier to send unicast request messages to specific DHCP servers to renew a current lease.</p> <p>This address must be a manually assigned, static IP address. The server cannot send a request and receive an IP address from itself or another DHCP server.</p>
<b>Default</b>	If no server identifier is set, the DHCP server sets the server identifier based on the primary interface address used by the server to receive a client request. For example, if the client sends a DHCP request and the server receives it on <b>fe-0/0/0</b> and the primary interface address is <b>1.1.1.1</b> , then the server identifier is set to <b>1.1.1.1</b> .
<b>Options</b>	<b><i>address</i></b> —IPv4 address of the server. This address must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>

## servers

---

<b>Syntax</b>	<pre>servers server-address {   port port-number; }</pre>
<b>Hierarchy Level</b>	[edit system services service-deployment]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure an IPv4 address for the Session and Resource Control (SRC) server.
<b>Options</b>	<p><b>server-address</b>—The TCP port number.</p> <p><b>Default:</b> 3333</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Work with SRC Software</li></ul>

## service-deployment

---

<b>Syntax</b>	<pre>service-deployment {   servers server-address {     port port-number;   }   source-address source-address; }</pre>
<b>Hierarchy Level</b>	[edit system services]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Enable Junos OS to work with the Session and Resource Control (SRC) software.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Work with SRC Software</li></ul>

---

**services**


---

```

Syntax  servicesw {
        dhcp { \* DHCP not supported on a DCF
            dhcp_services;
        }
        finger {
            connection-limit limit;
            rate-limit limit;
        }
        ftp {
            connection-limit limit;
            rate-limit limit;
        }
        ssh {
            protocol-version [v1 v2];
            connection-limit limit;
            rate-limit limit;
            root-login (allow | deny | deny-password);
        }
        service-deployment {
            servers server-address {
                port-number port-number;
            }
            source-address source-address;
        }
        telnet {
            connection-limit limit;
            rate-limit limit;
        }
        web-management {
            http {
                interfaces [ interface-names ];
                port port;
            }
            https {
                interfaces [ interface-names ];
                local-certificate name;
                port port;
            }
            session {
                idle-timeout [ minutes ];
                session-limit [ session-limit ];
            }
        }
        xnm-clear-text {
            connection-limit limit;
            rate-limit limit;
        }
        xnm-ssl {
            connection-limit limit;
            local-certificate name;
            rate-limit limit;
        }
    }

```

}

**Hierarchy Level** [edit system]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure the router or switch so that users on remote systems can access the local router or switch through the DHCP server, finger, rlogin, SSH, telnet, Web management, Junos XML protocol clear-text, Junos XML protocol SSL, and network utilities or enable Junos OS to work with the Session and Resource Control (SRC) software.

The remaining statements are explained separately.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Configuring clear-text or SSL Service for Junos XML Protocol Client Applications
- Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches
- Configuring the Junos OS to Work with SRC Software

## session

---

<b>Syntax</b>	<pre>session {   idle-timeout <i>minutes</i>;   session-limit <i>session-limit</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services web-management]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure limits for the number of minutes a session can be idle before it times out, and configure the number of simultaneous J-Web user login sessions.
<b>Options</b>	<p><b>idle-timeout <i>minutes</i></b>—Configure the number of minutes a session can be idle before it times out.</p> <p><b>Range:</b> 1 through 1440</p> <p><b>Default:</b> 1440</p> <p><b>session-limit <i>session-limit</i></b>—Configure the maximum number of simultaneous J-Web user login sessions.</p> <p><b>Range:</b> 1 through 1024</p> <p><b>Default:</b> Unlimited</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Junos OS J-Web Interface User Guide</i></li> </ul>

## sip-server

---

<b>Syntax</b>	<code>sip-server [address   name];</code>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure Session Initiation Protocol (SIP) server addresses or names for DHCP servers.
<b>Options</b>	<b>address</b> —IPv4 address of the SIP server. To configure multiple SIP servers, include multiple <b>address</b> options. This address must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).  <b>name</b> —Fully qualified domain name of the SIP server. To configure multiple SIP servers, include multiple <b>name</b> options. This domain name must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring a DHCP SIP Server on page 466</li></ul>

## source-address (SRC Software)

---

<b>Syntax</b>	<code>source-address source-address;</code>
<b>Hierarchy Level</b>	[edit system services service-deployment]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Enable Junos OS to work with the Session and Resource Control (SRC) software.
<b>Options</b>	<b>source-address</b> —Local IPv4 address to be used as source address for traffic to the SRC server. The source address restricts traffic within the out-of-band network.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Junos OS to Work with SRC Software</li></ul>

## source-address-giaddr

<b>Syntax</b>	source-address-giaddr;
<b>Hierarchy Level</b>	[edit forwarding-options helpers bootp], [edit forwarding-options helpers bootp interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure the gateway IP address (giaddr) as the source IP address of the switch for relayed DHCP packets when the switch is used as the DHCP relay agent.</p> <p>When this statement is entered in the [edit forwarding-options helpers bootp] hierarchy, the gateway IP address is configured as the source IP address of the switch for relayed DHCP packets exiting all interfaces on the switch.</p> <p>When this statement is entered in the [edit forwarding-options helpers bootp interface <i>interface-name</i>] hierarchy, the gateway IP address is configured as the source IP address of the switch for relayed DHCP packets exiting the specified interface of the switch.</p> <p>The IP address of the interface that the DHCP packet exits on the switch acting as a DHCP relay agent is used as the source IP address for relayed DHCP packets by default.</p>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>DHCP/BOOTP Relay for J-EX Series Switches Overview on page 458</li> </ul>

## ssh

<b>Syntax</b>	<pre>ssh {   protocol-version [v1 v2];   connection-limit <i>limit</i>;   rate-limit <i>limit</i>;   root-login (allow   deny   deny-password); }</pre>
<b>Hierarchy Level</b>	[edit system services]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Allow SSH requests from remote systems to the local router or switch.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring SSH Service for Remote Access to the Router or Switch</li> </ul>

## static-binding

---

<b>Syntax</b>	<pre>static-binding <i>mac-address</i> {   client-identifier (ascii <i>client-id</i>   hexadecimal <i>client-id</i>);   fixed-address {     <i>address</i>;   }   host-name <i>client-hostname</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services dhcp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Set static bindings for DHCP clients. A static binding is a mapping between a fixed IP address and the client's MAC address or client identifier.
<b>Options</b>	<p><b><i>mac-address</i></b>—The MAC address of the client. This is a hardware address that uniquely identifies a client on the network.</p> <p><b><i>fixed-address address</i></b>—Fixed IP address assigned to the client. Typically a client has one address assigned, but you can assign more.</p> <p><b><i>host-name client-hostname</i></b>—Hostname of the client requesting the DHCP server. The name can include the local domain name. Otherwise, the name is resolved based on the <b><i>domain-name</i></b> statement.</p> <p><b><i>client-identifier (ascii client-id   hexadecimal client-id)</i></b>—Used by the DHCP server to index the database of address bindings. The client identifier is an ASCII string or hexadecimal number and can include a type-value pair as specified in RFC 1700, <i>Assigned Numbers</i>. Either a client identifier or the client's MAC address must be configured to uniquely identify the client on the network.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li> </ul>



## system-generated-certificate

---

<b>Syntax</b>	system-generated-certificate;
<b>Hierarchy Level</b>	[edit system services web-management https]
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Configure the automatically generated self-signed certificate for enabling HTTPS services..
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure) on page 467</li> </ul>

## telnet

---

<b>Syntax</b>	telnet { connection-limit <i>limit</i> ; rate-limit <i>limit</i> ; }
<b>Hierarchy Level</b>	[edit system services]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Allow Telnet connections from remote systems to the local router or switch.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Telnet Service for Remote Access to a Router or Switch</li> </ul>

## tftp

---

**Syntax** tftp {  
    description *text-description*;  
    interface *interface-name* {  
        broadcast;  
        description *text-description*;  
        no-listen;  
        server address <logical-system *logical-system-name*> <routing-instance  
            *routing-instance-name*>;  
    }  
    server address <logical-system *logical-system-name*> <routing-instance  
        *routing-instance-name*>;  
}

**Hierarchy Level** [edit forwarding-options helpers]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Enable TFTP request packet forwarding.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring DNS and TFTP Packet Forwarding

## traceoptions

<b>Syntax</b>	<pre> traceoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt;;   flag all;   flag certificates;   flag database;   flag general;   flag ike;   flag parse;   flag policy-manager;   flag routing-socket;   flag timer;   level   no-remote-trace } </pre>
<b>Hierarchy Level</b>	<p>[edit security], [edit services ipsec-vpn]</p> <p>Trace options can be configured at either the [edit security] or the [edit services ipsec-vpn] hierarchy level, but not at both levels.</p>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure security trace options.</p> <p>To specify more than one trace option, include multiple <b>flag</b> statements. Trace option output is recorded in the <code>/var/log/kmd</code> file.</p>
<b>Options</b>	<p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file (for example, <code>kmd</code>) reaches its maximum size, it is renamed <code>kmd.0</code>, then <code>kmd.1</code>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you must also specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000 files <b>Default:</b> 0 files</p> <p><b>size <i>size</i></b>—(Optional) Maximum size of each trace file, in kilobytes (KB). When a trace file (for example, <code>kmd</code>) reaches this size, it is renamed, <code>kmd.0</code>, then <code>kmd.1</code> and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p><b>Default:</b> 1024 KB</p> <p><b>flag <i>flag</i></b>—Trace operation to perform. To specify more than one trace operation, include multiple <b>flag</b> statements.</p> <ul style="list-style-type: none"> <li>• <b>all</b>—Trace all security events.</li> <li>• <b>certificates</b>—Trace certificate events.</li> <li>• <b>database</b>—Trace database events.</li> </ul>

- **general**—Trace general events.
- **ike**—Trace IKE module processing.
- **parse**—Trace configuration processing.
- **policy-manager**—Trace policy manager processing.
- **routing-socket**—Trace routing socket messages.
- **timer**—Trace internal timer events.

**level** *level*—(Optional) Set traceoptions level.

- **all**—match all levels.
- **error**—Match error conditions.
- **info**—Match informational messages.
- **notice**—Match conditions that should be handled specially.
- **verbose**—Match verbose messages.
- **warning**—Match warning messages.

**no-remote-trace**—(Optional) Disable remote tracing

**Required Privilege Level** admin—To view the configuration.  
admin-control—To add this statement to the configuration.

**Related Documentation** • Configuring Tracing Operations for Security Services

## tracoptions (DHCP Server)

<b>Syntax</b>	<pre>tracoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regex</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable         no-world-readable&gt;;     flag <i>flag</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services dhcp]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Define tracing operations for DHCP processes for J-EX Series switches.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b><i>trace-file</i></b> reaches its maximum size, it is renamed <b><i>trace-file.0</i></b>, then <b><i>trace-file.1</i></b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>all</b>—All tracing operations</li> <li>• <b>binding</b>—Trace binding operations</li> <li>• <b>config</b>—Log reading of configuration</li> <li>• <b>conflict</b>—Trace user-detected conflicts for IP addresses</li> <li>• <b>event</b>—Trace important events</li> <li>• <b>ifdb</b>—Trace interface database operations</li> <li>• <b>io</b>— Trace I/O operations</li> <li>• <b>lease</b>—Trace lease operations</li> <li>• <b>main</b>—Trace main loop operations</li> <li>• <b>misc</b>— Trace miscellaneous operations</li> <li>• <b>packet</b>—Trace DHCP packets</li> <li>• <b>options</b>—Trace DHCP options</li> <li>• <b>pool</b>—Trace address pool operations</li> </ul>

- **protocol**—Trace protocol operations
- **rtsock**—Trace routing socket operations
- **scope**—Trace scope operations
- **signal**—Trace DHCP signal operations
- **trace**—All tracing operations
- **ui**—Trace user interface operations

**match *regex***—(Optional) Refine the output to include lines that contain the regular expression.

- **all**—All tracing operations
- **binding**—Trace binding operations
- **config**—Log reading of configuration
- **conflict**—Trace user-detected conflicts for IP addresses
- **event**—Trace important events
- **ifdb**— Trace interface database operations
- **io**—Trace I/O operations
- **lease**—Trace lease operations
- **main**—Trace main loop operations
- **match *regex***— Refine the output to include lines that contain the regular expression.
- **misc**—Trace miscellaneous operations
- **packet**—Trace DHCP packets
- **options**—Trace DHCP options
- **pool**—Trace address pool operations
- **protocol**—Trace protocol operations
- **rtsock**—Trace routing socket operations
- **scope**—Trace scope operations
- **signal**—Trace DHCP signal operations
- **trace**—All tracing operations
- **ui**—Trace user interface operations

**no-world-readable**—(Optional) Disable unrestricted file access.

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through 1 GB

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

**Required Privilege Level**    **system**—To view this statement in the configuration.  
                                  **system-control**—To add this statement to the configuration.

**Related Documentation**

- Configuring Tracing Operations for DHCP Processes
- System Management Configuration Statements

## traceoptions (DNS and TFTP Packet Forwarding)

<b>Syntax</b>	<pre> traceoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regular-expression</i>&gt; &lt;size <i>bytes</i>&gt; &lt;world-readable       no-world-readable&gt;;   flag <i>flag</i>;   level <i>level</i>;   &lt;no-remote-trace&gt;; } </pre>
<b>Hierarchy Level</b>	[edit forwarding-options helpers]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure tracing operations for BOOTP, DNS and TFTP packet forwarding.
<b>Default</b>	If you do not include this statement, no tracing operations are performed.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name in quotation marks (" "). All files are placed in a file named <b>fud</b> in the directory <b>/var/log</b>. If you include the <b>file</b> statement, you must specify a filename.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000  <b>Default:</b> 3 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>address</b>—Trace address management events</li> <li>• <b>all</b>—Trace all events</li> <li>• <b>bootp</b>—Trace BOOTP or DHCP services events</li> <li>• <b>config</b>—Trace configuration events</li> <li>• <b>domain</b>—Trace DNS service events</li> <li>• <b>ifdb</b>—Trace interface database operations</li> <li>• <b>io</b>—Trace I/O operations</li> <li>• <b>main</b>—Trace main loop events</li> <li>• <b>port</b>—Trace arbitrary protocol events</li> <li>• <b>rtsock</b>—Trace routing socket operations</li> </ul>



- **tftp**—Trace TFTP service events
- **trace**—Trace tracing operations
- **ui**—Trace user interface operations
- **util**—Trace miscellaneous utility operations

**match *regular-expression***—(Optional) Refine the output to include lines that contain the regular expression.

**no-remote-trace**—(Optional) Disable remote tracing globally or for a specific tracing operation.

**no-world-readable**—(Optional) Restrict file access to the owner.

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** file again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 0 bytes through 4,294,967,295 KB

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	• Tracing BOOTP, DNS, and TFTP Forwarding Operations

## web-management

---

**Syntax** web-management {  
    http {  
        interfaces [ *interface-names* ];  
        port *port*;  
    }  
    https {  
        interfaces [ *interface-names* ];  
        local-certificate *name*;  
        port *port*;  
    }  
}

**Hierarchy Level** [edit system services]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure settings for HTTP or HTTPS access. HTTP access allows management of the router or switch using the browser-based J-Web graphical user interface. HTTPS access allows secure management of the router or switch using the J-Web interface. With HTTPS access, communication between the router or switch Web server and your browser is encrypted.

The remaining statements are explained separately.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Table 65 on page 408
- *Junos OS J-Web Interface User Guide*
- **http** on page 491
- **https** on page 492
- **port** on page 505

## wins-server

---


<b>Syntax</b>	<pre>wins-server {     address; }</pre>
<b>Hierarchy Level</b>	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX Series switches. Specify one or more NetBIOS Name Servers. When a DHCP client is added to the network and assigned an IP address, the NetBIOS Name Server manages the Windows Internet Name Service (WINS) database that matches IP addresses (such as <b>192.168.1.3</b> ) to Windows NetBIOS names (such as <b>\\Marketing</b> ). List servers in order of preference.
<b>Options</b>	<b>address</b> —IPv4 address of the NetBIOS Name Server running WINS. To configure multiple servers, include multiple <b>address</b> options.
<b>Required Privilege Level</b>	<b>system</b> —To view this statement in the configuration. <b>system-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Router, Switch, or Interface to Act as a DHCP Server on J Series Services Routers and J-EX Series Switches</li></ul>



CHAPTER 32

# Operational Commands for System Services

## clear security pki local-certificate

<b>Syntax</b>	clear security pki local-certificate <all   certificate-id <i>certificate-id-name</i>   system-generated>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Delete local digital certificates, certificate requests, and the corresponding public/private key pairs from the switch.
<b>Options</b>	all—(Optional) Delete all local digital certificates, certificate requests, and the corresponding public and private key pairs from the router.
	 <b>NOTE:</b> This option does not delete the automatically generated self-signed certificate or its public/private key pair.
	certificate-id <i>certificate-id-name</i> —(Optional) Delete the specified local digital certificate and corresponding public and private key pair.
	system-generated—(Optional) Delete the automatically generated self-signed certificate.
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Deleting Self-Signed Certificates (CLI Procedure) on page 468</li> </ul>
<b>List of Sample Output</b>	clear security pki local-certificate all on page 530
<b>Output Fields</b>	This command produces no output.

### Sample Output

```
clear security pki local-certificate all
user@switch> clear security pki local-certificate all
```

---

## clear system services dhcp binding

---

<b>Syntax</b>	clear system services dhcp binding <address>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Remove obsolete IP address bindings on a Dynamic Host Configuration Protocol (DHCP) server and return them to the IP address pool.
<b>Options</b>	<i>address</i> —(Optional) Remove a specific IP address binding and return it to the address pool.
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show system services dhcp binding on page 543</a></li></ul>
<b>List of Sample Output</b>	<a href="#">clear system services dhcp binding on page 531</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
clear system services dhcp binding user@host> clear system services dhcp binding
```

## clear system services dhcp conflict

---

<b>Syntax</b>	clear system services dhcp conflict <address>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Remove IP addresses from the Dynamic Host Configuration Protocol (DHCP) server conflict list and return them to the IP address pool.
<b>Options</b>	<i>address</i> —(Optional) Remove a specific IP address from the conflict list and return it to the address pool.
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show system services dhcp conflict on page 545</a></li></ul>
<b>List of Sample Output</b>	<a href="#">clear system services dhcp conflict on page 532</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
clear system services user@host> clear system services dhcp conflict
dhcp conflict
```



## clear system services dhcp statistics

---

<b>Syntax</b>	clear system services dhcp statistics
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Clear Dynamic Host Configuration Protocol (DHCP) server statistics.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show system services dhcp statistics on page 550</a></li></ul>
<b>List of Sample Output</b>	<a href="#">clear system services dhcp statistics on page 533</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
clear system services dhcp statistics user@host> clear system services dhcp statistics
```

## request ipsec switch

---

<b>Syntax</b>	request ipsec switch (interface <es-fpc/pic/port>   security-associations <sa-name>)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Manually switch from the primary to the backup encryption services interface, or switch from the primary to the backup IP Security (IPsec) tunnel.
<b>Options</b>	interface <es-fpc/pic/port>—Switch to the backup encryption interface. security-associations <sa-name>—Switch to the backup tunnel.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• show ipsec redundancy</li></ul>
<b>List of Sample Output</b>	<a href="#">request ipsec switch on page 534</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request ipsec switch user@host> request ipsec switch security-associations sa-private
```

## request security certificate (signed)

<b>Syntax</b>	request security certificate enroll filename <i>filename</i> subject <i>subject</i> alternative-subject <i>alternative-subject</i> certification-authority <i>certification-authority</i> encoding (binary   pem) key-file <i>key-file</i> domain-name <i>domain-name</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Obtain a signed certificate from a certificate authority (CA). The signed certificate validates the CA and the owner of the certificate. The results are saved in a specified file to the <code>/var/etc/ikecert</code> directory.
<b>Options</b>	<p>filename <i>filename</i>—File that stores the certificate.</p> <p>subject <i>subject</i>—Distinguished name (<b>dn</b>), which consists of a set of components—for example, an organization (<b>o</b>), an organization unit (<b>ou</b>), a country (<b>c</b>), and a locality (<b>l</b>).</p> <p>alternative-subject <i>alternative-subject</i>—Tunnel source address.</p> <p>certification-authority <i>certification-authority</i>—Name of the certificate authority profile in the configuration.</p> <p>encoding (binary   pem)—File format used for the certificate. The format can be a binary file or privacy-enhanced mail (PEM), an ASCII base64-encoded format. The default format is binary.</p> <p>key-file <i>key-file</i>—File containing a local private key.</p> <p>domain-name <i>domain-name</i>—Fully qualified domain name.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>request security certificate (signed) on page 535</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

request security certificate (signed) user@host> request security certificate enroll filename host.crt subject c=uk,o=london
alternative-subject 10.50.1.4 certification-authority verisign key-file host-1.prv domain-name
host.juniper.net
CA name: juniper.net CA file: ca_verisign
local pub/private key pair: host.prv
subject: c=uk,o=london domain name: host.juniper.net
alternative subject: 10.50.1.4
Encoding: binary
Certificate enrollment has started. To view the status of your enrollment, check
the key management process (kmd) log file at /var/log/kmd. <-----

```

## request security certificate (unsigned)

<b>Syntax</b>	request security certificate enroll filename <i>filename</i> ca-file <i>ca-file</i> ca-name <i>ca-name</i> encoding (binary   perm) url <i>url</i>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Obtain a certificate from a certificate authority (CA). The results are saved in a specified file to the <code>/var/etc/ikecert</code> directory.
<b>Options</b>	<p>filename <i>filename</i>—File that stores the public key certificate.</p> <p>ca-file <i>ca-file</i>—Name of the certificate authority profile in the configuration.</p> <p>ca-name <i>ca-name</i>—Name of the certificate authority.</p> <p>encoding (binary   pem)—File format used for the certificate. The format can be a binary file or privacy-enhanced mail (PEM), an ASCII base64-encoded format. The default value is <b>binary</b>.</p> <p>url <i>url</i>—Certificate authority URL.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>request security certificate (unsigned) on page 536</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```

request security certificate (unsigned) user@host> request security certificate enroll filename ca_verisign ca-file verisign ca-name
juniper.net urlxyzcompany URL
http://<verisign ca-name xyzcompany url>/cgi-bin/pkiclient.exe CA name: juniper.net
CA file: verisign Encoding: binary
Certificate enrollment has started. To view the status of your enrollment, check
the key management process (kmd) log file at /var/log/kmd. <-----

```

## request security key-pair

---

<b>Syntax</b>	<code>request security key-pair <i>filename</i></code> <code>&lt;size <i>key-size</i>&gt;</code> <code>&lt;type (rsa   dsa)&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(Encryption interface on J-EX Series switches) Generate a public and private key pair for a digital certificate.
<b>Options</b>	<p><i>filename</i>—Name of a file in which to store the key pair.</p> <p><i>size key-size</i>—(Optional) Key size, in bits. The key size can be <b>512</b>, <b>1024</b>, or <b>2048</b>. The default value is <b>1024</b>.</p> <p><i>type</i>—(Optional) Algorithm used to encrypt the key:</p> <ul style="list-style-type: none"> <li>• <b>rsa</b>—RSA algorithm. This is the default.</li> <li>• <b>dsa</b>—Digital signature algorithm with Secure Hash Algorithm (SHA).</li> </ul>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">request security key-pair on page 537</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request security user@host> request security key-pair security-key-file
key-pair
```

## request security pki generate-key-pair

---

<b>Syntax</b>	<code>request security pki generate-key-pair certificate-id <i>certificate-id-name</i> &lt;size (512   1024   2048) &gt; &lt;type (dsa   rsa) &gt;</code>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Generate a public key infrastructure (PKI) public/private key pair for a local digital certificate.
<b>Options</b>	<p><code>certificate-id <i>certificate-id-name</i></code>—Name of the local digital certificate and the public/private key pair.</p> <p><code>size</code>—(Optional) Key pair size. The key pair size can be <b>512</b>, <b>1024</b>, or <b>2048</b> bits. If a key pair size is not specified, the default value, <b>1024</b> bits, is applied.</p> <p><code>type</code>—(Optional) The algorithm to be used for encrypting the public/private key pair. The encryption algorithm can be <b>dsa</b> or <b>rsa</b> . If an encryption algorithm is not specified, the default value, <b>rsa</b>, is applied.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466</li></ul>
<b>List of Sample Output</b>	<b>request security pki generate-key-pair on page 538</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request security pki user@switch> request security pki generate-key-pair certificate-id billy size 2048
generate-key-pair Generated key pair billy, key size 2048 bits
```

## request security pki local-certificate generate-self-signed

<b>Syntax</b>	request security pki local-certificate generate-self-signed certificate-id <i>certificate-id-name</i> domain-name <i>domain-name</i> ip-address <i>ip-address</i> email <i>email-address</i> subject <i>subject-distinguished-name</i>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Manually generate a self-signed certificate for the given distinguished name.
<b>Options</b>	<p>certificate-id <i>certificate-id-name</i>—Name of the local digital certificate and the public/private key pair.</p> <p>domain-name <i>domain-name</i>—Fully qualified domain name (FQDN). The FQDN provides the identity of the certificate owner for Internet Key Exchange (IKE) negotiations and provides an alternative to the subject name.</p> <p>email <i>email-address</i>—E-mail address of the certificate holder.</p> <p>ip-address <i>ip-address</i>—IP address of the switch.</p> <p>subject <i>subject-distinguished-name</i>—Distinguished name format that contains the common name, department, company name, state, and country:</p> <ul style="list-style-type: none"> <li>• <b>CN</b>—Common name</li> <li>• <b>OU</b>—Organizational unit name</li> <li>• <b>O</b>—Organization name</li> <li>• <b>ST</b>—State</li> <li>• <b>C</b>—Country</li> </ul>
<b>Required Privilege Level</b>	maintenance security
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466</li> </ul>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## request security pki local-certificate generate-self-signed

```
user@switch> request security pki local-certificate generate-self-signed certificate-id self-cert
subject cn=abc domain-name abc.net email jdoe@abc.net
Self-signed certificate generated and loaded successfully
```

## show security pki local-certificate

<b>Syntax</b>	show security pki local-certificate <brief   detail> <certificate-id <i>certificate-id-name</i> > <system-generated>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Display information about the local digital certificates and the corresponding public keys installed in the switch.
<b>Options</b>	<p>none—(Same as brief) Display information about all local digital certificates and corresponding public keys.</p> <p>brief   detail—(Optional) Display information about local digital certificates and corresponding public keys for the specified level of output.</p> <p>certificate-id <i>certificate-id-name</i>—(Optional) Display information about only the specified the local digital certificate and corresponding public keys.</p> <p>system-generated—(Optional) Display information about the automatically generated self-signed certificate.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 466</li> </ul>
<b>List of Sample Output</b>	<p>show security pki local-certificate on page 541</p> <p>show security pki local-certificate detail on page 542</p>
<b>Output Fields</b>	Table 71 on page 540 lists the output fields for the <b>show security pki local-certificate</b> command. Output fields are listed in the approximate order in which they appear.

**Table 71: show security pki local-certificate Output Fields**

Field Name	Field Description	Level of Output
Certificate identifier	Name of the digital certificate.	All levels
Certificate version	Revision number of the digital certificate.	detail
Serial number	Unique serial number of the digital certificate.	detail
Issued by	Authority that issued the digital certificate.	none brief
Issued to	Device that was issued the digital certificate.	none brief



Table 71: show security pki local-certificate Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Issuer</b>	Authority that issued the digital certificate, including details of the authority organized using the distinguished name format. Possible subfields are: <ul style="list-style-type: none"> <li>• <b>Common name</b>—Name of the authority.</li> <li>• <b>Organization</b>—Organization of origin.</li> <li>• <b>Organizational unit</b>—Department within an organization.</li> <li>• <b>State</b>—State of origin.</li> <li>• <b>Country</b>—Country of origin.</li> </ul>	<b>detail</b>
<b>Subject</b>	Details of the digital certificate holder organized using the distinguished name format. Possible subfields are: <ul style="list-style-type: none"> <li>• <b>Common name</b>—Name of the authority.</li> <li>• <b>Organization</b>—Organization of origin.</li> <li>• <b>Organizational unit</b>—Department within an organization.</li> <li>• <b>State</b>—State of origin.</li> <li>• <b>Country</b>—Country of origin.</li> </ul>	<b>detail</b>
<b>Alternate subject</b>	Domain name or IP address of the device related to the digital certificate.	<b>detail</b>
<b>Validity</b>	Time period when the digital certificate is valid. Values are: <ul style="list-style-type: none"> <li>• <b>Not before</b>—Start time when the digital certificate becomes valid.</li> <li>• <b>Not after</b>—End time when the digital certificate becomes invalid.</li> </ul>	All levels
<b>Public key algorithm</b>	Encryption algorithm used with the private key, such as <b>rsaEncryption (1024 bits)</b> .	All levels
<b>Public key verification status</b>	Public key verification status: <b>Failed</b> or <b>Passed</b> . The <b>detail</b> output also provides the verification hash.	All levels
<b>Signature algorithm</b>	Encryption algorithm that the CA used to sign the digital certificate, such as <b>sha1WithRSAEncryption</b> .	<b>detail</b>
<b>Fingerprint</b>	Secure Hash Algorithm (SHA1) and Message Digest 5 (MD5) hashes used to identify the digital certificate.	<b>detail</b>
<b>Distribution CRL</b>	Distinguished name information and URL for the certificate revocation list (CRL) server.	<b>detail</b>
<b>Use for key</b>	Use of the public key, such as <b>Certificate signing</b> , <b>CRL signing</b> , <b>Digital signature</b> , or <b>Key encipherment</b> .	<b>detail</b>

## Sample Output

```

show security pki local-certificate user@switch> show security pki local-certificate
Certificate identifier: local-entrust2
Issued to: router2.juniper.net, Issued by: juniper
Validity:

```

```
Not before: 2005 Nov 21st, 23:28:22 GMT
Not after: 2008 Nov 21st, 23:58:22 GMT
Public key algorithm: rsaEncryption(1024 bits)
Public key verification status: Passed
```

**show security pki  
local-certificate detail**

```
user@switch> show security pki local-certificate detail
Certificate identifier: local-entrust3
Certificate version: 3
Serial number: 4355 94f9
Issuer:
  Organization: juniper, Country: us
Subject:
  Organization: juniper, Country: us, Common name: switch1.juniper.net
Alternate subject: switch1.juniper.net
Validity:
  Not before: 2005 Nov 21st, 23:33:58 GMT
  Not after: 2008 Nov 22nd, 00:03:58 GMT
Public key algorithm: rsaEncryption(1024 bits)
Public key verification status: Passed
fb:79:df:d4:a9:03:0f:d3:69:7e:c1:e4:27:35:9c:d9:b1:a2:47:78
d2:6d:f3:e5:f4:68:4f:b3:04:45:88:57:99:82:39:a6:51:9e:5f:42
23:3f:d7:6e:3d:a5:54:a9:b1:2d:6e:90:dd:12:8a:bf:ef:2b:20:50
ba:f0:da:d9:0c:ad:5e:d6:c6:98:3a:ae:3f:90:dd:94:78:c1:ea:2e
7c:f0:2d:d4:79:d4:cd:f0:52:df:5e:72:f2:e7:ae:66:f7:61:f4:bc
72:57:3e:6c:6d:d3:24:58:8b:f4:ef:da:2a:6a:fa:eb:98:f8:34:84
79:54:da:4f:d3:6f:52:1f
Signature algorithm: sha1WithRSAEncryption
Fingerprint:
  61:3a:d0:b4:7a:16:9b:39:ba:81:3f:9d:ab:34:e5:c8:be:3b:a1:6d (sha1)
  60:a0:ff:58:05:4a:65:73:9d:74:3a:e1:83:6f:1b:c8 (md5)
Distribution CRL:
  C=us, O=juniper, CN=CRL1
  http://CA-1/CRL/juniper_us_crlfile.crl
Use for key: Digital signature
```

## show system services dhcp binding

<b>Syntax</b>	show system services dhcp binding <detail> <address>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Dynamic Host Configuration Protocol (DHCP) server client binding information.
<b>Options</b>	<p>none—Display brief information about all active client bindings.</p> <p>detail—(Optional) Display detailed information about all active client bindings.</p> <p>address—(Optional) Display detailed client binding information for the specified IP address only.</p>
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>clear system services dhcp binding on page 531</li> </ul>
<b>List of Sample Output</b>	<p>show system services dhcp binding on page 544</p> <p>show system services dhcp binding address on page 544</p> <p>show system services dhcp binding address detail on page 544</p>
<b>Output Fields</b>	Table 72 on page 543 describes the output fields for the <b>show system services dhcp binding</b> command. Output fields are listed in the approximate order in which they appear.

**Table 72: show system services dhcp binding Output Fields**

Field Name	Field Description	Level of Output
<b>Allocated address</b>	List of IP addresses the DHCP server has assigned to clients.	All levels
<b>MAC address</b>	Corresponding media access control (MAC) hardware address of the client.	All levels
<b>Client identifier</b>	( <i>address</i> option only) Client's unique identifier (represented by an ASCII string or hexadecimal digits). This identifier is used by the DHCP server to index its database of address bindings.	All levels
<b>Binding Type</b>	Type of binding assigned to the client. DHCP servers can assign a dynamic binding from a pool of IP addresses or a static binding to one or more specific IP addresses.	All levels
<b>Lease Expires at</b>	Time the lease expires or <b>never</b> for leases that do not expire.	All levels
<b>Lease Obtained at</b>	( <i>address</i> option only) Time the client obtained the lease from the DHCP server.	<b>detail</b>
<b>State</b>	Status of the binding. Bindings can be active or expired.	<b>detail</b>

Table 72: show system services dhcp binding Output Fields (*continued*)

Field Name	Field Description	Level of Output
Pool	Address pool that contains the IP address assigned to the client.	detail
Request received on	Interface on which the DHCP message exchange occurs. The IP address pool is configured based on the interface's IP address. If a relay agent is used, its IP address is also displayed.	detail
DHCP options	User-defined options created for the DHCP server. If no options have been defined, this field is blank.	detail

## Sample Output

```

show system services dhcp binding user@host> show system services dhcp binding
                                     Allocated address  MAC address      Binding Type  Lease expires at
                                     192.168.1.2         00:a0:12:00:12:ab  static       never
                                     192.168.1.3         00:a0:12:00:13:02  dynamic      2004-05-03 13:01:42 PDT

```

```

show system services dhcp binding address user@host> show system services dhcp binding 192.168.1.3
DHCP binding information:
Allocated address: 192.168.1.3
Mac address: 00:a0:12:00:12:ab
Client identifier
61 63 65 64 2d 30 30 3a 61 30 3a 31 32 3a 30 30aced-00:a0:12:00
3a 31 33 3a 30 32:13:02

Lease information:
  Binding Type dynamic
  Obtained at 2004-05-02 13:01:42 PDT
  Expires at 2004-05-03 13:01:42 PDT

```

```

show system services dhcp binding address detail user@host> show system services dhcp binding 192.168.1.3 detail
DHCP binding information:
Allocated address      192.168.1.3
MAC address 00:a0:12:00:12:ab
Pool                  192.168.1.0/24
Request received on fe-0/0/0, relayed by 192.168.4.254

Lease information:
  Type          DHCP
  Obtained at   2004-05-02 13:01:42 PDT
  Expires at    2004-05-03 13:01:42 PDT
  State active

DHCP options:
Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
Name: domain-name, Value: mydomain.tld
Code: 19, Type: flag, Value: off
Code: 40, Type: string, Value: domain.tld
Code: 32, Type: ip-address, Value: 3.3.3.33

```

## show system services dhcp conflict

<b>Syntax</b>	show system services dhcp conflict
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Display Dynamic Host Configuration Protocol (DHCP) client-detected conflicts for IP addresses. When a conflict is detected, the DHCP server removes the address from the address pool.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>clear system services dhcp conflict on page 532</li> </ul>
<b>List of Sample Output</b>	show system services dhcp conflict on page 545
<b>Output Fields</b>	Table 73 on page 545 describes the output fields for the <b>show system services dhcp conflict</b> command. Output fields are listed in the approximate order in which they appear.

**Table 73: show system services dhcp conflict Output Fields**

Field Name	Field Description
Detection time	Date and time the client detected the conflict.
Detection method	How the conflict was detected.
Address	IP address where the conflict occurs. The addresses in the conflicts list remain excluded from the pool until you use a <b>clear system services dhcp conflict</b> command to manually clear the list.

## Sample Output

```

user@host> show system services dhcp conflict
Detection time      Detection method  Address
2004-08-03 19:04:00 PDT  ARP              3.3.3.5
2004-08-04 04:23:12 PDT  Ping             4.4.4.8
2004-08-05 21:06:44 PDT  Client           3.3.3.10

```

## show system services dhcp global

<b>Syntax</b>	show system services dhcp global
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Display Dynamic Host Configuration Protocol (DHCP) global configuration options. Global options apply to all scopes and clients served by the DHCP server. Global options are overridden if specified otherwise in scope or client options. Scope options apply to specific subnets or ranges of addresses. Client options apply to specific clients.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view and system
<b>List of Sample Output</b>	show system services dhcp global on page 546
<b>Output Fields</b>	Table 74 on page 546 describes the output fields for the <b>show system services dhcp global</b> command. Output fields are listed in the approximate order in which they appear.

**Table 74: show system services dhcp global Output Fields**

Field Name	Field Description
<b>BOOTP lease length</b>	Length of lease time assigned to BOOTP clients.
<b>Default lease time</b>	Lease time assigned to clients that do not request a specific lease time.
<b>Minimum lease time</b>	Minimum time a client retains an IP address lease on the server.
<b>Maximum lease time</b>	Maximum time a client can retain an IP address lease on the server.
<b>DHCP options</b>	User-defined options created for the DHCP server. If no options have been defined, this field is blank.

### Sample Output

```

user@host> show system services dhcp global
show system services dhcp global
Global settings:
  BOOTP lease length      infinite

DHCP lease times:
  Default lease time      1 hour
  Minimum lease time      2 hours
  Maximum lease time      infinite

DHCP options:
  Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
  Name: domain-name, Value: mydomain.tld

```

Code: 19, Type: flag, Value: off  
Code: 40, Type: string, Value: domain.tld  
Code: 32, Type: ip-address, Value: 3.3.3.33

## show system services dhcp pool

<b>Syntax</b>	show system services dhcp pool <detail> <subnet-address>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Display Dynamic Host Configuration Protocol (DHCP) server IP address pools.
<b>Options</b>	none—Display brief information about all IP address pools.  detail—(Optional) Display detailed information.  subnet-address—(Optional) Display information for the specified subnet address.
<b>Required Privilege Level</b>	view and system
<b>List of Sample Output</b>	show system services dhcp pool on page 549 show system services dhcp pool subnet-address on page 549 show system services dhcp pool subnet-address detail on page 549
<b>Output Fields</b>	Table 75 on page 548 describes the output fields for the <b>show system services dhcp pool</b> command. Output fields are listed in the approximate order in which they appear.

Table 75: show system services dhcp pool Output Fields

Field Name	Field Description	Level of Output
Pool name	Subnet on which the IP address pool is defined.	None specified
Low address	Lowest address in the IP address pool.	None specified
High address	Highest address in the IP address pool.	None specified
Excluded addresses	Addresses excluded from the address pool.	None specified
Subnet	( <i>subnet-address</i> option only) Subnet to which the specified address pool belongs.	None specified
Address range	( <i>subnet-address</i> option only) Range of IP addresses in the address pool.	None specified
Addresses assigned	Number of IP addresses in the pool that are assigned to DHCP clients and the total number of IP addresses in the pool.	detail
Active	Number of assigned IP addresses in the pool that are active.	detail
Excluded	Number of assigned IP addresses in the pool that are excluded.	detail
Default lease time	Lease time assigned to clients that do not request a specific lease time.	detail



Table 75: show system services dhcp pool Output Fields (*continued*)

Field Name	Field Description	Level of Output
Minimum lease time	Minimum time a client can retain an IP address lease on the server.	detail
Maximum lease time	Maximum time a client can retain an IP address lease on the server.	detail
DHCP options	User-defined options created for the DHCP server. If no options have been defined, this field is blank.	detail

### Sample Output

```

show system services dhcp pool user@host> show system services dhcp pool
                                Pool name      Low address  High address  Excluded addresses
                                3.3.3.0/24  3.3.3.2     3.3.3.254   3.3.3.1

show system services dhcp pool user@host> show system services dhcp pool 3.3.3.0/24
subnet-address Pool information:
                Subnet                3.3.3.0/24
                Address range          3.3.3.2 - 3.3.3.254
                Addresses assigned      2/253

show system services dhcp pool user@host> show system services dhcp pool 3.3.3.0/24 detail
subnet-address detail Pool information:
                Subnet                3.3.3.0/24
                Address range          3.3.3.2 - 3.3.3.254
                Addresses assigned      2/253
                Active: 1, Excluded: 1

                DHCP lease times:
                Default lease time      1 hour
                Minimum lease time      2 hours
                Maximum lease time       infinite

                DHCP options:
                Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
                Name: domain-name, Value: mydomain.tld
                Name: router, Value: { 3.3.3.1 }
                Name: server-identifier, Value: 3.3.3.1
                Code: 19, Type: flag, Value: off
                Code: 40, Type: string, Value: domain.tld
                Code: 32, Type: ip-address, Value: 3.3.3.333.3.3.254 3.3.3.1

```

## show system services dhcp statistics

<b>Syntax</b>	show system services dhcp statistics
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Display Dynamic Host Configuration Protocol (DHCP) server statistics.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view and system
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>clear system services dhcp statistics on page 533</li> </ul>
<b>List of Sample Output</b>	show system services dhcp statistics on page 551
<b>Output Fields</b>	Table 76 on page 550 describes the output fields for the <b>show system services dhcp statistics</b> command. Output fields are listed in the approximate order in which they appear.

**Table 76: show system services dhcp statistics Output Fields**

Field Name	Field Description
<b>Default lease time</b>	Lease time assigned to clients that do not request a specific lease time.
<b>Minimum lease time</b>	Minimum time a client can retain an IP address lease on the server.
<b>Maximum lease time</b>	Maximum time a client can retain an IP address lease on the server.
<b>Packets dropped</b>	Total number of packets dropped and number of packets dropped because of: <ul style="list-style-type: none"> <li>Invalid hardware address</li> <li>Invalid opcode</li> <li>Invalid server address</li> <li>No available address</li> <li>No interface match</li> <li>No routing instance match</li> <li>No valid local addresses</li> <li>Packet too short</li> <li>Read error</li> <li>Send error</li> </ul>

Table 76: show system services dhcp statistics Output Fields (*continued*)

Field Name	Field Description
<b>Messages received</b>	Number of the following message types sent from DHCP clients and received by the DHCP server: <ul style="list-style-type: none"> <li>• BOOTREQUEST</li> <li>• DHCPDECLINE</li> <li>• DHCPDISCOVER</li> <li>• DHCPINFORM</li> <li>• DHCPRELEASE</li> <li>• DHCPREQUEST</li> </ul>
<b>Messages sent</b>	Number of the following message types sent from the DHCP server to DHCP clients: <ul style="list-style-type: none"> <li>• BOOTREPLY</li> <li>• DHCPACK</li> <li>• DHCPOFFER</li> <li>• DHCPNAK</li> </ul>

## Sample Output

```

show system services dhcp statistics user@host> show system services dhcp statistics
DHCP lease times:
  Default lease time      1 hour
  Minimum lease time     2 hours
  Maximum lease time     infinite

Packets dropped:
  Total                   0
  Bad hardware address   0
  Bad opcode              0
  Invalid server address 0
  No available addresses 0
  No interface match     0
  No routing instance match 0
  No valid local address 0
  Packet too short       0
  Read error              0
  Send error              0

Messages received:
  BOOTREQUEST            0
  DHCPDECLINE            0
  DHCPDISCOVER           0
  DHCPINFORM             0
  DHCPRELEASE            0
  DHCPREQUEST            0

Messages sent:
  BOOTREPLY              0
  DHCPACK                 0
  DHCPOFFER              0
  DHCPNAK                 0

```

## show system services service-deployment

<b>Syntax</b>	show system services service-deployment
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display information about a Session and Resource Control (SRC) client.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view system
<b>List of Sample Output</b>	<b>show system services service-deployment on page 552</b>
<b>Output Fields</b>	Table 77 on page 552 lists the output fields for the <b>show system services service-deployment</b> command. Output fields are listed in the approximate order in which they appear.

**Table 77: show system services service-deployment Output Fields**

Field Name	Field Description
PDT Keepalive settings	Configured PDT Keepalive interval, in seconds.
Keepalives sent	Number of Keepalives sent.
Notifications sent	Number of notifications sent.
Last update from peer	Time at which the last update from peer was received.

### Sample Output

```

show system services service-deployment user@host> show system services service-deployment
Connected to 192.4.4.4 port 10288 since 2004-05-03 11:04:34 PDT Keepalive settings:
Interval 15 seconds Keepalives sent: 750 Notifications sent: 0 Last update from
peer: 00:00:06 ago

```

## ssh

<b>Syntax</b>	<pre>ssh host &lt;bypass-routing&gt; &lt;inet   inet6&gt; &lt;interface interface-name&gt; &lt;logical-system logical-system-name&gt; &lt;routing-instance routing-instance-name&gt; &lt;source address&gt; &lt;v1   v2&gt;</pre>
<b>Syntax (J-EX Series)</b>	<pre>ssh host &lt;bypass-routing&gt; &lt;inet   inet6&gt; &lt;interface interface-name&gt; &lt;routing-instance routing-instance-name&gt; &lt;source address&gt; &lt;v1   v2&gt;</pre>
<b>Release Information</b>	Command introduced in Junos OS Release 9.0 for J-EX Series switches.
<b>Description</b>	<p>Use the SSH program to open a connection between a local router or switch and a remote system and execute commands on the remote system. You can issue the <b>ssh</b> command from the Junos OS CLI to log in to a remote system or from a remote system to log in to the local router or switch. When executing this command, you include one or more CLI commands by enclosing them in quotation marks and separating the commands with semicolons:</p> <pre>ssh address 'cli-command1 ; cli-command2 '</pre>
<b>Options</b>	<p><i>host</i>—Name or address of the remote system.</p> <p><i>bypass-routing</i>—(Optional) Bypass the normal routing tables and send ping requests directly to a system on an attached network. If the system is not on a directly attached network, an error is returned. Use this option to ping a local system through an interface that has no route through it.</p> <p><i>inet   inet6</i>—(Optional) Create an IPv4 or IPv6 connection, respectively.</p> <p><i>interface interface-name</i>—(Optional) Interface name for the SSH session. (This option does not work when <b>default-address-selection</b> is configured at the <b>[edit system]</b> hierarchy level, because this configuration uses the loopback interface as the source address for all locally generated IP packets.)</p> <p><i>logical-system logical-system-name</i>—(Optional) Name of a particular logical system for the SSH attempt.</p> <p><i>routing-instance routing-instance-name</i>—(Optional) Name of the routing instance for the SSH attempt.</p> <p><i>source address</i>—(Optional) Source address of the SSH connection.</p>

v1 | v2—(Optional) Use SSH version 1 or 2, respectively, when connecting to a remote host.

**Additional Information** To configure an SSH (version 1) key for your user account, include the **authentication ssh-rsa** statement at the **[edit system login user *user-name*]** hierarchy level. To configure an SSH (version 2) key for your user account, include the **authentication dsa-rsa** statement at the **[edit system login user *user-name*]** hierarchy level. For details, see the *Junos OS System Basics Configuration Guide*.

You can limit the number of times a user can attempt to enter a password while logging in through SSH. To specify the number of times a user can attempt to enter a password to log in through SSH, include the **retry-options** statement at the **[edit system login]** hierarchy level. For details, see the *Junos OS System Basics Configuration Guide*.

**Required Privilege Level** network

**Related Documentation**

- [Configuring SSH Host Keys for Secure Copying of Data](#)

**List of Sample Output** [ssh on page 554](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
ssh user@switch> ssh cree
Host key not found from the list of known hosts.
Are you sure you want to continue connecting (yes/no)? yes

Host 'cree' added to the list of known hosts.
boojun@cree's password:
Last login: Sun Jun 21 10:43:42 1998 from junos-router
% ...
```

## telnet

---

<b>Syntax</b>	telnet <i>host</i> <8bit> <bypass-routing> <inet   inet6> <interface <i>interface-name</i> > <logical-system <i>logical-system-name</i> > <no-resolve> <port <i>port-number</i> > <routing-instance <i>routing-instance-name</i> > <source <i>source-address</i> >
<b>Syntax (J-EX Series Switch)</b>	telnet <i>host</i> <8bit> <bypass-routing> <inet   inet6> <interface <i>interface-name</i> > <no-resolve> <port <i>port-number</i> > <routing-instance <i>routing-instance-name</i> > <source <i>source-address</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Open a telnet session to a remote system. Type Ctrl+] to escape from the telnet session to the telnet command level, and then type <b>quit</b> to exit from telnet.
<b>Options</b>	<p><i>host</i>—Name or address of the remote system.</p> <p>8bit—(Optional) Use an 8-bit data path.</p> <p>bypass-routing—(Optional) Bypass the normal routing tables and send ping requests directly to a system on an attached network. If the system is not on a directly attached network, an error is returned. Use this option to ping a local system through an interface that has no route through it.</p> <p>inet   inet6—(Optional) Open an IPv4 or IPv6 session, respectively.</p> <p>interface <i>interface-name</i>—(Optional) Interface name for the telnet session. (This option does not work when <b>default-address-selection</b> is configured at the <b>[edit system]</b> hierarchy level, because this configuration uses the loopback interface as the source address for all locally generated IP packets.)</p> <p>logical-system <i>logical-system-name</i>—(Optional) Name of a particular logical system for the telnet attempt.</p> <p>no-resolve—(Optional) Do not attempt to determine the hostname that corresponds to the IP address.</p> <p>port <i>port-number</i>—(Optional) Port number or service name on the remote system.</p>

routing-instance *routing-instance-name*—(Optional) Name of the routing instance for the telnet attempt.

source *source-address*—(Optional) Source address of the telnet connection.

**Additional Information** You can limit the number of times a user can attempt to enter a password while logging in through telnet. To specify the number of times a user can attempt to enter a password to log in through telnet, include the **retry-options** statement at the [**edit system login**] hierarchy level. For details, see the *Junos OS System Basics Configuration Guide*.

**Required Privilege Level** network

**List of Sample Output** telnet on page 556

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
telnet user@host> telnet 192.154.1.254
Trying 192.154.169.254...
Connected to level5.company.net.
Escape character is '^]'.
ttypa
Login:
```



## PART 9

# Junos OS for J-EX Series Switches System Monitoring

- System Monitoring Overview on page 559
- Administering and Monitoring System Functions on page 569
- Configuration Statements for System Monitoring on page 587
- Operational Commands for System Monitoring on page 601



# System Monitoring Overview

- Understanding Alarm Types and Severity Levels on J-EX Series Switches on page 559
- Dashboard for J-EX Series Switches on page 560

## Understanding Alarm Types and Severity Levels on J-EX Series Switches

Before monitoring alarms on the switch, become familiar with the terms defined in Table 78 on page 559.

Table 78: Alarm Terms

Term	Definition
<b>alarm</b>	Signal alerting you to conditions that might prevent normal operation. On a switch, the alarm signal is the yellow <b>ALARM</b> LED lit on the front of the chassis.
<b>alarm condition</b>	Failure event that triggers an alarm.
<b>alarm severity</b>	Seriousness of the alarm. The level of severity can be either major (red) or minor (yellow).
<b>chassis alarm</b>	Predefined alarm triggered by a physical condition on the switch such as a power supply failure, excessive component temperature, or media failure.
<b>system alarm</b>	Predefined alarm triggered by a missing rescue configuration or failure to install a license for a licensed software feature.

### Alarm Types

The switch supports these alarms:

- Chassis alarms indicate a failure on the switch or one of its components. Chassis alarms are preset and cannot be modified.
- System alarms indicate a missing rescue configuration. System alarms are preset and cannot be modified, although you can configure them to appear automatically in the J-Web interface display or CLI display.

### Alarm Severity Levels

Alarms on J-EX Series Switches have two severity levels:

- Major (red)—Indicates a critical situation on the switch that has resulted from one of the following conditions. A red alarm condition requires immediate action.
  - One or more hardware components have failed.
  - One or more hardware components have exceeded temperature thresholds.
  - An alarm condition configured on an interface has triggered a critical warning.
- Minor (yellow or amber)—Indicates a noncritical condition on the switch that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.

A missing rescue configuration generates a yellow system alarm.

**Related Documentation**

- Checking Active Alarms with the J-Web Interface on page 572
- Dashboard for J-EX Series Switches on page 560

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## Dashboard for J-EX Series Switches

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When you log in to the J-Web user interface, the dashboard for the J-EX Series switch appears. Use the dashboard to view system information.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

The dashboard comprises four panels and a graphical chassis viewer. You can click **Preferences** to choose which panels are to be displayed and set the refresh interval for chassis viewer information. Click **OK** to save your preference changes and return to the dashboard or click **Cancel** to return to the dashboard without saving changes.



**NOTE:** You can drag and drop the various panels to different locations in the J-Web window.

This topic describes:

- System Information Panel on page 561
- Health Status Panel on page 561
- Capacity Utilization Panel on page 562
- Alarms Panel on page 563
- Chassis Viewer on page 563

## System Information Panel

Table 79: System Information

Field	Description
System name	Indicates the local name of the J-EX Series switch.
Device model	Indicates the model of the J-EX Series switch.  <b>NOTE:</b> For a J-EX8208 switch or a J-EX8216 switch, the <b>Device model</b> information changes with respect to the selected line card, the Switch Fabric and Routing Engine (SRE) module in a J-EX8208 switch, or the Routing Engine (RE) module in a J-EX8216 switch.
Inventory details	Indicates the following: <ul style="list-style-type: none"> <li>For J-EX4200 switches not configured as Virtual Chassis and for J-EX4500 switches, the value in <b>Inventory</b> is always 1 FPC. FPC is a legacy term for a slot in a large chassis; here, it simply refers to the single switch.</li> <li>For a J-EX4200 switch configured as a Virtual Chassis, the value in <b>Inventory</b> is displayed as 1–10 FPC, with the number corresponding to the number of member switches.</li> <li>For a J-EX8208 switch, the values in <b>Inventory</b> are displayed as 1–3 CB and 0–8 FPC. Control board (CB) refers to SRE and SF modules. FPC refers to line cards.</li> <li>For a J-EX8216 switch, the values in <b>Inventory</b> are displayed as 1-2 CB and 0-16 FPC. Control board (CB) refers to RE modules and FPC refers to line cards.</li> </ul>
Junos image	Indicates the version of the Junos OS image.
Boot image	Indicates the version of the boot image that is used.
Device uptime	Indicates the time since the last reboot.
Last configured time	Indicates the time when the switch was last configured.

## Health Status Panel

Table 80: Health Status

Field	Description
<b>J-EX4200 Switches</b>	
Memory util.	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the master Routing Engine is displayed.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Temp.	Indicates the chassis temperature status. Temperatures in the dashboard are listed in Celsius and the corresponding Fahrenheit values.
CPU load	Indicates the average CPU usage over 15 minutes.

Table 80: Health Status (*continued*)

Field	Description
<b>Fan status</b>	Indicates the status of the fans in the fan tray. The possible values are <b>OK</b> , <b>Failed</b> , and <b>Absent</b> .
<b>J-EX4500 Switches</b>	
<b>NOTE:</b> You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.	
<b>Memory util.</b>	Indicates the memory used in the Routing Engine.
<b>Flash</b>	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
<b>CPU load</b>	Indicates the average CPU usage over 15 minutes.
<b>Fan status</b>	Indicates the status of the fans in the fan tray. The possible values are <b>OK</b> , <b>Failed</b> , and <b>Absent</b> . Also indicates the direction of airflow of the fan tray. The possible values are <b>Front to back</b> and <b>Back to front</b> .
<b>J-EX8208 Switches</b>	
<b>Memory util.</b>	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the master Routing Engine is displayed.
<b>CPU load</b>	Indicates the average CPU usage over 15 minutes.
<b>Flash</b>	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
<b>J-EX8216 Switches</b>	
<b>Memory util.</b>	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the master Routing Engine is displayed.
<b>CPU load</b>	Indicates the average CPU usage over 15 minutes.
<b>Flash</b>	Indicates the usage and capacity of internal flash memory and any external USB flash drive.

## Capacity Utilization Panel

Table 81: Capacity Utilization

Field	Description
<b>Number of active ports</b>	Indicates the number of active ports in the switch.
<b>Total number of ports</b>	Indicates the number of ports in the switch.
<b>Used-up MAC-Table entries</b>	Indicates the number of MAC-Table entries.

Table 81: Capacity Utilization (*continued*)

Field	Description
Supported MAC-Table entries	Indicates the maximum number of MAC-Table entries permitted.
Number of VLANs configured	Indicates the number of VLANs configured.
Number of VLANs supported	Indicates the maximum number of VLANs supported.

## Alarms Panel

Displays information about the last five alarms raised in the system. For example, if there are 5 major alarms, then details for all 5 major alarms are displayed. If there are 4 major alarms and 3 minor alarms, then details of the 4 major alarms and 1 minor alarm are displayed. Major alarms are displayed in red and minor alarms are displayed in yellow.

## Chassis Viewer

You can click the **Rear View** button to see the back of the chassis image. Click **Front View** to see the front of the image. In a Virtual Chassis configuration, the **Rear View** button is disabled if the switch is not selected.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

- Table 82 on page 563—Describes the chassis viewer for J-EX4200 switches.
- Table 83 on page 564—Describes the chassis viewer for J-EX4500 switches.



**NOTE:** In the J-EX4500 switch, the rear chassis view incorrectly shows the Virtual Chassis module as an “Interconnect module.”

- Table 84 on page 565—Describes the chassis viewer for J-EX8208 switches.
- Table 85 on page 566—Describes the chassis viewer for J-EX8216 switches.

Table 82: Chassis Viewer for J-EX4200 Switches

Field	Description
Front View	

Table 82: Chassis Viewer for J-EX4200 Switches (*continued*)

Field	Description
Interface status	<p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>Green—Interface is up and operational.</li> <li>Yellow—Interface is up but is nonoperational.</li> <li>Gray—Interface is down and nonoperational.</li> </ul> <p>Hover the mouse pointer over the interface (port) to view more information.</p> <p>For a Virtual Chassis configuration, select the switch to view the interface status.</p> <p>If an SFP+ uplink module is installed in the switch, hover the mouse pointer over the port icon to display whether the module is configured to operate in 1-gigabit mode or 10G-gigabit mode. If the module is configured to operate in 1-gigabit mode, the tool tip information is displayed for all 4 ports. If the module is configured to operate in 10-gigabit mode, the tool tip information is displayed only for 2 ports.</p> <p>For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays “Transceiver not plugged-in” when you hover the mouse pointer over the port icon.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover the mouse pointer over the icon to view the current character display.
<b>Rear View of the J-EX4200 Switch</b>	
Fan tray	Hover the mouse pointer over the fan tray icon to display Name, Status, and Description information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	<p>Displayed only when switches are configured as a Virtual Chassis. The colors listed below denote the Virtual Chassis port (VCP) status:</p> <ul style="list-style-type: none"> <li>Green—VCP is up and operational.</li> <li>Yellow—VCP is up but is nonoperational.</li> <li>Gray—VCP is down and nonoperational.</li> </ul>
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend you use USB flash drives purchased from Juniper Networks for your J-EX Series switch.</p>
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
Power supplies	Hover the mouse pointer over the power supply icons to display Name, Status, and Description information.

Table 83: Chassis Viewer for J-EX4500 Switches

Field	Description
<b>Front View</b>	



Table 83: Chassis Viewer for J-EX4500 Switches (*continued*)

Field	Description
Interface status	<p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover the mouse pointer over the interface (port) to view more information.</p> <p>If an SFP+ uplink module is installed in the switch, hover the mouser pointer over the interface (ports) on the module for more information.</p> <p>For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays “Transceiver not plugged-in” when you hover the mouse pointer over the port icon.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover the mouse pointer over the icon to view the current character display.
Console port	The console port is used to connect the switch to a management console or to a console server.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend you use USB flash drives purchased from Dell for your J-EX Series switch.</p>
<b>Rear View of the J-EX4500 Switch</b>	
Fan tray	Hover the mouse pointer over the fan tray icon to display status of the fans and airflow direction information.
Power supplies	Hover the mouse pointer over the power supply icons to display Name, Status, and Description information.
Virtual Chassis module	In the J-EX4500 switch, the rear chassis view incorrectly shows the Virtual Chassis module as an “Interconnect module.”

Table 84: Chassis Viewer for J-EX8208 Switches

Field	Description
<b>Front View</b>	

Table 84: Chassis Viewer for J-EX8208 Switches (*continued*)

Field	Description
Interface status	<p>In the image, click any line card, SRE module, or SF module to view the front view of the selected component. The colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>Green—Interface is up and operational.</li> <li>Yellow—Interface is up but is nonoperational.</li> <li>Gray—Interface is down and nonoperational.</li> </ul> <p>Hover the mouse pointer over the interface (port) to view more information.</p> <p>You can view status for the following ports on the SRE module:</p> <ul style="list-style-type: none"> <li>USB port—Indicates the USB port for the switch.</li> </ul> <p><b>NOTE:</b> We recommend you use USB flash drives purchased from Juniper Networks for your J-EX Series switch.</p> <ul style="list-style-type: none"> <li>Auxiliary port—This port is not enabled on the switch. It is reserved for future use.</li> <li>Management (<b>me0</b>) port—The management port is used to connect the switch to a management device for out-of-band management.</li> <li>Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)</li> </ul> <p>Because the SF module has no ports, no status information is displayed.</p>
Slot numbers	<p>Slots on the switch are labeled, from the top of the switch down:</p> <ul style="list-style-type: none"> <li>0–3 (line cards)</li> <li>SRE0, SF, SRE1 (SRE and SF modules)</li> <li>4–7 (line cards)</li> </ul>
Temperature	<p>The active slots contain a gray temperature icon. Hover the mouse pointer over the icon to display temperature information for the slot.</p>
Fan status	<p>Hover the mouse pointer over the fan tray icon to display Name, Status, and Description information.</p>
Power supplies	<p>Hover the mouse pointer over the power supply icons to display Name, Status, and Description information.</p>
LCD panel	<p>LCD panel configured for the LEDs on the ports. Hover the mouse pointer over the icon to view the current character display.</p>
Rear View	<p>The J-EX8208 switch does not have any components on the rear of the chassis.</p>

Table 85: Chassis Viewer for J-EX8216 Switches

Field	Description
Front View	

Table 85: Chassis Viewer for J-EX8216 Switches (*continued*)

Field	Description
Interface status	<p>In the image, click any line card or RE module to view the front view of the selected component. The colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover the mouse pointer over the interface (port) to view more information.</p> <p>You can view status for the following ports on the RE module:</p> <ul style="list-style-type: none"> <li>• USB port—Indicates the USB port for the switch.</li> </ul> <p><b>NOTE:</b> We recommend you use USB flash drives purchased from Dell for your J-EX Series switch.</p> <ul style="list-style-type: none"> <li>• Auxiliary port—This port is not enabled on the switch. It is reserved for future use.</li> <li>• Management (<b>meO</b>) port—The management port is used to connect the switch to a management device for out-of-band management.</li> <li>• Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)</li> </ul>
Slot numbers	<p>Slots on the switch are labeled, from the top of the switch down:</p> <ul style="list-style-type: none"> <li>• RE0 (RE module)</li> <li>• RE1 (RE module)</li> <li>• 0–15 (line cards)</li> </ul>
Temperature	<p>The active slots contain a gray temperature icon. Hover the mouse pointer over the icon to display temperature information for the slot.</p>
Fan status	<p>Hover the mouse pointer over the fan tray icon to display consolidated fan information.</p>
Power supplies	<p>Hover the mouse pointer over the power supply icons to display Name, Status, and Description information.</p>
LCD panel	<p>LCD panel configured for the LEDs on the ports. Hover the mouse pointer over the icon to view the current character display.</p>
<b>Rear View</b>	
SF modules	<p>Hover the mouse pointer over the SF module icons in their respective slots to display information. Slots are numbered SF7–SF0, from left to right.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• J-Web User Interface for J-EX Series Switches Overview on page 153</li> <li>• Checking Active Alarms with the J-Web Interface on page 572</li> <li>• J-EX4200 Switches Hardware Overview on page 29</li> <li>• J-EX4500 Switches Hardware Overview on page 31</li> <li>• J-EX8208 Switch Hardware Overview on page 35</li> <li>• J-EX8216 Switch Hardware Overview on page 38</li> </ul>



# Administering and Monitoring System Functions

- Monitoring System Log Messages on page 569
- Checking Active Alarms with the J-Web Interface on page 572
- Monitoring Chassis Alarms for a J-EX8200 Switch on page 573
- Monitoring Switch Control Traffic on page 576
- Monitoring System Properties on page 578
- Monitoring Chassis Information on page 580
- Monitoring System Process Information on page 582
- Managing Log, Temporary, and Crash Files on the Switch (J-Web Procedure) on page 583

## Monitoring System Log Messages

---

**Purpose** Use the monitoring functionality to filter and view system log messages for J-EX Series switches.

**Action** To view events in the J-Web interface, select **Monitor > Events and Alarms > View Events**.

Apply a filter or a combination of filters to view messages. You can use filters to display relevant events. Table 86 on page 570 describes the different filters, their functions, and the associated actions.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To view events in the CLI, enter the following command:

```
show log
```

Table 86: Filtering System Log Messages

Field	Function	Your Action
System Log File	<p>Specifies the name of a system log file for which you want to display the recorded events.</p> <p>Lists the names of all the system log files that you configure.</p> <p>By default, a log file, <b>messages</b>, is included in the <code>/var/log/</code> directory.</p>	<p>To specify events recorded in a particular file, select the system log filename from the list—for example, <b>messages</b>.</p> <p>Select <b>Include archived files</b> to include archived files in the search.</p>
Process	<p>Specifies the name of the process generating the events you want to display.</p> <p>To view all the processes running on your system, enter the CLI command <b>show system processes</b>.</p> <p>For more information about processes, see the <i>Junos OS Installation and Upgrade Guide</i>.</p>	<p>To specify events generated by a process, type the name of the process.</p> <p>For example, type <b>mgd</b> to list all messages generated by the management process.</p>
Date From To	<p>Specifies the time period in which the events you want displayed are generated.</p> <p>Displays a calendar that allows you to select the year, month, day, and time. It also allows you to select the local time.</p> <p>By default, the messages generated in the last hour are displayed. End Time shows the current time and Start Time shows the time one hour before End Time.</p>	<p>To specify the time period:</p> <ul style="list-style-type: none"> <li>Click the <b>Calendar</b> icon and select the year, month, and date—for example, <b>02/10/2007</b>.</li> <li>Click the <b>Calendar</b> icon and select the year, month, and date—for example, <b>02/10/2007</b>.</li> <li>Click to select the time in hours, minutes, and seconds.</li> </ul>
Event ID	<p>Specifies the event ID for which you want to display the messages.</p> <p>Allows you to type part of the ID and completes the remainder automatically.</p> <p>An event ID, also known as a system log message code, uniquely identifies a system log message. It begins with a prefix that indicates the generating software process or library.</p>	<p>To specify events with a specific ID, type the partial or complete ID—for example, <b>TFTPD_AF_ERR</b>.</p>
Description	<p>Specifies text from the description of events that you want to display.</p> <p>Allows you to use regular expressions to match text from the event description.</p> <p><b>NOTE:</b> Regular expression matching is case-sensitive.</p>	<p>To specify events with a specific description, type a text string from the description with regular expression.</p> <p>For example, type <b>^Initial*</b> to display all messages with lines beginning with the term <i>Initial</i>.</p>
Search	<p>Applies the specified filter and displays the matching messages.</p>	<p>To apply the filter and display messages, click <b>Search</b>.</p>

**Meaning** Table 87 on page 571 describes the Event Summary fields.



**NOTE:** By default, the View Events page in the J-Web interface displays the most recent 25 events, with severity levels highlighted in different colors. After you specify the filters, Event Summary displays the events matching the specified filters. Click the **First**, **Next**, **Prev**, and **Last** links to navigate through messages.

**Table 87: Viewing System Log Messages**

Field	Function	Additional Information
Process	Displays the name and ID of the process that generated the system log message.	The information displayed in this field is different for messages generated on the local Routing Engine than for messages generated on another Routing Engine (on a system with two Routing Engines installed and operational). Messages from the other Routing Engine also include the identifiers <b>re0</b> and <b>re1</b> to identify the Routing Engine.
Severity	<p>Severity level of a message is indicated by different colors.</p> <ul style="list-style-type: none"> <li>• <b>Unknown</b>—Gray—Indicates no severity level is specified.</li> <li>• <b>Debug/Info/Notice</b>—Green—Indicates conditions that are not errors but are of interest or might warrant special handling.</li> <li>• <b>Warning</b>—Yellow—Indicates conditions that warrant monitoring.</li> <li>• <b>Error</b>—Blue—Indicates standard error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels.</li> <li>• <b>Critical</b>—Pink—Indicates critical conditions, such as hard-drive errors.</li> <li>• <b>Alert</b>—Orange—Indicates conditions that require immediate correction, such as a corrupted system database.</li> <li>• <b>Emergency</b>—Red—Indicates system panic or other conditions that cause the switch to stop functioning.</li> </ul>	A severity level indicates how seriously the triggering event affects switch functions. When you configure a location for logging a facility, you also specify a severity level for the facility. Only messages from the facility that are rated at that level or higher are logged to the specified file.
Event ID	<p>Displays a code that uniquely identifies the message.</p> <p>The prefix on each code identifies the message source, and the rest of the code indicates the specific event or error.</p>	<p>The event ID begins with a prefix that indicates the generating software process.</p> <p>Some processes on a switch do not use codes. This field might be blank in a message generated from such a process.</p> <p>An event can belong to one of the following type categories:</p> <ul style="list-style-type: none"> <li>• <b>Error</b>—Indicates an error or failure condition that might require corrective action.</li> <li>• <b>Event</b>—Indicates a condition or occurrence that does not generally require corrective action.</li> </ul>

Table 87: Viewing System Log Messages (*continued*)

Field	Function	Additional Information
Event Description	Displays a more detailed explanation of the message.	
Time	Displays the time at which the message was logged.	

- Related Documentation**
- Checking Active Alarms with the J-Web Interface on page 572
  - Understanding Alarm Types and Severity Levels on J-EX Series Switches on page 559

## Checking Active Alarms with the J-Web Interface

**Purpose** Use the monitoring functionality to view alarm information for the J-EX Series switches including alarm type, alarm severity, and a brief description for each active alarm on the switching platform.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

**Action** To view the active alarms:

1. Select **Monitor > Events and Alarms > View Alarms** in the J-Web interface.
2. Select an alarm filter based on alarm type, severity, description, and date range.
3. Click **Go**.

All the alarms matching the filter are displayed.



**NOTE:** When the switch is reset, the active alarms are displayed.

**Meaning** Table 88 on page 572 lists the alarm output fields.

Table 88: Summary of Key Alarm Output Fields

Field	Values
Type	Category of the alarm: <ul style="list-style-type: none"> <li>• Chassis—Indicates an alarm condition on the chassis (typically an environmental alarm such as one related to temperature).</li> <li>• System—Indicates an alarm condition in the system.</li> </ul>
Severity	Alarm severity—either major (red) or minor (yellow).



Table 88: Summary of Key Alarm Output Fields (*continued*)

Field	Values
Description	Brief synopsis of the alarm.
Time	Date and time when the failure was detected.

- Related Documentation**
- Monitoring System Log Messages on page 569
  - Dashboard for J-EX Series Switches on page 560
  - Understanding Alarm Types and Severity Levels on J-EX Series Switches on page 559

## Monitoring Chassis Alarms for a J-EX8200 Switch

**Purpose** This document provides information on chassis alarm conditions, and how you should respond when a certain chassis alarm is seen on your switch.

Various conditions related to the chassis components trigger yellow and red alarms. You cannot configure these conditions. See “Understanding Alarm Types and Severity Levels on J-EX Series Switches” on page 559.

**Action** You can monitor chassis alarms by watching the ALM chassis status LED and using the LCD panel to gather information about the alarm. See Chassis Status LEDs in a J-EX8200 Switch and LCD Panel in a J-EX8200 Switch.

To display switch chassis alarms in the CLI, use the following command

```
user@host> show chassis alarms
```

The command output displays the number of alarms currently active, the time when the alarm began, the severity level, and an alarm description. Note the date and time of an alarm so that you can correlate it with error messages in the messages system log file.

You can also monitor chassis alarms using the J-Web interface. See “Checking Active Alarms with the J-Web Interface” on page 572.

Table 89 on page 573 lists some of the chassis alarms that a J-EX8200 switch can generate.

Table 89: Chassis Alarms for J-EX8200 Switches

Component	Alarm Condition	Remedy	Severity	Additional Information
Fan tray	The fan tray has been removed from the chassis.	Install the fan tray.	Yellow/Red	The switch will eventually get too hot to operate if a fan tray is removed. Temperature alarms will follow.  This alarm is expected during fan tray removal and installation.

Table 89: Chassis Alarms for J-EX8200 Switches (*continued*)

Component	Alarm Condition	Remedy	Severity	Additional Information
Fan tray	One or more fans in a fan tray is spinning below the required speed.	Replace the fan tray.	Red	Individual fans cannot be replaced; you must replace the fan tray.
Fan tray	The fan tray's internal connection to the switch is not functioning properly.	Remove and reinsert the fan tray.  If removing and reinserting the fan tray does not resolve the problem, reboot the switch.	Red	The switch will eventually get too hot to operate if a fan tray is not operating. Temperature alarms will follow.
Power supply	A power supply slot that contained a power supply at bootup is now empty.	Install a power supply in the empty power supply slot.	Yellow	You can ignore this alarm in cases in which a power supply slot can remain empty.  You will not see this alarm if the switch is booted with an empty power supply slot.  This alarm is expected during power supply removal and installation.  This alarm can be triggered by a line card insertion. The alarm condition corrects itself when seen for this reason.
Power supply	A power supply has failed due to an input or output failure, or due to temperature issues.	Replace the failed power supply.	Red	
Power supply	A power supply's internal connection to the switch is not operating properly.	Remove and reinsert the power supply.  If removing and reinserting the power supply does not resolve the problem, reboot the switch.	Red	

Table 89: Chassis Alarms for J-EX8200 Switches (*continued*)

Component	Alarm Condition	Remedy	Severity	Additional Information
Temperature	The chassis warm temperature threshold has been exceeded and fan speeds have increased.	Adjust room temperature downward, if possible.  Ensure airflow through the switch is unobstructed.	Yellow	The chassis is warm and should be cooled down. The switch is still functioning normally.  To monitor temperature: <code>user@switch&gt; show chassis environment</code>  To monitor temperature thresholds: <code>user@switch&gt; show chassis temperature-thresholds</code>
Temperature	The chassis high temperature threshold has been exceeded and the fans are operating at full speed.	Adjust room temperature downward, if possible.  Ensure airflow through the switch is unobstructed.	Red	The chassis is hot and should be cooled down. The switch might still function normally but is close to shutting down if it hasn't already.  To monitor temperature: <code>user@switch&gt; show chassis environment</code>  To monitor temperature thresholds: <code>user@switch&gt; show chassis temperature-thresholds</code>
Temperature	The chassis warm temperature threshold has been exceeded, and one or more fans are not operating properly. The operating fans are running at full speed.	Replace the fan tray that has the faulty fan or fans.  Adjust room temperature downward, if possible.  Ensure airflow through the switch is unobstructed.	Yellow	The chassis is warm and should be cooled down. The switch is still functioning normally.  To monitor temperature: <code>user@switch&gt; show chassis environment</code>  To monitor temperature thresholds: <code>user@switch&gt; show chassis temperature-thresholds</code>

Table 89: Chassis Alarms for J-EX8200 Switches (*continued*)

Component	Alarm Condition	Remedy	Severity	Additional Information
Temperature	The chassis high temperature threshold has been exceeded, and one or more fans is not operating properly. The operating fans are running at full speed.	<p>Replace the fan tray that has the faulty fan or fans.</p> <p>Adjust room temperature downward, if possible.</p> <p>Ensure airflow through the switch is unobstructed.</p>	Red	<p>The chassis is hot and should be cooled down. The switch might still function normally but is close to shutting down if it hasn't already.</p> <p>To monitor temperature:</p> <pre>user@switch&gt; show chassis environment</pre> <p>To monitor temperature thresholds:</p> <pre>user@switch&gt; show chassis temperature-thresholds</pre>
Temperature	The temperature sensor on a hardware component has failed.	Replace the hardware component.	Yellow	
Routing Engine (RE), Switch Fabric and Routing Engine (SRE), or Switch Fabric (SF) module	The RE, SRE, or SF module has failed.	The RE, SRE, or SF module must be replaced.	Red	
Link Status	The link to the network is down.	Check network connectivity.	Red or Yellow	The network link is disabled by default, so you might see this alarm before you connect the switch to the network.

- Related Documentation**
- Checking Active Alarms with the J-Web Interface on page 572
  - Chassis Status LEDs in a J-EX8200 Switch

## Monitoring Switch Control Traffic

**Purpose** Use the packet capture feature when you need to quickly capture and analyze switch control traffic on a switch. The packet capture feature allows you to capture traffic destined for or originating from the Routing Engine.

**Action** To use the packet capture feature in the J-Web interface, select **Troubleshoot > Packet Capture**.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To use the packet capture feature in the CLI, enter the following CLI command:

**monitor traffic**

**Meaning** You can use the packet capture feature to compose expressions with various matching criteria to specify the packets that you want to capture. You can decode and view the captured packets in the J-Web interface as they are captured. The packet capture feature does not capture transient traffic.

**Table 90: Packet Capture Field Summary**

Field	Function	Your Action
Interface	Specifies the interface on which the packets are captured. If you select default, packets on the Ethernet management port 0, are captured.	From the list, select an interface—for example, <b>ge-0/0/0</b> .
Detail level	Specifies the extent of details to be displayed for the packet headers. <ul style="list-style-type: none"> <li>Brief—Displays the minimum packet header information. This is the default.</li> <li>Detail—Displays packet header information in moderate detail.</li> <li>Extensive—Displays the maximum packet header information.</li> </ul>	From the list, select <b>Detail</b> .
Packets	Specifies the number of packets to be captured. Values range from 1 to <b>1000</b> . Default is <b>10</b> . Packet capture stops capturing packets after this number is reached.	From the list, select the number of packets to be captured—for example, 10.
Addresses	Specifies the addresses to be matched for capturing the packets using a combination of the following parameters: <ul style="list-style-type: none"> <li>Direction—Matches the packet headers for IP address, hostname, or network address of the source, destination or both.</li> <li>Type—Specifies if packet headers are matched for host address or network address.</li> </ul> <p>You can add multiple entries to refine the match criteria for addresses.</p>	Select address-matching criteria. For example: <ol style="list-style-type: none"> <li>From the Direction list, select <b>source</b>.</li> <li>From the Type list, select <b>host</b>.</li> <li>In the Address box, type <b>10.1.40.48</b>.</li> <li>Click <b>Add</b>.</li> </ol>
Protocols	Matches the protocol for which packets are captured. You can choose to capture TCP, UDP, or ICMP packets or a combination of TCP, UDP, and ICMP packets.	From the list, select a protocol—for example, <b>tcp</b> .
Ports	Matches packet headers containing the specified source or destination TCP or UDP port number or port name.	Select a direction and a port. For example: <ul style="list-style-type: none"> <li>From the Type list, select <b>src</b>.</li> <li>In the Port box, type <b>23</b>.</li> </ul>
<b>Advanced Options</b>		
Absolute TCP Sequence	Specifies that absolute TCP sequence numbers are to be displayed for the packet headers.	To display absolute TCP sequence numbers in the packet headers, select this check box.

Table 90: Packet Capture Field Summary (*continued*)

Field	Function	Your Action
Layer 2 Headers	Specifies that link-layer packet headers are to be displayed.	To include link-layer packet headers while capturing packets, select this check box.
Non-Promiscuous	Specifies not to place the interface in promiscuous mode, so that the interface reads only packets addressed to it. In promiscuous mode, the interface reads every packet that reaches it.	To read all packets that reach the interface, select this check box.
Display Hex	Specifies that packet headers, except link-layer headers, are to be displayed in hexadecimal format.	To display the packet headers in hexadecimal format, select this check box.
Display ASCII and Hex	Specifies that packet headers are to be displayed in hexadecimal and ASCII format.	To display the packet headers in ASCII and hexadecimal formats, select this check box.
Header Expression	Specifies the match condition for the packets to be captured. The match conditions you specify for Addresses, Protocols, and Ports are displayed in expression format in this field.	You can enter match conditions directly in this field in expression format or modify the expression composed from the match conditions you specified for Addresses, Protocols, and Ports. If you change the match conditions specified for Addresses, Protocols, and Ports again, packet capture overwrites your changes with the new match conditions.
Packet Size	Specifies the number of bytes to be displayed for each packet. If a packet header exceeds this size, the display is truncated for the packet header. The default value is 96 bytes.	Type the number of bytes you want to capture for each packet header—for example, <b>256</b> .
Don't Resolve Addresses	Specifies that IP addresses are not to be resolved into hostnames in the packet headers displayed.	To prevent packet capture from resolving IP addresses to hostnames, select this check box.
No Timestamp	Suppresses the display of packet header timestamps.	To stop displaying timestamps in the captured packet headers, select this check box.
Write Packet Capture File	Writes the captured packets to a file in PCAP format in /var/tmp. The files are named with the prefix jweb-pcap and the extension .pcap. If you select this option, the decoded packet headers are not displayed on the packet capture page.	To decode and display the packet headers on the J-Web page, clear this check box.

**Related Documentation** • Using the CLI Terminal on page 159

## Monitoring System Properties

**Purpose** Use the monitoring functionality to view system properties such as the name and IP address of the switch and resource usage.

**Action** To monitor system properties in the J-Web interface, select **Monitor > System View > System Information**.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To monitor system properties in the CLI, enter the following commands:

- **show system uptime**
- **show system users**
- **show system storage**

**Meaning** Table 91 on page 579 summarizes key output fields in the system properties display.

**Table 91: Summary of Key System Properties Output Fields**

Field	Values	Additional Information
<b>General Information</b>		
Serial Number	Serial number for the switch.	
Junos OS Version	Version of Junos OS active on the switch, including whether the software is for domestic or export use.	Export software is for use outside of the U.S. and Canada.
Hostname	The name of switch.	
IP Address	The IP address of the switch.	
Loopback Address	The loopback address.	
Domain Name Server	The address of the domain name server.	
Time Zone	The time zone on the switch.	
<b>Time</b>		
Current Time	Current system time, in Coordinated Universal Time (UTC).	
System Booted Time	Date and time when the switch was last booted and how long it has been running.	

Table 91: Summary of Key System Properties Output Fields (*continued*)

Field	Values	Additional Information
Protocol Started Time	Date and time when the switching protocols were last started and how long they have been running.	
Last Configured Time	Date and time when a configuration was last committed. This field also shows the name of the user who issued the last <b>commit</b> command, through either the J-Web interface or the CLI.	
Load Average	The CPU load average for 1, 5, and 15 minutes.	
<b>Storage Media</b>		
Internal Flash Memory	Memory usage details of internal flash.	
External Flash Memory	Usage details of external flash memory.	
<b>Logged in Users Details</b>		
User	Username of any user logged in to the switching platform.	
Terminal	Terminal through which the user is logged in.	
From	System from which the user has logged in. A hyphen indicates that the user is logged in through the console.	
Login Time	Time when the user logged in.	This is the <b>LOGIN@</b> field in <b>show system users</b> command output.
Idle Time	How long the user has been idle.	

- Related Documentation**
- Monitoring System Process Information on page 582
  - Understanding J-Web User Interface Sessions on page 157

## Monitoring Chassis Information

**Purpose** Use the monitoring functionality to view chassis properties such as general switch information, temperature and fan status, and resource information for the J-EX Series switch.

**Action** To view chassis properties in the J-Web interface, select **Monitor > System View > Chassis Information**.





**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To view chassis properties in the CLI, enter the following commands:

- **show chassis environment**
- **show chassis fpc**
- **show chassis hardware**

**Meaning** Table 92 on page 581 gives information about the key output fields for chassis information.



**NOTE:** For a J-EX4500 switch or a J-EX4200 standalone switch, the FPC slot number refers to the switch itself and is always 0. In a Virtual Chassis configuration, the FPC slot number refers to the member ID. In a J-EX8200 switch, the FPC slot number refers to the line card slot number.

**Table 92: Summary of the Key Output Fields for Chassis Information**

Field	Values
<b>Routing Engine Details</b>	Select the <b>Master</b> tab to view details about the master Routing Engine or select <b>Backup</b> to view details about the backup Routing Engine.
Name/Value	This table displays the following details of the master Routing Engine: <ul style="list-style-type: none"> <li>• Routing engine module</li> <li>• Model</li> <li>• Version</li> <li>• Part number</li> <li>• Serial number</li> <li>• Memory utilization</li> <li>• Temperature</li> <li>• Start time</li> <li>• CPU load average for 1, 5, and 15 minutes</li> </ul>
<b>Power and Fan Tray Details</b>	
<b>Power</b>	Select the <b>Power</b> tab to view details of the power supplies.
Name/Value	Displays the status and model number of each power supply.
<b>Fan</b>	Select the <b>Fan</b> tab to view details about the fans.
Name/Value	Displays the status of each fan in the corresponding FPC.

Table 92: Summary of the Key Output Fields for Chassis Information (*continued*)

Field	Values
<b>Chassis Component Details</b>	
Select component	Select an FPC to view <b>General</b> , <b>Temperature</b> , <b>Resource</b> , and <b>Sub-component</b> details.
<b>General</b>	Select the <b>General</b> tab to view the general information about the chassis components.
Name/Value	Displays general information: <ul style="list-style-type: none"> <li>• Version—Revision level. Supply the version number when reporting hardware problems to customer support.</li> <li>• Part Number</li> <li>• Serial Number—Supply the serial number when contacting customer support about the switch chassis.</li> <li>• Description—Brief text description.</li> </ul>
<b>Temperature</b>	Select the <b>Temperature</b> tab to view the temperature details of the components in the selected FPC.
Name/Value	Displays the temperature details of the sensors present in the selected FPC.
<b>Resource</b>	Select the <b>Resource</b> tab to view the resource details of the selected FPC.
Name/Value	Displays resource details: <ul style="list-style-type: none"> <li>• State: <ul style="list-style-type: none"> <li>• <b>Dead</b>—Held in reset because of errors.</li> <li>• <b>Diag</b>—The FPC is running diagnostics.</li> <li>• <b>Dormant</b>—Held in reset.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Online</b>—The FPC is online and running.</li> <li>• <b>Probed</b>—Probe is complete. The FPC is awaiting restart of the Packet Forwarding Engine (PFE).</li> <li>• <b>Probe-wait</b>—The FPC is waiting for the probe operation to start.</li> </ul> </li> <li>• <b>Total CPU DRAM</b>—Total DRAM, in megabytes, available to the FPC.</li> <li>• <b>Start time</b>—Date and time the switch was last rebooted.</li> </ul>

- Related Documentation**
- Monitoring System Process Information on page 582
  - Monitoring System Properties on page 578
  - Dashboard for J-EX Series Switches on page 560

## Monitoring System Process Information

**Purpose** Use the monitoring functionality to view the processes running on the switch.

**Action** To view the software processes running on the switch in the J-Web interface, select **Monitor > System View > Process Details**.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To view the software processes running on the switch in the CLI, enter the following command.

```
show system processes
```

**Meaning** Table 93 on page 583 summarizes the output fields in the system process information display.

The display includes the total CPU load and total memory utilization.

**Table 93: Summary of System Process Information Output Fields**

Field	Values	Additional Information
PID	Identifier of the process.	
Name	Owner of the process.	
State	Current state of the process.	
CPU Load	Percentage of the CPU that is being used by the process.	
Memory Utilization	Amount of memory that is being used by the process.	
Start Time	Time of day when the process started.	

- Related Documentation**
- Monitoring System Properties on page 578
  - For more information about show system properties command, see **show system uptime on page 903**

## Managing Log, Temporary, and Crash Files on the Switch (J-Web Procedure)

You can use the J-Web interface to rotate log files and delete unnecessary log, temporary, and crash files on the switch.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

1. Cleaning Up Files on page 584
2. Downloading Files on page 584
3. Deleting Files on page 585

## Cleaning Up Files

If you are running low on storage space, use the file cleanup procedure to quickly identify files to delete.

The file cleanup procedure performs the following tasks:

- Rotates log files—Archives the current log files, and creates fresh log files.
- Deletes log files in `/var/log`—Deletes files that are not currently being written to.
- Deletes temporary files in `/var/tmp`—Deletes files that have not been accessed within two days.
- Deletes all crash files in `/var/crash`—Deletes core files that the switch has written during an error.

To rotate log files and delete unnecessary files with the J-Web interface:

1. Select **Maintain > Files**.
2. In the Clean Up Files section, click **Clean Up Files**. The switching platform rotates log files and identifies files that can be safely deleted.

The J-Web interface displays the files that you can delete and the amount of space that will be freed on the file system.

3. Click one:
  - To delete the files and return to the Files page, click **OK**.
  - To cancel your entries and return to the list of files in the directory, click **Cancel**.

## Downloading Files

You can use the J-Web interface to download a copy of an individual log, temporary, or crash file from the switching platform. When you download a file, it is not deleted from the file system.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.

To download files with the J-Web interface:

1. In the J-Web interface, select **Maintain > Files**.
2. In the Download and Delete Files section, click one:
  - Log Files—Log files in the `/var/log` directory on the switch.
  - Temporary Files—Lists the temporary files in the `/var/tmp` directory on the switching platform.
  - Jailed Temporary Files (Install, Session, etc)—Lists the files in the `/var/jail/tmp` directory on the switching platform.
  - Crash (Core) Files—Lists the core files in the `/var/crash` directory on the switching platform.

The J-Web interface displays the files located in the directory.

3. Select the files that you want to download and click **Download**.
4. Choose a location for the saved file.

The file is saved as a text file, with a `.txt` file extension.

## Deleting Files

You can use the J-Web interface to delete an individual log, temporary, and crash file from the switching platform. When you delete the file, it is permanently removed from the file system.



**NOTE:** You can configure and manage a standalone J-EX4500 switch with the J-Web interface, but the J-Web interface does not support configuration or management of a J-EX4500 Virtual Chassis.



**CAUTION:** If you are unsure whether to delete a file from the switching platform, we recommend using the Clean Up Files tool described in “Cleaning Up Files” on page 584. This tool determines which files can be safely deleted from the file system.

To delete files with the J-Web interface:

1. Select **Maintain > Files**.
2. In the Download and Delete Files section, click one:
  - Log Files—Lists the log files in the `/var/log` directory on the switching platform.
  - Temporary Files—Lists the temporary files in the `/var/tmp` directory on the switching platform.

- Jailed Temporary Files (Install, Session, etc)—Lists the files in the /var/jail/tmp directory on the switching platform.
- Crash (Core) Files—Lists the core files in the /var/crash directory on the switching platform.

The J-Web interface displays the files in the directory.

3. Select the box next to each file you plan to delete.
4. Click **Delete**.

The J-Web interface displays the files you can delete and the amount of space that will be freed on the file system.

5. Click one of the following buttons on the confirmation page:
  - To delete the files and return to the Files page, click **OK**.
  - To cancel your entries and return to the list of files in the directory, click **Cancel**.

**Related  
Documentation**

- J-Web User Interface for J-EX Series Switches Overview on page 153

# Configuration Statements for System Monitoring

## facility-override

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<b>Syntax</b>	<code>facility-override <i>facility</i>;</code>
<b>Hierarchy Level</b>	[edit system syslog host]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Substitute an alternate facility for the default facilities used when messages are directed to a remote destination.
<b>Options</b>	<i>facility</i> —Alternate facility to substitute for the default facilities. For a list of the possible facilities, see Junos OS System Log Alternate Facilities for Remote Logging.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Changing the Alternative Facility Name for Remote System Log Messages</li><li>• <i>Junos OS System Log Messages Reference</i></li></ul>

## file (System Logging)

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<b>Syntax</b>	<pre>file <i>filename</i> {     <i>facility severity</i>;     archive {         files <i>number</i>;         size <i>size</i>;         (no-world-readable   world-readable);     }     explicit-priority;     match "<i>regular-expression</i>";     structured-data {         brief;     } }</pre>
<b>Hierarchy Level</b>	[edit system syslog]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the logging of system messages to a file.
<b>Options</b>	<p><b><i>facility</i></b>—Class of messages to log. To specify multiple classes, include multiple <b><i>facility severity</i></b> statements. For a list of the facilities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p><b>file <i>filename</i></b>—File in the <code>/var/log</code> directory in which to log messages from the specified facility. To log messages to more than one file, include more than one <b>file</b> statement.</p> <p><b><i>severity</i></b>—Severity of the messages that belong to the facility specified by the paired <b><i>facility</i></b> name. Messages with severities of the specified level and higher are logged. For a list of the severities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Directing System Log Messages to a Log File</li> <li><i>Junos OS System Log Messages Reference</i></li> </ul>



---

**files**


---

<b>Syntax</b>	<code>files <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit system syslog archive], [edit system syslog file <i>filename</i> archive]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the maximum number of archived log files to retain. When the Junos OS logging utility has written a defined maximum amount of data to a log file <i>logfile</i> , it closes the file, compresses it, and renames it to <i>logfile.0.gz</i> (for information about the maximum file size, see <b>size</b> ). The utility then opens and writes to a new file called <i>logfile</i> . When the new file reaches the maximum size, the <i>logfile.0.gz</i> file is renamed to <i>logfile.1.gz</i> , and the new file is closed, compressed, and renamed <i>logfile.0.gz</i> . By default, the logging facility creates up to ten archive files in this manner. Once the maximum number of archive files exists, each time the active log file reaches the maximum size, the contents of the oldest archive file are lost (overwritten by the next oldest file).
<b>Options</b>	<i>number</i> —Maximum number of archived files. <b>Range:</b> 1 through 1000 <b>Default:</b> 10 files
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Specifying Log File Size, Number, and Archiving Properties</li> <li>• <i>Junos OS System Log Messages Reference</i></li> <li>• <b>size on page 592</b></li> </ul>

## host

---

<b>Syntax</b>	<pre>host (hostname   other-routing-engine) {     facility severity;     explicit-priority;     facility-override facility;     log-prefix string;     match "regular-expression"; }</pre>
<b>J-EX Series Switches</b>	<pre>host (hostname   other-routing-engine   scc-master) {     facility severity;     explicit-priority;     facility-override facility;     log-prefix string;     match "regular-expression"; }</pre>
<b>Hierarchy Level</b>	[edit system syslog]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the logging of system messages to a remote destination.
<b>Options</b>	<p><b>facility</b>—Class of messages to log. To specify multiple classes, include multiple <b>facility severity</b> statements. For a list of the facilities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p><b>hostname</b>—IPv4 address, IPv6 address, or fully qualified hostname of the remote machine to which to direct messages. To direct messages to multiple remote machines, include a <b>host</b> statement for each one.</p> <p><b>other-routing-engine</b>—Direct messages to the other Routing Engine on a router or switch with two Routing Engines installed and operational.</p> <p><b>severity</b>—Severity of the messages that belong to the facility specified by the paired <b>facility</b> name. Messages with severities of the specified level and higher are logged. For a list of the severities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Directing System Log Messages to a Remote Machine or the Other Routing Engine</li> <li><i>Junos OS System Log Messages Reference</i></li> </ul>

## interface (Accounting or Sampling)

---

<b>Syntax</b>	interface <i>interface-name</i> { engine-id <i>number</i> ; engine-type <i>number</i> ; source-address <i>address</i> ; }
<b>Hierarchy Level</b>	[edit forwarding-options accounting <i>name</i> output], [edit forwarding-options sampling output]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the output interface for monitored traffic.
<b>Options</b>	<i>interface-name</i> —Name of the interface.  The remaining statements are explained separately.
<b>Usage Guidelines</b>	See Configuring Discard Accounting or Configuring Traffic Sampling.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## log-prefix

---

<b>Syntax</b>	log-prefix <i>string</i> ;
<b>Hierarchy Level</b>	[edit system syslog host]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Include a text string in each message directed to a remote destination.
<b>Options</b>	<i>string</i> —Text string to include in each message.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Adding a Text String to System Log Messages</li> <li><i>Junos OS System Log Messages Reference</i></li> </ul>

## match

---

<b>Syntax</b>	<code>match "regular-expression";</code>
<b>Hierarchy Level</b>	[edit system syslog file <i>filename</i> ], [edit system syslog host <i>hostname</i>   other-routing-engine  scc-master)], [edit system syslog user ( <i>username</i>   *)]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify a text string that must (or must not) appear in a message for the message to be logged to a destination.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Using Regular Expressions to Refine the Set of Logged Messages</li></ul>


## size

---

<b>Syntax</b>	<code>size size;</code>
<b>Hierarchy Level</b>	[edit system syslog archive], [edit system syslog file <i>filename</i> archive]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the maximum amount of data that the Junos OS logging utility writes to a log file <i>logfile</i> before archiving it (closing it, compressing it, and changing its name to <i>logfile.0.gz</i> ). The utility then opens and writes to a new file called <i>logfile</i> . For information about the number of archive files that the utility creates in this way, see <b>files</b> .
<b>Options</b>	<p><b>size</b>—Maximum size of each system log file, in kilobytes (KB), megabytes (MB), or gigabytes (GB).</p> <p><b>Syntax:</b> <i>xk</i> to specify the number of kilobytes, <i>xm</i> for the number of megabytes, or <i>xg</i> for the number of gigabytes</p> <p><b>Range:</b> 64 KB through 1 GB</p> <p><b>Default:</b> 1 MB for MX Series routers and the QFX Series</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Specifying Log File Size, Number, and Archiving Properties</li><li><i>Junos OS System Log Messages Reference</i></li><li><b>files on page 589</b></li></ul>

## structured-data

---

<b>Syntax</b>	structured-data { brief; }
<b>Hierarchy Level</b>	[edit system syslog file <i>filename</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Write system log messages to the log file in structured-data format, which complies with Internet draft draft-ietf-syslog-protocol-23, <i>The syslog Protocol</i> ( <a href="http://tools.ietf.org/html/draft-ietf-syslog-protocol-23">http://tools.ietf.org/html/draft-ietf-syslog-protocol-23</a> ).
	<p> <b>NOTE:</b> When this statement is included, other statements that specify the format for messages written to the file are ignored (the explicit-priority statement at the [edit system syslog file <i>filename</i>] hierarchy level and the time-format statement at the [edit system syslog] hierarchy level).</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Logging Messages in Structured-Data Format</li> <li><i>Junos OS System Log Messages Reference</i></li> <li>explicit-priority</li> <li>time-format on page 595</li> </ul>

## syslog

```

Syntax  syslog {
    archive {
        files number;
        size maximum-file-size;
        start-time "YYYY-MM-DD.hh:mm";
        transfer-interval minutes;
        (world-readable | no-world-readable);
    }
    console {
        facility severity;
    }
    file filename {
        facility severity;
        explicit-priority;
        match "regular-expression";
        archive {
            files number;
            size maximum-file-size;
            start-time "YYYY-MM-DD.hh:mm";
            transfer-interval minutes;
            (world-readable | no-world-readable);
        }
        structured-data {
            brief;
        }
    }
    host (hostname | other-routing-engine | scc-master) {
        facility severity;
        explicit-priority;
        facility-override facility;
        log-prefix string;
        match "regular-expression";
        source-address source-address;
    }
    source-address source-address;
    time-format (millisecond | year | year millisecond);
    user (username | *) {
        facility severity;
        match "regular-expression";
    }
}

```

**Hierarchy Level** [edit system]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure the types of system log messages to log to files, a remote destination, user terminals, or the system console.

The remaining statements are explained separately.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Junos OS System Log Configuration Overview
- *Junos OS System Log Messages Reference*

## time-format

**Syntax** time-format (year | millisecond | year millisecond);

**Hierarchy Level** [edit system syslog]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Include the year, the millisecond, or both, in the timestamp on every standard-format system log message. The additional information is included for messages directed to each destination configured by a **file**, **console**, or **user** statement at the [edit system syslog] hierarchy level, but not to destinations configured by a **host** statement.

By default, the timestamp specifies the month, date, hour, minute, and second when the message was logged—for example, **Aug 21 12:36:30**.



**NOTE:** When the **structured-data** statement is included at the [edit system syslog file *filename*] hierarchy level, this statement is ignored for the file.

**Options** **millisecond**—Include the millisecond in the timestamp.

**year**—Include the year in the timestamp.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Including the Year or Millisecond in Timestamps
- *Junos OS System Log Messages Reference*
- **structured-data on page 593**

## time-zone

<b>Syntax</b>	<code>time-zone (GMT <i>hour-offset</i>   <i>time-zone</i>);</code>
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Set the local time zone. To have the time zone change take effect for all processes running on the router or switch, you must reboot the router or switch.
<b>Default</b>	UTC
<b>Options</b>	<p><b>GMT <i>hour-offset</i></b>—Set the time zone relative to UTC time.</p> <p><b>Range:</b> -14 through +12</p> <p><b>Default:</b> 0</p> <p><b><i>time-zone</i></b>—Specify the time zone as <b>UTC</b>, which is the default time zone, or as a string such as PDT (Pacific Daylight Time), or use one of the following continents and major cities:</p> <p>Africa/Abidjan, Africa/Accra, Africa/Addis_Ababa, Africa/Algiers, Africa/Asmera, Africa/Bamako, Africa/Bangui, Africa/Banjul, Africa/Bissau, Africa/Blantyre, Africa/Brazzaville, Africa/Bujumbura, Africa/Cairo, Africa/Casablanca, Africa/Ceuta, Africa/Conakry, Africa/Dakar, Africa/Dar_es_Salaam, Africa/Djibouti, Africa/Douala, Africa/EL_Aaiun, Africa/Freetown, Africa/Gaborone, Africa/Harare, Africa/Johannesburg, Africa/Kampala, Africa/Khartoum, Africa/Kigali, Africa/Kinshasa, Africa/Lagos, Africa/Libreville, Africa/Lome, Africa/Luanda, Africa/Lubumbashi, Africa/Lusaka, Africa/Malabo, Africa/Maputo, Africa/Maseru, Africa/Mbabane, Africa/Mogadishu, Africa/Monrovia, Africa/Nairobi, Africa/Ndjamena, Africa/Niamey, Africa/Nouakchott, Africa/Ouagadougou, Africa/Porto-Novo, Africa/Sao_Tome, Africa/Timbuktu, Africa/Tripoli, Africa/Tunis, Africa/Windhoek</p> <p>America/Adak, America/Anchorage, America/Anguilla, America/Antigua, America/Aruba, America/Asuncion, America/Barbados, America/Belize, America/Bogota, America/Boise, America/Buenos_Aires, America/Caracas, America/Catamarca, America/Cayenne, America/Cayman, America/Chicago, America/Cordoba, America/Costa_Rica, America/Cuiaba, America/Curacao, America/Dawson, America/Dawson_Creek, America/Denver, America/Detroit, America/Dominica, America/Edmonton, America/EL_Salvador, America/Ensenada, America/Fortaleza, America/Glace_Bay, America/Godthab, America/Goose_Bay, America/Grand_Turk, America/Grenada, America/Guadeloupe, America/Guatemala, America/Guayaquil, America/Guyana, America/Halifax, America/Havana, America/Indiana/Knox, America/Indiana/Marengo, America/Indiana/Vevay, America/Indianapolis, America/Inuvik, America/Iqaluit, America/Jamaica, America/Jujuy, America/Juneau, America/La_Paz, America/Lima, America/Los_Angeles, America/Louisville, America/Maceio, America/Managua, America/Manaus, America/Martinique, America/Mazatlan, America/Mendoza, America/Menominee, America/Mexico_City, America/Miquelon, America/Montevideo, America/Montreal, America/Montserrat, America/Nassau, America/New_York, America/Nipigon, America/Nome, America/Noronha, America/Panama, America/Pangnirtung, America/Paramaribo, America/Phoenix, America/Port-au-Prince, America/Port_of_Spain, America/Porto_Acre, America/Puerto_Rico, America/Rainy_River, America/Rankin_Inlet, America/Regina, America/Rosario, America/Santiago,</p>



America/Santo\_Domingo, America/Sao\_Paulo, America/Scoresbysund, America/Shiprock, America/St\_Johns, America/St\_Kitts, America/St\_Lucia, America/St\_Thomas, America/St\_Vincent, America/Swift\_Current, America/Tegucigalpa, America/Thule, America/Thunder\_Bay, America/Tijuana, America/Tortola, America/Vancouver, America/Whitehorse, America/Winnipeg, America/Yakutat, America/Yellowknife

Antarctica/Casey, Antarctica/DumontDUrville, Antarctica/Mawson, Antarctica/McMurdo, Antarctica/Palmer, Antarctica/South\_Pole

Arctic/Longyearbyen

Asia/Aden, Asia/Alma-Ata, Asia/Amman, Asia/Anadyr, Asia/Aqtau, Asia/Aqtobe, Asia/Ashkhabad, Asia/Baghdad, Asia/Bahrain, Asia/Baku, Asia/Bangkok, Asia/Beirut, Asia/Bishkek, Asia/Brunei, Asia/Calcutta, Asia/Chungking, Asia/Colombo, Asia/Dacca, Asia/Damascus, Asia/Dubai, Asia/Dushanbe, Asia/Gaza, Asia/Harbin, Asia/Hong\_Kong, Asia/Irkutsk, Asia/Ishigaki, Asia/Jakarta, Asia/Jayapura, Asia/Jerusalem, Asia/Kabul, Asia/Kamchatka, Asia/Karachi, Asia/Kashgar, Asia/Katmandu, Asia/Krasnoyarsk, Asia/Kuala\_Lumpur, Asia/Kuching, Asia/Kuwait, Asia/Macao, Asia/Magadan, Asia/Manila, Asia/Muscat, Asia/Nicosia, Asia/Novosibirsk, Asia/Omsk, Asia/Phnom\_Penh, Asia/Pyongyang, Asia/Qatar, Asia/Rangoon, Asia/Riyadh, Asia/Saigon, Asia/Seoul, Asia/Shanghai, Asia/Singapore, Asia/Taipei, Asia/Tashkent, Asia/Tbilisi, Asia/Tehran, Asia/Thimbu, Asia/Tokyo, Asia/Ujung\_Pandang, Asia/Ulan\_Bator, Asia/Urumqi, Asia/Vientiane, Asia/Vladivostok, Asia/Yakutsk, Asia/Yekaterinburg, Asia/Yerevan

Atlantic/Azores, Atlantic/Bermuda, Atlantic/Canary, Atlantic/Cape\_Verde, Atlantic/Faeroe, Atlantic/Jan\_Mayen, Atlantic/Madeira, Atlantic/Reykjavik, Atlantic/South\_Georgia, Atlantic/St\_Helena, Atlantic/Stanley

Australia/Adelaide, Australia/Brisbane, Australia/Broken\_Hill, Australia/Darwin, Australia/Hobart, Australia/Lindeman, Australia/Lord\_Howe, Australia/Melbourne, Australia/Perth, Australia/Sydney

Europe/Amsterdam, Europe/Andorra, Europe/Athens, Europe/Belfast, Europe/Belgrade, Europe/Berlin, Europe/Bratislava, Europe/Brussels, Europe/Bucharest, Europe/Budapest, Europe/Chisinau, Europe/Copenhagen, Europe/Dublin, Europe/Gibraltar, Europe/Helsinki, Europe/Istanbul, Europe/Kaliningrad, Europe/Kiev, Europe/Lisbon, Europe/Ljubljana, Europe/London, Europe/Luxembourg, Europe/Madrid, Europe/Malta, Europe/Minsk, Europe/Monaco, Europe/Moscow, Europe/Oslo, Europe/Paris, Europe/Prague, Europe/Riga, Europe/Rome, Europe/Samara, Europe/San\_Marino, Europe/Sarajevo, Europe/Simferopol, Europe/Skopje, Europe/Sofia, Europe/Stockholm, Europe/Tallinn, Europe/Tirane, Europe/Vaduz, Europe/Vatican, Europe/Vienna, Europe/Vilnius, Europe/Warsaw, Europe/Zagreb, Europe/Zurich

Indian/Antananarivo, Indian/Chagos, Indian/Christmas, Indian/Cocos, Indian/Comoro, Indian/Kerguelen, Indian/Mahe, Indian/Maldives, Indian/Mauritius, Indian/Mayotte, Indian/Reunion

Pacific/Apia, Pacific/Auckland, Pacific/Chatham, Pacific/Easter, Pacific/Efate, Pacific/Enderbury, Pacific/Fakaofu, Pacific/Fiji, Pacific/Funafuti, Pacific/Galapagos, Pacific/Gambier, Pacific/Guadalcanal, Pacific/Guam, Pacific/Honolulu, Pacific/Johnston, Pacific/Kiritimati, Pacific/Kosrae, Pacific/Kwajalein, Pacific/Majuro, Pacific/Marquesas, Pacific/Midway, Pacific/Nauru, Pacific/Niue, Pacific/Norfolk, Pacific/Noumea, Pacific/Pago\_Pago, Pacific/Palau, Pacific/Pitcairn, Pacific/Ponape, Pacific/Port\_Moresby, Pacific/Rarotonga, Pacific/Saipan, Pacific/Tahiti, Pacific/Tarawa, Pacific/Tongatapu, Pacific/Truk, Pacific/Wake, Pacific/Wallis, Pacific/Yap

**Required Privilege** system—To view this statement in the configuration.  
**Level** system-control—To add this statement to the configuration.

**Related Documentation**

- Modifying the Default Time Zone for a Router or Switch Running Junos OS
- System Management Configuration Statements

## user (System Logging)

---

<b>Syntax</b>	<pre>user (username   *) {     facility severity;     match "regular-expression"; }</pre>
<b>Hierarchy Level</b>	[edit system syslog]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the logging of system messages to user terminals.
<b>Options</b>	<p>* (the asterisk)—Log messages to the terminal sessions of all users who are currently logged in.</p> <p><b>facility</b>—Class of messages to log. To specify multiple classes, include multiple <b>facility severity</b> statements. For a list of the facilities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p><b>severity</b>—Severity of the messages that belong to the facility specified by the paired <b>facility</b> name. Messages with severities the specified level and higher are logged. For a list of the severities, see Junos OS System Logging Facilities and Message Severity Levels.</p> <p><b>username</b>—Junos OS login name of the user whose terminal session is to receive system log messages. To log messages to more than one user's terminal session, include more than one <b>user</b> statement.</p> <p>The remaining statement is explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Directing System Log Messages to a User Terminal</li><li>• Junos OS System Logging Facilities and Message Severity Levels</li><li>• <i>Junos OS System Log Messages Reference</i></li></ul>

---

## world-readable

---

<b>Syntax</b>	world-readable   no-world-readable;
<b>Hierarchy Level</b>	[edit system syslog archive], [edit system syslog file <i>filename</i> archive]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Grant all users permission to read log files, or restrict the permission only to the <b>root</b> user and users who have the Junos <b>maintenance</b> permission.
<b>Default</b>	no-world-readable
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Specifying Log File Size, Number, and Archiving Properties</li><li>• <i>Junos System Log Messages Reference</i></li></ul>



CHAPTER 36

# Operational Commands for System Monitoring

## clear log

---

<b>Syntax</b>	<code>clear log <i>filename</i></code> <code>&lt;all&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Remove contents of a log file.
<b>Options</b>	<i>filename</i> —Name of the specific log file.  all—(Optional) Delete the specified log file and all archived versions of it.
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show log on page 673</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">clear log on page 602</a>
<b>Output Fields</b>	See <a href="#">file list</a> for an explanation of output fields.

## Sample Output

**clear log** The following sample commands list log file information, clear the contents of a log file, and then display the updated log file information:

```

user@host> file list lcc0-re0:/var/log/sampled detail
lcc0-re0:
-----
-rw-r----- 1 root  wheel      26450 Jun 23 18:47 /var/log/sampled
total 1

user@host> clear log lcc0-re0:sampled
lcc0-re0:
-----

user@host> file list lcc0-re0:/var/log/sampled detail
lcc0-re0:
-----
-rw-r----- 1 root  wheel      57 Sep 15 03:44 /var/log/sampled
total 1

```

## file archive

<b>Syntax</b>	<code>file archive destination <i>destination</i> source <i>source</i> &lt;compress&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Archive, and optionally compress, one or multiple local system files as a single file, locally or at a remote location.
<b>Options</b>	<p><code>destination <i>destination</i></code>—Destination of the archived file or files. Specify the destination as a URL or filename. The Junos OS adds one of the following suffixes if the destination filename does not already have it:</p> <ul style="list-style-type: none"> <li>• For archived files—The suffix <code>.tar</code></li> <li>• For archived and compressed files—The suffix <code>.tgz</code></li> </ul> <p><code>source <i>source</i></code>—Source of the original file or files. Specify the source as a URL or filename.</p> <p><code>compress</code>—(Optional) Compress the archived file with the GNU zip (gzip) compression utility. The compressed files have the suffix <code>.tgz</code>.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p><a href="#">file archive (Multiple Files) on page 603</a></p> <p><a href="#">file archive (Single File) on page 603</a></p> <p><a href="#">file archive (with Compression) on page 603</a></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

<b>file archive (Multiple Files)</b>	<p>The following sample command archives all message files in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tar</code>.</p> <pre>user@host&gt; file archive source /var/log/messages* destination /var/log/messages-archive.tar /usr/bin/tar: Removing leading / from absolute path names in the archive. user@host&gt;</pre>
<b>file archive (Single File)</b>	<p>The following sample command archives one message file in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tar</code>.</p> <pre>user@host&gt; file archive source /var/log/messages destination /var/log/messages-archive.tar /usr/bin/tar: Removing leading / from absolute path names in the archive. user@host</pre>
<b>file archive (with Compression)</b>	<p>The following sample command archives and compresses all message files in the local directory <code>/var/log/messages</code> as the single file <code>messages-archive.tgz</code>.</p> <pre>user@host&gt; file archive compress source /var/log/messages* destination /var/log/messages-archive.tgz</pre>

`/usr/bin/tar: Removing leading / from absolute path names in the archive.`



## file checksum md5

---

<b>Syntax</b>	<code>file checksum md5 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Message Digest 5 (MD5) checksum of a file.
<b>Options</b>	<p><i>pathname</i>—(Optional) Path to a filename.</p> <p><i>filename</i>—Name of a local file for which to calculate the MD5 checksum.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></li> <li>• <a href="#">file checksum sha-256 on page 380</a></li> <li>• <a href="#">file checksum sha1 on page 379</a></li> <li>• <a href="#">op on page 234</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">file checksum md5 on page 605</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum md5 user@host> file checksum md5 jbundle-5.3R2.4-export-signed.tgz
MD5 (jbundle-5.3R2.4-export-signed.tgz) = 2a3b69e43f9bd4893729cc16f505a0f5
```

## file checksum sha1

---

<b>Syntax</b>	<code>file checksum sha1 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Secure Hash Algorithm (SHA-1) checksum of a file.
<b>Options</b>	<i>pathname</i> —(Optional) Path to a filename. <i>filename</i> —Name of a local file for which to calculate the SHA-1 checksum.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li><li>• <a href="#">file checksum md5 on page 378</a></li><li>• <a href="#">file checksum sha-256 on page 380</a></li><li>• <a href="#">op on page 234</a></li></ul>
<b>List of Sample Output</b>	<a href="#">file checksum sha1 on page 606</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum sha1 user@host> file checksum sha1 /var/db/scripts/opscript.slax
SHA1 (/var/db/scripts/commitscript.slax) = ba9e47120c7ce55cff29afd73eacd370e162c676
```

## file checksum sha-256

---

<b>Syntax</b>	<code>file checksum sha-256 &lt;pathname&gt; filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Calculate the Secure Hash Algorithm 2 family (SHA-256) checksum of a file.
<b>Options</b>	<p><i>pathname</i>—(Optional) Path to a filename.</p> <p><i>filename</i>—Name of a local file for which to calculate the SHA-256 checksum.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i></a></li> <li>• <a href="#">file checksum md5 on page 378</a></li> <li>• <a href="#">file checksum sha1 on page 379</a></li> <li>• <a href="#">op on page 234</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">file checksum sha-256 on page 607</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file checksum sha-256 user@host> file checksum sha-256 /var/db/scripts/commitscript.slax
SHA256 (/var/db/scripts/commitscript.slax) =
94c2b061fb55399e15babd2529453815601a602b5c98e5c12ed929c9d343dd71
```

## file compare

---

<b>Syntax</b>	file compare (files <i>filename filename</i> ) < context   unified > <ignore-white-space >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Compare two local files and describe the differences between them in default, context, or unified output styles:</p> <ul style="list-style-type: none"> <li>• <b>Default</b>—In the first line of output, <b>c</b> means lines were changed between the two files, <b>d</b> means lines were deleted between the two files, and <b>a</b> means lines were added between the two files. The numbers preceding this alphabetical marker represent the first file, and the lines after the alphabetical marker represent the second file. A left angle bracket (&lt;) in front of output lines refers to the first file. A right angle bracket (&gt;) in front of output lines refers to the second file.</li> <li>• <b>Context</b>—The display is divided into two parts. The first part is the first file; the second part is the second file. Output lines preceded by an exclamation point (!) have changed. Additions are marked with a plus sign (+), and deletions are marked with a minus sign (-).</li> <li>• <b>Unified</b>—The display is preceded by the line number from the first and the second file (xx,xxx,x). Before the line number, additions to the file are marked with a plus sign (+), and deletions to the file are marked with a minus sign (-). The body of the output contains the affected lines. Changes are viewed as additions plus deletions.</li> </ul>
<b>Options</b>	<p>files <i>filename</i>—Names of two local files to compare.</p> <p>context—(Optional) Display output in context format.</p> <p>ignore-white-space—(Optional) Ignore changes in the amount of white space.</p> <p>unified—(Optional) Display output in unified format.</p>
<b>Required Privilege Level</b>	none
<b>List of Sample Output</b>	<p><b>file compare files on page 609</b></p> <p><b>file compare files context on page 609</b></p> <p><b>file compare files unified on page 609</b></p> <p><b>file compare files unified ignore-white-space on page 609</b></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```

file compare files user@host> file compare files /tmp/one /tmp/two
100c100
<          full-name "File 1";
---
>          full-name "File 2";
102c102
<          class foo; # 'foo' is not defined
---
>          class super-user;

file compare files user@host> file compare files /tmp/one /tmp/two context
context
*** /tmp/one   Wed Dec  3 17:12:50 2003
--- /tmp/two   Wed Dec  3 09:13:14 2003
*****
*** 97,104 ****
    }
    }
    user bill {
!       full-name "Bill Smith";
!       class foo; # 'foo' is not defined
    authentication {
        encrypted-password SECRET;
    }
--- 97,105 ----
    }
    }
    user bill {
!       full-name "Bill Smith";
!       uid 1089;
!       class super-user;
    authentication {
        encrypted-password SECRET;
    }

file compare files user@host> file compare files /tmp/one /tmp/two unified
unified
--- /tmp/one   Wed Dec  3 17:12:50 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -97,8 +97,9 @@
    }
    }
    user bill {
-       full-name "Bill Smith";
-       class foo; # 'foo' is not defined
+       full-name "Bill Smith";
+       uid 1089;
+       class super-user;
    authentication {
        encrypted-passwordSECRET;
    }

file compare files user@host> file compare files /tmp/one /tmp/two unified ignore-white-space
unified
ignore-white-space
--- /tmp/one   Wed Dec  3 09:13:10 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -99,7 +99,7 @@
    user bill {
        full-name "Bill Smith";
        uid 1089;

```

```
-      class foo; # 'foo' is not defined
+      class super-user;
      authentication {
          encrypted-password <SECRET>; # SECRET-DATA
      }
```

## file copy

<b>Syntax</b>	<code>file copy <i>source destination</i></code> <code>&lt;source-address <i>address</i>&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Copy files from one place to another on the local router or switch or between the local router or switch and a remote system.
<b>Options</b>	<p><i>source</i>—Source of the original file. Specify this as a URL or filename.</p> <p><i>destination</i>—Destination of the copied file. Specify this as a URL or filename. If you are copying a file to the current directory (your home directory on the local router or switch) and are not renaming the file, specify the destination with a period (.).</p> <p><i>source-address <i>address</i></i>—(Optional) Source IP host address. This option is useful for specifying the source address of a secure copy (scp) file transfer.</p>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<p><b>file copy (A File from the Router or Switch to a PC) on page 611</b></p> <p><b>file copy (A Configuration File Between Routing Engines) on page 611</b></p> <p><b>file copy (A Log File Between Routing Engines) on page 611</b></p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

<b>file copy (A File from the Router or Switch to a PC)</b>	<pre>user@host&gt; file copy /var/tmp/rpd.core.4 berry:/c/junipero/tmp ...transferring.file.....             0 KB     0.3 kB/s   ETA: 00:00:00   100%</pre>
<b>file copy (A Configuration File Between Routing Engines)</b>	<p>The following sample command copies a configuration file from Routing Engine 0 to Routing Engine 1:</p> <pre>user@host&gt; file copy /config/juniper.conf re1:/var/tmp/copied-juniper.conf</pre>
<b>file copy (A Log File Between Routing Engines)</b>	<p>The following sample command copies a log file from Routing Engine 0 to Routing Engine 1:</p> <pre>user@host&gt; file copy lcc0-re0:/var/log/chassisd lcc0-re1:/var/tmp</pre>

## file delete

---

<b>Syntax</b>	<code>file delete <i>filename</i></code> <code>&lt;purge&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Delete a file on the local router or switch.
<b>Options</b>	<i>filename</i> —Name of the file to delete. For a routing matrix, include chassis information in the filename if the file to be deleted is not local to the Routing Engine from which the command is issued.  <code>purge</code> —(Optional) Overwrite regular files before deleting them.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">file delete on page 612</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
file delete user@host> file list /var/tmp
            dcd.core
            rpd.core
            snmpd.core

            user@host> file delete /var/tmp/snmpd.core
            user@host> file list /var/tmp
            dcd.core
            rpd.core
```



## file list

---

<b>Syntax</b>	file list <detail   recursive> <filename>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display a list of files on the local router or switch.
<b>Options</b>	<p>none—Display a list of all files for the current directory.</p> <p>detail   recursive—(Optional) Display detailed output or descend recursively through the directory hierarchy, respectively.</p> <p>filename—(Optional) Display a list of files. For a routing matrix, the filename must include the chassis information.</p>
<b>Additional Information</b>	The default directory is the home directory of the user logged in to the router or switch. To view available directories, enter a space and then a backslash (/) after the <b>file list</b> command. To view files within a specific directory, include a backslash followed by the directory and, optionally, subdirectory name after the <b>file list</b> command.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>file list on page 613</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
file list user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core
```

## file rename

---

<b>Syntax</b>	<code>file rename <i>source destination</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Rename a file on the local router or switch.
<b>Options</b>	<i>destination</i> —New name for the file.  <i>source</i> —Original name of the file. For a routing matrix, the filename must include the chassis information.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">file rename on page 614</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

**file rename** The following example lists the files in `/var/tmp`, renames one of the files, and then displays the list of files again to reveal the newly named file.

```
user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core

user@host> file rename /var/tmp/dcd.core /var/tmp/dcd.core.990413
user@host> file list /var/tmp
dcd.core.990413
rpd.core
snmpd.core
```

## file show

---

<b>Syntax</b>	<code>file show <i>filename</i></code> <code>&lt;encoding (base64   raw)&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the contents of a file.
<b>Options</b>	<i>filename</i> —Name of a file. For a routing matrix, the filename must include the chassis information.  encoding (base64   raw)—(Optional) Encode file contents with base64 encoding or show raw text.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>file show on page 615</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
file show user@host> file show /var/log/messages
Apr 13 21:00:08 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:00:40 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:02:48 romney last message repeated 4 times
Apr 13 21:07:04 romney last message repeated 8 times
Apr 13 21:07:13 romney /kernel: so-1/1/0: Clearing SONET alarm(s) RDI-P
Apr 13 21:07:29 romney /kernel: so-1/1/0: Asserting SONET alarm(s) RDI-P
...
```

## monitor list

<b>Syntax</b>	monitor list
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the status of monitored log and trace files.
<b>Options</b>	This command has no options.
<b>Additional Information</b>	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are configured with the <b>syslog</b> statement at the <b>[edit system]</b> hierarchy level and the <b>options</b> statement at the <b>[edit routing-options]</b> hierarchy level. The trace files generated by the routing protocol process are those configured with <b>traceoptions</b> statements at the <b>[edit routing-options]</b> , <b>[edit interfaces]</b> , and <b>[edit protocols protocol]</b> hierarchy levels.
<b>Required Privilege Level</b>	trace
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">monitor start on page 617</a></li> <li>• <a href="#">monitor stop on page 618</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">monitor list on page 616</a>
<b>Output Fields</b>	Table 94 on page 616 describes the output fields for the <b>monitor list</b> command. Output fields are listed in the approximate order in which they appear.

**Table 94: monitor list Output Fields**

Field Name	Field Description
<b>monitor start</b>	Indicates the file is being monitored.
<b>"filename"</b>	Name of the file that is being monitored.
<b>Last changed</b>	Date and time at which the file was last modified.

## Sample Output

```

monitor list user@host> monitor list
monitor start "vrrpd" (Last changed Dec 03:11:06 20)
monitor start "cli-commands" (Last changed Nov 07:3)

```

## monitor start

<b>Syntax</b>	<code>monitor start filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Start displaying the system log or trace file and additional entries being added to those files.
<b>Options</b>	<i>filename</i> —Specific log or trace file.
<b>Additional Information</b>	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are configured with the <b>syslog</b> statement at the <b>[edit system]</b> hierarchy level and the <b>options</b> statement at the <b>[edit routing-options]</b> hierarchy level. The trace files generated by the routing protocol process are configured with <b>traceoptions</b> statements at the <b>[edit routing-options]</b> , <b>[edit interfaces]</b> , and <b>[edit protocols protocol]</b> hierarchy levels.
<b>Required Privilege Level</b>	trace
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">monitor list on page 616</a></li> <li>• <a href="#">monitor stop on page 618</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">monitor start on page 617</a>
<b>Output Fields</b>	Table 95 on page 617 describes the output fields for the <b>monitor start</b> command. Output fields are listed in the approximate order in which they appear.

**Table 95: monitor start Output Fields**

Field Name	Field Description
<b>***filename***</b>	Name of the file from which entries are being displayed. This line is displayed initially and when the command switches between log files.
<b>Date and time</b>	Timestamp for the log entry.

## Sample Output

```

monitor start user@host> monitor start system-log
*** system-log***
Jul 20 15:07:34 hang sshd[5845]: log: Generating 768 bit RSA key.
Jul 20 15:07:35 hang sshd[5845]: log: RSA key generation complete.
Jul 20 15:07:35 hang sshd[5845]: log: Connection from 204.69.248.180 port 912
Jul 20 15:07:37 hang sshd[5845]: log: RSA authentication for root accepted.
Jul 20 15:07:37 hang sshd[5845]: log: ROOT LOGIN as 'root' from trip.jcmax.com
Jul 20 15:07:37 hang sshd[5845]: log: Closing connection to 204.69.248.180

```

## monitor stop

---

<b>Syntax</b>	<code>monitor stop filename</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Stop displaying the system log or trace file.
<b>Options</b>	<i>filename</i> —Specific log or trace file.
<b>Additional Information</b>	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are those configured with the <b>syslog</b> statement at the <b>[edit system]</b> hierarchy level and the <b>options</b> statement at the <b>[edit routing-options]</b> hierarchy level. The trace files generated by the routing protocol process are those configured with <b>traceoptions</b> statements at the <b>[edit routing-options]</b> , <b>[edit interfaces]</b> , and <b>[edit protocols protocol]</b> hierarchy levels.
<b>Required Privilege Level</b>	trace
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">monitor list on page 616</a></li><li>• <a href="#">monitor start on page 617</a></li></ul>
<b>List of Sample Output</b>	<a href="#">monitor stop on page 618</a>
<b>Output Fields</b>	This command produces no output.

## Sample Output

```
monitor stop user@host> monitor stop
```

---

## request chassis cb

---

<b>Syntax</b>	<code>request chassis cb (offline   online) slot <i>slot-number</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Control the operation of the Control Board (CB). For information about the meaning of “CBs” on the switches, see J-EX Series Switches Hardware and CLI Terminology Mapping.
<b>Options</b>	<p>offline—Take the CB offline.</p> <p>online—Bring the CB online.</p> <p>slot <i>slot-number</i>—CB slot number:</p> <ul style="list-style-type: none"><li>• J-EX8208 switch—Replace <i>slot-number</i> with a value from 0 through 2.</li><li>• J-EX8216 switch—Replace <i>slot-number</i> with a value from 0 through 1.</li></ul>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">request chassis cb on page 619</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request chassis cb user@host> request chassis cb offline slot 1
Backup CB 1 cannot be set offline, backup RE is online
```

## request chassis fabric plane

---

<b>Syntax</b>	request chassis fabric plane <i>plane-number</i> (offline   online)
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Control the operation of the specified fabric plane.
<b>Options</b>	<p>offline—Take the fabric plane offline. Use the <b>request chassis fabric plane <i>plane-number</i> offline</b> command to clear a <b>FAULT</b> state on a fabric plane. To bring the fabric plane back online, use the <b>request chassis fabric plane <i>plane-number</i> online</b> command.</p> <p>online—Bring the fabric plane online.</p> <p>plane <i>plane-number</i>—Fabric plane number.</p> <ul style="list-style-type: none"><li>• For the J-EX8208 switch, replace <i>plane-number</i> with a value from 0 through 11.</li><li>• For the J-EX8216 switch, replace <i>plane-number</i> with a value from 0 through 7.</li></ul>
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<b>request chassis fabric plane 0 online on page 620</b> <b>request chassis fabric plane 0 offline on page 620</b> <b>request chassis fabric plane 0 online (J-EX8200 switch) on page 620</b>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

<b>request chassis fabric plane 0 online</b>	user@host> request chassis fabric plane 0 online Online initiated, use "show chassis fabric plane" to verify
<b>request chassis fabric plane 0 offline</b>	user@host> request chassis fabric plane 0 offline Offline initiated, use "show chassis fabric plane" to verify
<b>request chassis fabric plane 0 online (J-EX8200 switch)</b>	user@host> request chassis fabric plane 0 online Plane 0 is already active



## request chassis fpc

---

<b>Syntax</b>	<code>request chassis fpc (offline   online   restart) slot <i>slot-number</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX Series switches) Control the operation of the Flexible PIC Concentrator (FPC). For information about the meaning of “FPC” on the switches, see the hardware and CLI terminology equivalents tables in the J-EX Series hardware guides at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a> .
<b>Options</b>	<p>offline—Take the FPC offline.</p> <p>online—Bring the FPC online.</p> <p>restart—Restart the FPC.</p> <p>slot <i>slot-number</i>—FPC slot number:</p> <ul style="list-style-type: none"> <li>• J-EX Series switches: <ul style="list-style-type: none"> <li>• J-EX4200 switches in a Virtual Chassis configuration—Replace <i>slot-number</i> with a value from 0 through 9 (switch’s member ID).</li> <li>• J-EX8208 switches—Replace <i>slot-number</i> with a value from 0 through 7 (line card).</li> <li>• J-EX8216 switches—Replace <i>slot-number</i> with a value from 0 through 15 (line card).</li> </ul> </li> </ul>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show chassis fpc on page 652</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request chassis fpc on page 621</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

```
request chassis fpc user@host> request chassis fpc online slot 0
FPC 0 already online
```

## request system configuration rescue delete

---

<b>Syntax</b>	request system configuration rescue delete
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Delete an existing rescue configuration.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• request system configuration rescue save on page 389</li><li>• request system software rollback on page 133</li><li>• show system commit on page 393</li></ul>
<b>List of Sample Output</b>	<a href="#">request system configuration rescue delete on page 622</a> <a href="#">request system configuration rescue delete on page 622</a>
<b>Output Fields</b>	This command produces no output.

### Sample Output

```
request system configuration rescue delete
user@host> request system configuration rescue delete
```

### Sample Output

```
request system configuration rescue delete
user@switch> request system configuration rescue delete
```

---

## request system configuration rescue save

---

<b>Syntax</b>	request system configuration rescue save
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Save the most recently committed configuration as the rescue configuration so that you can return to it at any time by using the <b>rollback</b> command.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">request system software delete on page 131</a></li><li>• <a href="#">request system software rollback on page 133</a></li><li>• <a href="#">show system commit on page 393</a></li></ul>
<b>List of Sample Output</b>	<a href="#">request system configuration rescue save on page 623</a>
<b>Output Fields</b>	This command produces no output.

### Sample Output

```
request system user@switch> request system configuration rescue save
configuration rescue
save
```

## request system scripts refresh-from commit

<b>Syntax</b>	<code>request system scripts refresh-from commit file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard commit scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;commit&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from commit file config.txt url http://host1.juniper.net</code> on page 624

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from commit file config.txt url
refresh-from commit http://host1.juniper.net
file config.txt url user@switch>
http://host1.juniper.net
```

## request system scripts refresh-from event

<b>Syntax</b>	<code>request system scripts refresh-from event file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard event scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;event&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li>• <i>Junos OS Junos XML Management Protocol Guide</i></li> <li>• <i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from event file config.txt url http://host1.juniper.net</code> on page 625

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from event file config.txt url http://host1.juniper.net
refresh-from event file user@switch>
config.txt url
http://host1.juniper.net
```

## request system scripts refresh-from op

<b>Syntax</b>	<code>request system scripts refresh-from op file <i>file-name</i> url <i>url-path</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Automatically download the initial Junos OS configuration and a set of standard op scripts during a Junos XML management protocol/NETCONF session when a switch is brought up for the first time.</p> <p>The Junos XML management protocol equivalent for this operational mode command is:</p> <pre>&lt;request-script-refresh-from&gt;   &lt;type&gt;op&lt;/type&gt;   &lt;file&gt;file-name&lt;/file&gt;   &lt;URL&gt;URL&lt;/URL&gt; &lt;/request-script-refresh-from&gt;</pre>
<b>Options</b>	<p><code>file <i>file-name</i></code>—Name of the file to be downloaded.</p> <p><code>url <i>url-path</i></code>—URL of the file to be downloaded.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Automatic Refreshing of Scripts on J-EX Series Switches on page 329</li> <li><i>Junos OS Junos XML Management Protocol Guide</i></li> <li><i>Junos OS NETCONF XML Management Protocol Guide</i></li> </ul>
<b>List of Sample Output</b>	<code>request system scripts refresh-from op file config.txt url http://host1.juniper.net</code> on page 626

### Sample Output

```
request system scripts user@switch> request system scripts refresh-from op file config.txt url http://host1.juniper.net
refresh-from op file user@switch>
config.txt url
http://host1.juniper.net
```

## show chassis alarms

<b>Syntax</b>	show chassis alarms
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display information about the conditions that have been configured to trigger alarms.
<b>Options</b>	none—Display information about the conditions that have been configured to trigger alarms.
<b>Additional Information</b>	<p>You cannot clear the alarms for chassis components. Instead, you must remedy the cause of the alarm. When a chassis alarm is lit, it indicates that you are running the router or switch in a manner that we do not recommend.</p> <p>In Junos OS Release 11.1 and later, alarms for fans also show the slot number of the fans in the CLI output.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show chassis alarms (Alarms Active) on page 627</p> <p>show chassis alarms (No Alarms Active) on page 627</p> <p>show chassis alarms (Fan Tray) on page 628</p> <p>show chassis alarms (Backup Routing Engine) on page 628</p>
<b>Output Fields</b>	Table 96 on page 627 lists the output fields for the <b>show chassis alarms</b> command. Output fields are listed in the approximate order in which they appear.

**Table 96: show chassis alarms Output Fields**

Field Name	Field Description
Alarm time	Date and time the alarm was first recorded.
Class	Severity class for this alarm: <b>Minor</b> or <b>Major</b> .
Description	Information about the alarm.

## Sample Output

```

show chassis alarms (Alarms Active) user@host> show chassis alarms
3 alarms are currently active
Alarm time           Class  Description
2000-02-07 10:12:22 UTC Major fxp0: ethernet link down
2000-02-07 10:11:54 UTC Minor YELLOW ALARM - PEM 1 Removed
2000-02-07 10:11:03 UTC Minor YELLOW ALARM - Lower Fan Tray Removed

show chassis alarms (No Alarms Active) user@host> show chassis alarms
No alarms are currently active

```

```
show chassis alarms user@host> show chassis alarms
(Fan Tray)          4 alarms currently active
Alarm time          Class Description
2010-11-11 20:27:38 UTC Major Side Fan Tray 7 Failure
2010-11-11 20:27:13 UTC Minor Side Fan Tray 7 Overspeed
2010-11-11 20:27:13 UTC Major Side Fan Tray 5 Failure
2010-11-11 20:27:13 UTC Major Side Fan Tray 0 Failure
```

```
show chassis alarms user@host> show chassis alarms
(Backup Routing    2 alarms are currently active
Engine)            Alarm time          Class Description
2005-04-07 10:12:22 PDT Minor Host 1 Boot from alternate media
2005-04-07 10:11:54 PDT Major Host 1 compact-flash missing in Boot List
```



## show chassis environment

<b>Syntax</b>	show chassis environment
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display environmental information about the router or switch chassis, including the temperature and information about the fans, power supplies, and Routing Engine.
<b>Options</b>	none—Display environmental information about the router or switch chassis.  For information about the remaining options, see the Related Documentation.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <b>show chassis environment cb on page 631</b></li> <li>• show chassis environment cip</li> <li>• <b>show chassis environment fpc on page 635</b></li> <li>• show chassis environment fpm</li> <li>• show chassis environment mcs</li> <li>• show chassis environment pcg</li> <li>• show chassis environment pem</li> <li>• <b>show chassis environment routing-engine on page 637</b></li> </ul>
<b>List of Sample Output</b>	<b>show chassis environment (J-EX4200 Standalone Switch) on page 630</b>
<b>Output Fields</b>	Table 97 on page 629 lists the output fields for the <b>show chassis environment</b> command. Output fields are listed in the approximate order in which they appear.

**Table 97: show chassis environment Output Fields**

Field Name	Field Description
<b>Class</b>	Item, Status, Measurement
<b>Power</b>	Power information:  Power information: <ul style="list-style-type: none"> <li>• Power supply status: <b>OK</b>, <b>Testing</b> (during initial power-on), <b>Failed</b>, or <b>Absent</b>.</li> <li>• Information about the Power Entry Module status: <b>OK</b>, <b>Testing</b> (during initial power-on), <b>Check</b>, <b>Failed</b>, or <b>Absent</b>.</li> </ul>
<b>Temp</b>	Temperature of air flowing through the chassis in degrees Celsius (C) and Fahrenheit (F).
<b>Fan</b>	Fan status: <b>OK</b> , <b>Testing</b> (during initial power-on), <b>Failed</b> , or <b>Absent</b> . <b>Measurement</b> indicates if fans are spinning at normal or high speed.

Table 97: show chassis environment Output Fields (*continued*)

Field Name	Field Description
Misc	Information about other components of the chassis:

### Sample Output

```

show chassis environment
(J-EX4200 Standalone Switch)
user@host> show chassis environment
Class Item                               Status Measurement
Power FPC 0 Power Supply 0              OK
      FPC 0 Power Supply 1              Absent
Temp  FPC 0 CPU                          OK          41 degrees C / 105 degrees F
      FPC 0 EX-PFE1                     OK          42 degrees C / 107 degrees F
      FPC 0 EX-PFE2                     OK          46 degrees C / 114 degrees F
      FPC 0 GEPHY Front Left            OK          25 degrees C / 77 degrees F
      FPC 0 GEPHY Front Right          OK          27 degrees C / 80 degrees F
      FPC 0 Uplink Conn                 OK          29 degrees C / 84 degrees F
Fans  FPC 0 Fan 1                         OK          Spinning at normal speed
      FPC 0 Fan 2                         OK          Spinning at normal speed
      FPC 0 Fan 3                         OK          Spinning at normal speed
    
```

## show chassis environment cb

<b>Syntax</b>	show chassis environment cb <slot>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display environmental information about the Control Boards (CBs). For information about the meaning of “CBs” on the switches, see the hardware and CLI terminology equivalents table in the <i>Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide</i> or the <i>Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a> .
<b>Options</b>	<p>none—Display environmental information about all CBs.</p> <p>slot—(Optional) Display environmental information about the specified CB. On the routers, replace <i>slot</i> with <b>0</b> or <b>1</b>. On the switches, replace <i>slot</i> with <b>0</b>, <b>1</b>, or <b>2</b>.</p> <p>slot—(Optional) Display environmental information about the specified CB. On J-EX8200 switches, replace <i>slot</i> with <b>0</b> or <b>1</b> or <b>2</b>.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><b>show chassis environment cb (J-EX8200 Switch) on page 632</b></p> <p><b>show chassis environment cb (J-EX8208 Switch) on page 633</b></p>
<b>Output Fields</b>	Table 98 on page 631 lists the output fields for the <b>show chassis environment cb</b> command. Output fields are listed in the approximate order in which they appear.

**Table 98: show chassis environment cb Output Fields**

Field Name	Field Description
<b>State</b>	<p>Status of the CB. If two CBs are installed and online, one is functioning as the master, and the other is the standby.</p> <ul style="list-style-type: none"> <li>• <b>Online</b>—CB is online and running.</li> <li>• <b>Offline</b>—CB is powered down.</li> </ul> <p><b>NOTE:</b> On the J-EX8208 switch, the installation can include three CBs. See the hardware and CLI terminology equivalents table in the <i>Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide</i> or the <i>Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a>.</p>
<b>Temperature</b>	<p>Temperature in Celsius (C) and Fahrenheit (F) of the air flowing past the CB.</p> <ul style="list-style-type: none"> <li>• <b>Temperature Intake</b>—Measures the temperature of the air intake to cool the power supplies.</li> <li>• <b>Temperature Exhaust</b>—Measures the temperature of the hot air exhaust.</li> </ul>
<b>Power</b>	<p>Power required and measured on the CB. The left column displays the required power, in volts. The right column displays the measured power, in millivolts.</p>

Table 98: show chassis environment cb Output Fields (*continued*)

Field Name	Field Description
BUS Revision	Revision level of the generic bus device. (Not on switches.)
FPGA Revision	Revision level of the field-programmable gate array (FPGA). (Not on switches.)

### Sample Output

```

show chassis environment cb (J-EX8200 Switch) user@host> show chassis environment cb
CB 0 status:
State Online Master
Temperature Intake 20 degrees C / 68 degrees F
Temperature Exhaust 24 degrees C / 75 degrees F
Power 1
  1.1 V 1086 mV
  1.2 V 1179 mV
  1.2 V * 1182 mV
  1.2 V * 1182 mV
  1.25 V 1211 mV
  1.5 V 1472 mV
  1.8 V 1756 mV
  2.5 V 2449 mV
  3.3 V 3254 mV
  3.3 V bias 3300 mV
  5.0 V 4911 mV
  12.0 V 11891 mV
Power 2
  3.3 V bias * 3615 mV
  3.3 V bias * 3615 mV
  3.3 V bias * 3567 mV
  3.3 V bias * 3664 mV
  4.3 V bias * 4224 mV
  4.3 V bias * 4215 mV
  4.3 V bias * 4224 mV
  4.3 V bias * 4205 mV
  4.3 V bias * 4195 mV
  4.3 V bias * 4215 mV
  5.0 V bias 4920 mV
CB 1 status:
State Online Standby
Temperature Intake 19 degrees C / 66 degrees F
Temperature Exhaust 23 degrees C / 73 degrees F
Power 1
  1.1 V 1082 mV
  1.2 V 1169 mV
  1.2 V * 1179 mV
  1.2 V * 1179 mV
  1.25 V 1214 mV
  1.5 V 1482 mV
  1.8 V 1759 mV
  2.5 V 2481 mV
  3.3 V 3248 mV
  3.3 V bias 3306 mV
  5.0 V 4911 mV
  12.0 V 11910 mV
Power 2

```

```

3.3 V bias *          3644 mV
3.3 V bias *          3664 mV
3.3 V bias *          3586 mV
3.3 V bias *          3654 mV
4.3 V bias *          4224 mV
4.3 V bias *          4215 mV
4.3 V bias *          4224 mV
4.3 V bias *          4205 mV
4.3 V bias *          4244 mV
4.3 V bias *          4215 mV
5.0 V bias            4930 mV
CB 2 status:
State                  Online
Temperature Intake     19 degrees C / 66 degrees F
Temperature Exhaust    23 degrees C / 73 degrees F
Power 1
 1.2 V                 1195 mV
 1.5 V                 1511 mV
 1.8 V                 1804 mV
 2.5 V                 2526 mV
 3.3 V                 3300 mV
 3.3 V bias            3306 mV
12.0 V                12220 mV

```

**show chassis  
environment cb  
(J-EX8208 Switch)**

```

user@host> show chassis environment cb
CB 0 status:
State                  Online Master
Temperature Intake     20 degrees C / 68 degrees F
Temperature Exhaust    24 degrees C / 75 degrees F
Power 1
 1.1 V                 1086 mV
 1.2 V                 1179 mV
 1.2 V *               1182 mV
 1.2 V *               1182 mV
 1.25 V                1211 mV
 1.5 V                 1466 mV
 1.8 V                 1759 mV
 2.5 V                 2455 mV
 3.3 V                 3261 mV
 3.3 V bias            3300 mV
 5.0 V                 4930 mV
12.0 V                11891 mV
Power 2
 3.3 V bias *          3606 mV
 3.3 V bias *          3615 mV
 3.3 V bias *          3567 mV
 3.3 V bias *          3673 mV
 4.3 V bias *          4224 mV
 4.3 V bias *          4215 mV
 4.3 V bias *          4234 mV
 4.3 V bias *          4205 mV
 4.3 V bias *          4186 mV
 4.3 V bias *          4215 mV
 5.0 V bias            4940 mV
CB 1 status:
State                  Online Standby
Temperature Intake     19 degrees C / 66 degrees F
Temperature Exhaust    23 degrees C / 73 degrees F
Power 1
 1.1 V                 1086 mV
 1.2 V                 1169 mV

```

```

1.2 V *                1179 mV
1.2 V *                1179 mV
1.25 V                1211 mV
1.5 V                 1479 mV
1.8 V                 1759 mV
2.5 V                 2475 mV
3.3 V                 3235 mV
3.3 V bias            3306 mV
5.0 V                 4930 mV
12.0 V                11891 mV
Power 2
3.3 V bias *          3644 mV
3.3 V bias *          3664 mV
3.3 V bias *          3586 mV
3.3 V bias *          3654 mV
4.3 V bias *          4215 mV
4.3 V bias *          4224 mV
4.3 V bias *          4215 mV
4.3 V bias *          4215 mV
4.3 V bias *          4234 mV
4.3 V bias *          4224 mV
5.0 V bias            4920 mV
CB 2 status:
State                  Online
Temperature Intake     20 degrees C / 68 degrees F
Temperature Exhaust    24 degrees C / 75 degrees F
Power 1
1.2 V                  1202 mV
1.5 V                  1508 mV
1.8 V                  1804 mV
2.5 V                  2520 mV
3.3 V                  3300 mV
3.3 V bias            3300 mV
12.0 V                 12200 mV

```

## show chassis environment fpc

<b>Syntax</b>	show chassis environment fpc <slot>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	J-EX Series switches. Display environmental information about Flexible PIC Concentrators (FPCs).
<b>Options</b>	<p>none—Display environmental information about all FPCs.</p> <p>slot or fpc-slot—(Optional) Display environmental information about an individual FPC:</p> <ul style="list-style-type: none"> <li>• J-EX Series switches: <ul style="list-style-type: none"> <li>• J-EX4200 standalone switches—Replace <b>slot</b> with 0.</li> <li>• J-EX4200 switches in a Virtual Chassis configuration—Replace <b>slot</b> with a value from 0 through 9 (switch’s member ID).</li> <li>• J-EX8208 switches—Replace <b>slot</b> with a value from 0 through 7 (line card).</li> <li>• J-EX8216 switches—Replace <b>slot</b> with a value from 0 through 15 (line card).</li> </ul> </li> </ul>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show chassis environment fpc on page 636
<b>Output Fields</b>	Table 99 on page 635 lists the output fields for the <b>show chassis environment fpc</b> command. Output fields are listed in the approximate order in which they appear.

**Table 99: show chassis environment fpc Output Fields**

Field Name	Field Description
<b>State</b>	<p>Status of the FPC:</p> <ul style="list-style-type: none"> <li>• <b>Unknown</b>—FPC is not detected by the router.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Present</b>—FPC is detected by the chassis daemon but is either not supported by the current version of the Junos OS, or the FPC is coming up but not yet online.</li> <li>• <b>Ready</b>—FPC is in intermediate or transition state.</li> <li>• <b>Announce online</b>—Intermediate state during which the FPC is coming up but not yet online, and the chassis manager acknowledges the chassisd FPC online initiative.</li> <li>• <b>Online</b>—FPC is online and running.</li> <li>• <b>Offline</b>—FPC is powered down.</li> <li>• <b>Diagnostics</b>—FPC is set to operate in diagnostics mode.</li> </ul>
<b>Power</b>	Information about the voltage supplied to the FPC. The left column displays the required power, in volts. The right column displays the measured power, in millivolts.

## Sample Output

```
show chassis user@switch> show chassis environment fpc 0
environment fpc FPC 0 status:
  State Online
  Temperature 42 degrees C / 107 degrees F
```



## show chassis environment routing-engine

<b>Syntax</b>	show chassis environment routing-engine <slot>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Routing Engine environmental status information.
<b>Options</b>	<p>none—Display environmental information about all Routing Engines.</p> <p>slot—(Optional) Display environmental information about an individual Routing Engine. On J-EX4200 standalone switches, replace <b>slot</b> with <b>0</b>. On J-EX4200 switches in a Virtual Chassis configuration and on J-EX8208 and J-EX8216 switches, replace <b>slot</b> with <b>0</b> or <b>1</b>.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show chassis environment routing-engine (Nonredundant) on page 637</p> <p>show chassis environment routing-engine (Redundant) on page 637</p>
<b>Output Fields</b>	Table 100 on page 637 lists the output fields for the <b>show chassis environment routing-engine</b> command. Output fields are listed in the approximate order in which they appear.

Table 100: show chassis environment routing-engine Output Fields

Field Name	Field Description
Routing engine slot status	Number of the Routing Engine slot: 0 or 1.
State	Status of the Routing Engine: <ul style="list-style-type: none"> <li>• <b>Online Master</b>—MCS is online, operating as Master.</li> <li>• <b>Online Standby</b>—MCS is online, operating as Standby.</li> </ul>
Temperature	Temperature of the air flowing past the Routing Engine.

### Sample Output

```

show chassis environment routing-engine (Nonredundant)
user@host> show chassis environment routing-engine
Routing Engine 0 status:
  State                Online Master
  Temperature          27 degrees C / 80 degrees

show chassis environment routing-engine (Redundant)
user@host> show chassis environment routing-engine
Route Engine 0 status:
  State                Online Master
  Temperature          26 degrees C / 78 degrees F
Route Engine 1 status:

```

State: Online Standby  
Temperature: 26 degrees C / 78 degrees F

## show chassis ethernet-switch

---

<b>Syntax</b>	show chassis ethernet-switch <errors <port>>
<b>Syntax (J-EX8200 Switch)</b>	show chassis ethernet-switch <statistics <port>   switch <number>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display information about the ports on the Control Board (CB) Ethernet switch.
<b>Options</b>	<p>none—Display information about each connected port on the Ethernet switch.</p> <p>errors—(Optional) Display the numbers and types of errors accumulated on all ports of the Ethernet switch.</p> <p>errors <i>port</i>—(Optional) Display the numbers and types of errors accumulated on the specified port (0 through 15) of the Ethernet switch. On the J-EX8200 switch, replace <i>port</i> with a value from 0 through 27.</p> <p>statistics—(Optional) Display traffic statistics for each connected port on the Ethernet switch.</p> <p>statistics <i>port</i>—(Optional) Display traffic statistics for the specified port on the Ethernet switch. On the J-EX8200 switch, replace <i>port</i> with a value from 0 through 27.</p> <p>statistics switch <i>number</i>—(Optional) Display traffic statistics for the specified Ethernet switch number. On the J-EX8216 switch, replace <i>number</i> with a value from 0 through 2. On the J-EX8208 switch, replace <i>number</i> with a value from 0 through 1.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show chassis ethernet-switch on page 641</p> <p>show chassis ethernet-switch errors on page 641</p> <p>show chassis ethernet-switch statistics on page 642</p>
<b>Output Fields</b>	Table 101 on page 640 lists the output fields for the <b>show chassis ethernet-switch</b> command. Output fields are listed in the approximate order in which they appear.

Table 101: show chassis ethernet-switch Output Fields

Field Name	Field Description
Link is good on port n connected to device	Information about the link between each port on the CB's Ethernet switch and one of the following devices:
or	<ul style="list-style-type: none"> <li>FPC0 (Flexible PIC Concentrator 0) through FPC7</li> <li>Local controller</li> <li>Other RE (on a system with two Routing Engines)</li> <li>SPMB (Switch Processor Mezzanine Board)</li> </ul>
Link is good on FE port n connected to device	
Speed is	Speed at which the Ethernet link is running: <b>10 Mb</b> or <b>100 Mb</b> . 16E.
Duplex is	Duplex type of the Ethernet link: <b>full</b> or <b>half</b> .
Auto-negotiate is enabled	By default, interfaces automatically choose the correct speed based on the PIC type and whether the PIC is configured to operate in multiplexed mode (using the <b>no-concatenate</b> statement at the <b>[edit chassis]</b> hierarchy level, as described in the <i>Junos OS System Basics Configuration Guide</i> ).
MLT3	Number of multilevel threshold-3 (MLT-3) Fast Ethernet errors detected.
<b>Accumulated error counts for port n connected to device FPCn: (error output only)</b>	
Lock	Number of lock errors detected.
Xmit	Number of transmission errors detected.
ESD	Number of electrostatic discharge (ESD) errors detected.
False Carrier	Number of false carrier errors detected.
Disconnects	Number of disconnect errors detected.
FX mode	Number of errors detected on an Ethernet link over optical fiber.
<b>Statistics for port n connected to device FPCn (statistics output only)</b>	
TX Unicast packets	Number of unicast packets sent.
TX Multicast packets	Number of multicast packets sent.
TX Broadcast packets	Number of broadcast packets sent.
TX Late collisions	Number of packets aborted during sending because of collisions after 64 bytes.
TX Excessive collisions	Number of packets not sent because of too many collisions.
TX Dropped packets	Number of transmitted packets that were dropped.
RX Unicast packets	Number of unicast packets received.
RX Multicast packets	Number of multicast packets received.

Table 101: show chassis ethernet-switch Output Fields (*continued*)

Field Name	Field Description
RX Broadcast packets	Number of broadcast packets received.
RX FCS Errors	Number of packets discarded because of frame check sequence errors.
RX Alignment Errors	Number of incomplete octets received.
RX Dropped Packets	Number of incoming packets that were dropped.
RX Fragments	Number of fragmented packets received.
RX Symbol Errors	Number of symbols received that the router did not correctly decode.

### Sample Output

```

show chassis ethernet-switch user@host> show chassis ethernet-switch
Link is good on port 0 connected to device: FPC0
  Speed is 100Mb
  Duplex is full

Link is good on port 1 connected to device: FPC1
  Speed is 100Mb
  Duplex is full

Link is good on port 2 connected to device: FPC2
  Speed is 100Mb
  Duplex is full

Link is good on port 3 connected to device: FPC3
  Speed is 100Mb
  Duplex is full

Link is good on port 7 connected to device: Local controller
  Speed is 100Mb
  Duplex is full

Link is good on port 9 connected to device: SPMB
  Speed is 100Mb
  Duplex is full

Link is good on port 13 connected to device: FPC5
  Speed is 100Mb
  Duplex is full

show chassis ethernet-switch errors user@host> show chassis ethernet-switch errors
Accumulated error counts for port 0 connected to device FPC0:
  MLT3          2
  Lock          0
  Xmit          0
  ESD           0
  False carrier 2
  Disconnects   0
  FX mode       0

```

```

Accumulated error counts for port 1 connected to device FPC1:
MLT3          2
Lock          0
Xmit          0
ESD           0
False carrier 2
Disconnects   0
FX mode       0
Accumulated error counts for port 2 connected to device FPC2:
MLT3          2
Lock          0
Xmit          0
ESD           0
False carrier 3
Disconnects   0
FX mode       0
Accumulated error counts for port 3 connected to device FPC3:
MLT3          0
Lock          0
Xmit          0
ESD           0
False carrier 0
Disconnects   0
Accumulated error counts for port 4 connected to device Nothing:
MLT3          0
Lock          0
Xmit          0
ESD           0
False carrier 0
Disconnects   0
FX mode       0
...

```

**show chassis  
ethernet-switch  
statistics**

```

user@host> show chassis ethernet-switch statistics
Statistics for port 0 connected to device FPC0:
TX Unicast packets      68113
TX Multicast packets    0
TX Broadcast packets    20851
TX Late collisions      0
TX Excessive collisions 0
TX Dropped packets      0

RX Unicast packets      67410
RX Multicast packets    0
RX Broadcast packets    20852
RX FCS Errors           0
RX Alignment Errors     0
RX Dropped Packets      0
RX Fragments            0
RX Symbol Errors        0

Statistics for port 1 connected to device FPC1:
TX Unicast packets      66496
TX Multicast packets    0
TX Broadcast packets    20080
TX Late collisions      0
TX Excessive collisions 0
TX Dropped packets      0

RX Unicast packets      66037
RX Multicast packets    0

```

---

RX Broadcast packets	20080
RX FCS Errors	0
RX Alignment Errors	0
RX Dropped Packets	0
RX Fragments	0
RX Symbol Errors	0

Statistics for port 2 connected to device FPC2:

TX Unicast packets	64206
TX Multicast packets	0
TX Broadcast packets	21183
TX Late collisions	0
TX Excessive collisions	0
TX Dropped packets	0

RX Unicast packets	63671
RX Multicast packets	0
RX Broadcast packets	21183
RX FCS Errors	0
RX Alignment Errors	0
RX Dropped Packets	0
RX Fragments	0
RX Symbol Errors	0

Statistics for port 3 connected to device FPC3:

...

## show chassis fabric fpcs

<b>Syntax</b>	show chassis fabric fpcs <fcc number>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	( J-EX8200 switches only) Display the state of the electrical and optical switch fabric links between the Flexible PIC Concentrators (FPCs) and the Switch Interface Boards (SIBs).
<b>Options</b>	none—Display the switch fabric link state.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>show chassis fabric fpcs (J-EX8200 Switch) on page 644</b>
<b>Output Fields</b>	Table 102 on page 644 lists the output fields for the <b>show chassis fabric fpcs</b> command. Output fields are listed in the approximate order in which they appear.

**Table 102: show chassis fabric fpcs Output Fields**

Field Name	Field Description
<b>Fabric management FPC state</b>	<p>Switching fabric link (link from SIB to FPC) state for each FPC:</p> <ul style="list-style-type: none"> <li>• <b>Unused</b>—FPC is not present.</li> <li>• <b>Destination error on PFEs list of PFE numbers</b>—Destination errors to the listed Packet Forwarding Engines. Indicates that the link is not carrying traffic to the listed Packet Forwarding Engines. The list of Packet Forwarding Engines with destination errors is displayed in the output.</li> <li>• <b>Links ok</b>—Link between the spare SIB and FPC is eligible to carry traffic.</li> <li>• <b>Link error</b>—Link between the SIB and FPC has CRC errors. However, the link is still eligible to carry traffic.</li> <li>• <b>Plane disabled</b>—Fabric plane has been disabled for the following reasons: <ul style="list-style-type: none"> <li>• Destination errors have exceeded the thresholds.</li> <li>• Run-time link errors have exceeded the thresholds.</li> <li>• Initialization time link errors detected, and link training was unsuccessful.</li> </ul> </li> <li>• <b>Plane enabled</b>—Link between the active SIB and FPC is eligible to carry traffic.</li> </ul>

### Sample Output

```

show chassis fabric fpcs (J-EX8200 Switch)
user@host> show chassis fabric fpcs
Fabric management FPC state
FPC 6
  PFE #0
    Plane 0: Plane enabled

```



```
Plane 1: Plane enabled
Plane 2: Plane enabled
Plane 3: Plane enabled
Plane 4: Links ok
Plane 5: Links ok
Plane 6: Links ok
Plane 7: Links ok
Plane 8: Plane enabled
Plane 9: Plane enabled
Plane 10: Plane enabled
Plane 11: Plane enabled
PFE #1
Plane 0: Plane enabled
Plane 1: Plane enabled
Plane 2: Plane enabled
Plane 3: Plane enabled
Plane 4: Links ok
Plane 5: Links ok
Plane 6: Links ok
Plane 7: Links ok
Plane 8: Plane enabled
Plane 9: Plane enabled
Plane 10: Plane enabled
Plane 11: Plane enabled
FPC 7
PFE #0
Plane 0: Plane enabled
Plane 1: Plane enabled
Plane 2: Plane enabled
Plane 3: Plane enabled
Plane 4: Links ok
Plane 5: Links ok
Plane 6: Links ok
Plane 7: Links ok
Plane 8: Plane enabled
Plane 9: Plane enabled
Plane 10: Plane enabled
Plane 11: Plane enabled
PFE #1
Plane 0: Plane enabled
Plane 1: Plane enabled
Plane 2: Plane enabled
Plane 3: Plane enabled
Plane 4: Links ok
Plane 5: Links ok
Plane 6: Links ok
Plane 7: Links ok
Plane 8: Plane enabled
Plane 9: Plane enabled
Plane 10: Plane enabled
Plane 11: Plane enabled
```

## show chassis fabric map

**Syntax** show chassis fabric map  
plane <plane-number>

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** (J-EX8200 switches only) On the J-EX8200 switch, display the state of the switching fabric map for connections from each Packet Forwarding Engine on the Dense Port Concentrators (DPCs) to the ports on the fabric planes, as interpreted by the fabric plane. For information about the meaning of “fabric plane”, “DPCs”, and “SIBs” on the switches, see the hardware and CLI terminology equivalents table in the *Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide* or the *Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

**Options** none—Display the switching fabric map state for the J-EX8200 switch.

**plane**plane-number—(Optional) Display the state of the fabric link for the specified plane number.

- For the J-EX8208 switch, replace **plane-number** with a value from 0 through 11.
- For the J-EX8216 switch, replace **plane-number** with a value from 0 through 7.

**Required Privilege Level** view

**List of Sample Output** show chassis fabric map plane 1 (J-EX8200 Switch) on page 647

**Output Fields** Table 103 on page 646 lists the output fields for the **show chassis fabric map** command. Output fields are listed in the approximate order in which they appear.

**Table 103: show chassis fabric map Output Fields**

Field Name	Field Description
in-links	Fabric map for receive side links.
out-links	Fabric map for transmit side links.
state	State of the fabric link: <ul style="list-style-type: none"> <li>• <b>RESET</b>—Link between SIB and FPC/DPC is powered down on purpose. This is done in all non-dual PFE based boards.</li> <li>• <b>UP</b>—Link between SIB and FPC/DPC is up and running.</li> <li>• <b>DOWN</b>—Link between SIB and FPC/DPC is powered down.</li> <li>• <b>FAULT</b>—SIB is in alarmed state where the SIB's plane is not operational for the following reasons:               <ul style="list-style-type: none"> <li>• On-board F-chip is not operational.</li> <li>• Fiber optic connector faults.</li> <li>• FPC connector faults.</li> <li>• SIB midplane connector faults.</li> </ul> </li> </ul>

## Sample Output

```

user@host> show chassis fabric map plane 1
regress@tp-grande01> show chassis fabric map plane 1
show chassis fabric map plane1 (J-EX8200 Switch)
DPC6PFE0->CB0F0_00_0    Down    CB0F0_00_0->DPC6PFE0    Down
DPC6PFE1->CB0F0_00_1    Down    CB0F0_00_1->DPC6PFE1    Down
DPC6PFE2->CB0F0_00_2    Down    CB0F0_00_2->DPC6PFE2    Down
DPC6PFE3->CB0F0_00_3    Down    CB0F0_00_3->DPC6PFE3    Down
DPC0PFE0->CB0F0_01_0    Down    CB0F0_01_0->DPC0PFE0    Down
DPC0PFE1->CB0F0_01_1    Down    CB0F0_01_1->DPC0PFE1    Down
DPC0PFE2->CB0F0_01_2    Down    CB0F0_01_2->DPC0PFE2    Down
DPC0PFE3->CB0F0_01_3    Down    CB0F0_01_3->DPC0PFE3    Down
DPC5PFE0->CB0F0_02_0    Down    CB0F0_02_0->DPC5PFE0    Down
DPC5PFE1->CB0F0_02_1    Down    CB0F0_02_1->DPC5PFE1    Down
DPC5PFE2->CB0F0_02_2    Down    CB0F0_02_2->DPC5PFE2    Down
DPC5PFE3->CB0F0_02_3    Down    CB0F0_02_3->DPC5PFE3    Down
DPC3PFE0->CB0F0_03_0    Down    CB0F0_03_0->DPC3PFE0    Down
DPC3PFE1->CB0F0_03_1    Down    CB0F0_03_1->DPC3PFE1    Down
DPC3PFE2->CB0F0_03_2    Down    CB0F0_03_2->DPC3PFE2    Down
DPC3PFE3->CB0F0_03_3    Down    CB0F0_03_3->DPC3PFE3    Down
DPC4PFE0->CB0F0_04_0    Down    CB0F0_04_0->DPC4PFE0    Down
DPC4PFE1->CB0F0_04_1    Down    CB0F0_04_1->DPC4PFE1    Down
DPC4PFE2->CB0F0_04_2    Down    CB0F0_04_2->DPC4PFE2    Down
DPC4PFE3->CB0F0_04_3    Down    CB0F0_04_3->DPC4PFE3    Down
DPC2PFE0->CB0F0_05_0    Down    CB0F0_05_0->DPC2PFE0    Down
DPC2PFE1->CB0F0_05_1    Down    CB0F0_05_1->DPC2PFE1    Down
DPC2PFE2->CB0F0_05_2    Down    CB0F0_05_2->DPC2PFE2    Down
DPC2PFE3->CB0F0_05_3    Down    CB0F0_05_3->DPC2PFE3    Down
DPC7PFE0->CB0F0_06_0    Down    CB0F0_06_0->DPC7PFE0    Down
DPC7PFE1->CB0F0_06_1    Down    CB0F0_06_1->DPC7PFE1    Down
DPC7PFE2->CB0F0_06_2    Down    CB0F0_06_2->DPC7PFE2    Down
DPC7PFE3->CB0F0_06_3    Down    CB0F0_06_3->DPC7PFE3    Down
DPC1PFE0->CB0F0_07_0    Down    CB0F0_07_0->DPC1PFE0    Down
DPC1PFE1->CB0F0_07_1    Down    CB0F0_07_1->DPC1PFE1    Down
DPC1PFE2->CB0F0_07_2    Down    CB0F0_07_2->DPC1PFE2    Down
DPC1PFE3->CB0F0_07_3    Down    CB0F0_07_3->DPC1PFE3    Down
DPC0PFE0->CB0F0_08_0    Down    CB0F0_08_0->DPC0PFE0    Down
DPC0PFE1->CB0F0_08_1    Down    CB0F0_08_1->DPC0PFE1    Down
DPC0PFE2->CB0F0_08_2    Down    CB0F0_08_2->DPC0PFE2    Down
DPC0PFE3->CB0F0_08_3    Down    CB0F0_08_3->DPC0PFE3    Down
DPC7PFE0->CB0F0_09_0    Down    CB0F0_09_0->DPC7PFE0    Down
DPC7PFE1->CB0F0_09_1    Down    CB0F0_09_1->DPC7PFE1    Down
DPC7PFE2->CB0F0_09_2    Down    CB0F0_09_2->DPC7PFE2    Down
DPC7PFE3->CB0F0_09_3    Down    CB0F0_09_3->DPC7PFE3    Down
DPC1PFE0->CB0F0_10_0    Down    CB0F0_10_0->DPC1PFE0    Down
DPC1PFE1->CB0F0_10_1    Down    CB0F0_10_1->DPC1PFE1    Down
DPC1PFE2->CB0F0_10_2    Down    CB0F0_10_2->DPC1PFE2    Down
DPC1PFE3->CB0F0_10_3    Down    CB0F0_10_3->DPC1PFE3    Down
DPC4PFE0->CB0F0_11_0    Down    CB0F0_11_0->DPC4PFE0    Down
DPC4PFE1->CB0F0_11_1    Down    CB0F0_11_1->DPC4PFE1    Down
DPC4PFE2->CB0F0_11_2    Down    CB0F0_11_2->DPC4PFE2    Down
DPC4PFE3->CB0F0_11_3    Down    CB0F0_11_3->DPC4PFE3    Down
DPC2PFE0->CB0F0_12_0    Down    CB0F0_12_0->DPC2PFE0    Down
DPC2PFE1->CB0F0_12_1    Down    CB0F0_12_1->DPC2PFE1    Down
DPC2PFE2->CB0F0_12_2    Down    CB0F0_12_2->DPC2PFE2    Down
DPC2PFE3->CB0F0_12_3    Down    CB0F0_12_3->DPC2PFE3    Down
DPC5PFE0->CB0F0_13_0    Down    CB0F0_13_0->DPC5PFE0    Down
DPC5PFE1->CB0F0_13_1    Down    CB0F0_13_1->DPC5PFE1    Down
DPC5PFE2->CB0F0_13_2    Down    CB0F0_13_2->DPC5PFE2    Down
DPC5PFE3->CB0F0_13_3    Down    CB0F0_13_3->DPC5PFE3    Down
DPC3PFE0->CB0F0_14_0    Down    CB0F0_14_0->DPC3PFE0    Down

```

DPC3PFE1->CB0F0_14_1	Down	CB0F0_14_1->DPC3PFE1	Down
DPC3PFE2->CB0F0_14_2	Down	CB0F0_14_2->DPC3PFE2	Down
DPC3PFE3->CB0F0_14_3	Down	CB0F0_14_3->DPC3PFE3	Down
DPC6PFE0->CB0F0_15_0	Down	CB0F0_15_0->DPC6PFE0	Down
DPC6PFE1->CB0F0_15_1	Down	CB0F0_15_1->DPC6PFE1	Down
DPC6PFE2->CB0F0_15_2	Down	CB0F0_15_2->DPC6PFE2	Down
DPC6PFE3->CB0F0_15_3	Down	CB0F0_15_3->DPC6PFE3	Down

## show chassis fabric plane

<b>Syntax</b>	show chassis fabric plane
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display the state of all fabric planes. This command can be used on the master Routing Engine only.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<b>show chassis fabric plane (J-EX8200 Switch) on page 649</b>
<b>Output Fields</b>	Table 104 on page 649 lists the output fields for the <b>show chassis fabric plane</b> command. Output fields are listed in the approximate order in which they appear.

Table 104: show chassis fabric plane Output Fields

Field Name	Field Description	Level of output
Plane	Number of the plane.	none
Plane state	State of each plane: <ul style="list-style-type: none"> <li>• <b>ACTIVE</b>—SIB is operational and running.</li> <li>• <b>OFFLINE</b>—SIB is powered down.</li> <li>• <b>FAULTY</b>— SIB is in alarmed state where the SIB's plane is not operational for the following reasons:               <ul style="list-style-type: none"> <li>• On-board fabric ASIC is not operational.</li> <li>• Fiber optic connector faults.</li> <li>• FPC connector faults.</li> <li>• SIB midplane connector faults.</li> </ul> </li> </ul>	none

### Sample Output

```

show chassis fabric plane (J-EX8200 Switch) user@host> show chassis fabric plane
Fabric management PLANE state
Plane 0
  Plane state: ACTIVE
Plane 1
  Plane state: ACTIVE
Plane 2
  Plane state: ACTIVE
Plane 3
  Plane state: ACTIVE
Plane 4
  Plane state: SPARE
Plane 5
  Plane state: SPARE
Plane 6
  Plane state: SPARE
Plane 7
  Plane state: SPARE

```

```
Plane 8
  Plane state: ACTIVE
Plane 9
  Plane state: ACTIVE
Plane 10
  Plane state: ACTIVE
Plane 11
  Plane state: ACTIVE
```

## show chassis fabric plane-location

<b>Syntax</b>	show chassis fabric plane-location
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display the Control Board (CB) location of each plane. This command can be used on the master Routing Engine or the backup Routing Engine. For information about the meaning of “CBs” and “fabric plane” on the switches, see the hardware and CLI terminology equivalents table in the <i>Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide</i> or the <i>Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a> .
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	show chassis fabric plane-location (J-EX8200 Switch) on page 651
<b>Output Fields</b>	Table 105 on page 651 lists the output fields for the <b>show chassis fabric plane location</b> command. Output fields are listed in the approximate order in which they appear.

**Table 105: show chassis fabric plane location Output Fields**

Field Name	Field Description
Plane <i>n</i>	Plane number.
Control Board <i>n</i>	Control board number.

### Sample Output

```

show chassis fabric plane-location (J-EX8200 Switch)
user@host> show chassis fabric plane-location
-----Fabric Plane Locations-----
Plane 0           Control Board 0
Plane 1           Control Board 0
Plane 2           Control Board 0
Plane 3           Control Board 0
Plane 4           Control Board 1
Plane 5           Control Board 1
Plane 6           Control Board 1
Plane 7           Control Board 1
Plane 8           Control Board 2
Plane 9           Control Board 2
Plane 10          Control Board 2
Plane 11          Control Board 2

```

## show chassis fpc

---

<b>Syntax</b>	show chassis fpc <detail <slot>>   <pic-status <slot>>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display status information about the installed Flexible PIC Concentrators (FPCs) and PICs.
<b>Options</b>	<p>none—Display status information for all FPCs.</p> <p>detail—(Optional) Display detailed status information for all FPCs or for the FPC in the specified slot (see <i>fpc-slot</i> or <i>slot</i>).</p> <p><i>fpc-slot</i>—(Optional) FPC slot number:</p> <ul style="list-style-type: none"> <li>• J-EX Series switches: <ul style="list-style-type: none"> <li>• J-EX4200 standalone switches—Replace <i>fpc-slot</i> with <b>0</b>.</li> <li>• J-EX4200 switches in a Virtual Chassis configuration—Replace <i>fpc-slot</i> with a value from <b>0</b> through <b>9</b> (switch's member ID).</li> <li>• J-EX8208 switches—Replace <i>fpc-slot</i> with a value from <b>0</b> through <b>7</b> (line card).</li> <li>• J-EX8216 switches—Replace <i>fpc-slot</i> with a value from <b>0</b> through <b>15</b> (line card).</li> </ul> </li> </ul> <p><i>pic-status</i>—(Optional) Display status information for all PICs or for the PIC in the specified slot (see <i>fpc-slot</i>).</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• request chassis fpc on page 621</li> </ul>
<b>List of Sample Output</b>	<p>show chassis fpc (Hardware Not Supported) on page 654</p> <p>show chassis fpc detail (Hardware Not Supported) on page 654</p> <p>show chassis fpc pic-status on page 654</p>
<b>Output Fields</b>	Table 106 on page 653 lists the output fields for the <b>show chassis fpc</b> command. Output fields are listed in the approximate order in which they appear.



Table 106: show chassis fpc Output Fields

Field Name	Field Description	Level of Output
<b>Slot</b> or <b>Slot State</b>	Slot number and state. The state can be one of the following conditions: <ul style="list-style-type: none"> <li>• <b>Dead</b>—Held in reset because of errors.</li> <li>• <b>Diag</b>—Slot is being ignored while the FPC is running diagnostics.</li> <li>• <b>Dormant</b>—Held in reset.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Online</b>—FPC is online and running.</li> <li>• <b>Present</b>—FPC is detected by the chassis daemon but either is not supported by the current version of Junos OS or is inserted in the wrong slot. The output also states either <b>Hardware Not Supported</b> or <b>Hardware Not In Right Slot</b>. The FPC is coming up but not yet online.</li> <li>• <b>Probed</b>—Probe is complete; awaiting restart of the Packet Forwarding Engine (PFE).</li> <li>• <b>Probe-wait</b>—Waiting to be probed.</li> </ul>	all levels
<b>Logical slot</b>	Slot number.	all levels
<b>Temp (C) or Temperature</b>	Temperature of the air passing by the FPC, in degrees Celsius or in both Celsius and Fahrenheit.	all levels
<b>Total CPU Utilization (%)</b>	Total percentage of CPU being used by the FPC's processor.	all levels
<b>Interrupt CPU Utilization (%)</b>	Of the total CPU being used by the FPC's processor, the percentage being used for interrupts.	none specified
<b>Memory DRAM (MB)</b>	Total DRAM, in megabytes, available to the FPC's processor.	none specified
<b>Heap Utilization (%)</b>	Percentage of heap space (dynamic memory) being used by the FPC's processor. If this number exceeds 80 percent, there may be a software problem (memory leak).	none specified
<b>Buffer Utilization (%)</b>	Percentage of buffer space being used by the FPC's processor for buffering internal messages.	none specified
<b>Total CPU DRAM</b>	Amount of DRAM available to the FPC's CPU.	<b>detail</b>
<b>Total RLDRAM</b>	Amount of reduced latency dynamic random access memory (RLDRAM) available to the FPC CPU.	<b>detail</b>
<b>Total DDR DRAM</b>	Amount of double data rate dynamic random access memory (DDR DRAM) available to the FPC CPU.	<b>detail</b>
<b>Total SRAM</b>	Amount of static RAM (SRAM) used by the FPC's CPU.	<b>detail</b>
<b>Total SDRAM</b>	Total amount of memory used for storing packets and notifications.	<b>detail</b>

Table 106: show chassis fpc Output Fields (continued)

Field Name	Field Description	Level of Output
I/O Manager ASICs information	I/O Manager version number, manufacturer, and part number.	detail
Start time	Time when the Routing Engine detected that the FPC was running.	detail
Uptime	How long the Routing Engine has been connected to the FPC and, therefore, how long the FPC has been up and running.	detail
PIC type	(pic-status output only) Type of PIC.	none specified

### Sample Output

```

show chassis fpc      user@host> show chassis fpc
(Hardware Not      show chassis fpc
Supported)
Slot State      Temp CPU Utilization (%)  Memory  Utilization (%)
                (C) Total Interrupt      DRAM (MB) Heap      Buffer
-----
0 Online        ----- CPU less FPC -----
1 Present      ----- Hardware Not In Right Slot -----
2 Online        0      0      0      0      0
3 Present      ----- Hardware Not Supported -----
4 Empty
5 Empty
6 Online        0      0      0      0      0

show chassis fpc detail user@host> show chassis fpc detail
(Hardware Not      Slot 0 information:
Supported)      State Online
                  Total CPU DRAM ---- CPU less FPC ----
                  Start time 2006-07-07 03:21:00 UTC
                  Uptime 27 minutes, 51 seconds
Slot 1 information:
                  State Present
                  Reason --- Hardware Not In Right Slot ---
Slot 2 information:
                  State Online
                  Total CPU DRAM 32 MB
                  Start time 2006-07-07 03:20:59 UTC
                  Uptime 27 minutes, 52 seconds
Slot 3 information:
                  State Present
                  Reason --- Hardware Not Supported ---
                  Total CPU DRAM 0 MB
Slot 6 information:
                  State Online
                  Total CPU DRAM 32 MB
                  Start time 2006-07-07 03:21:01 UTC
                  Uptime 27 minutes, 50 seconds

show chassis fpc      user@host> show chassis fpc pic-status
pic-status      Slot 0 Online
                  PIC 1 1x OC-12 ATM, MM
                  PIC 2 1x OC-12 ATM, MM
    
```

PIC 3 1x OC-12 ATM, MM  
Slot 1 Online  
PIC 0 1x OC-48 SONET, SMIR  
Slot 2 Online  
PIC 0 1x OC-192 SONET, SMSR

## show chassis hardware

---

<b>Syntax</b>	show chassis hardware <clei-models   detail   extensive   models>
<b>Syntax (EX Series)</b>	show chassis hardware <clei-models> <detail   extensive> <models>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Display a list of all Flexible PIC Concentrators (FPCs) and PICs installed in the router or switch chassis, including the hardware version level and serial number.</p> <p>In J-EX Series switch command output, FPC refers to the following:</p> <ul style="list-style-type: none"> <li>• On J-EX4200 standalone switches and J-EX4500 switches—Refers to the switch; FPC <i>number</i> is always 0.</li> <li>• On J-EX4200 switches in a Virtual Chassis configuration—Refers to the member of a Virtual Chassis; FPC <i>number</i> equals the member ID, from 0 through 9.</li> <li>• On J-EX8208 and J-EX8216 switches—Refers to a line card; FPC <i>number</i> equals the slot number for the line card.</li> </ul>
<b>Options</b>	<p>none—Display information about hardware.</p> <p>clei-models—(Optional) Display Common Language Equipment Identifier (CLEI) bar code and model number for orderable field-replaceable units (FRUs).</p> <p>detail—(Optional) Include RAM and disk information in output.</p> <p>extensive—(Optional) Display ID EEPROM information.</p> <p>models—(Optional) Display model numbers and part numbers for orderable FRUs and, for components that use ID EEPROM format v2, the CLEI code.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><b>show chassis hardware (J-EX8216 Switch) on page 658</b></p> <p><b>show chassis hardware clei-models (J-EX8216 Switch) on page 658</b></p> <p><b>show chassis hardware detail (J-EX4200 Switch) on page 659</b></p> <p><b>show chassis hardware models (J-EX4500 Switch) on page 659</b></p>
<b>Output Fields</b>	Table 107 on page 657 lists the output fields for the <b>show chassis hardware</b> command. Output fields are listed in the approximate order in which they appear.

Table 107: show chassis hardware Output Fields

Field Name	Field Description	Level of Output
<b>Item</b>	Chassis component: <ul style="list-style-type: none"> <li>(J-EX Series switches)—Information about the chassis, Routing Engine (SRE and RE modules in J-EX8200 switches), power supplies, fan trays, and LCD panel. Also displays information about Flexible PIC Concentrators (FPCs) and associated Physical Interface Cards (PICs). Information about the backplane, midplane, and SIBs (SF modules) is displayed for J-EX8200 switches. See the hardware and CLI terminology equivalents table in the <i>Dell PowerConnect J-Series J-EX8208 Ethernet Switch Hardware Guide</i> or the <i>Dell PowerConnect J-Series J-EX8216 Ethernet Switch Hardware Guide</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a>.</li> </ul>	All levels
<b>Version</b>	Revision level of the chassis component.	All levels
<b>Part number</b>	Part number of the chassis component.	All levels
<b>Serial number</b>	Serial number of the chassis component. The serial number of the backplane is also the serial number of the router or switch chassis. Use this serial number when you need to contact Juniper Networks Customer Support about the router or switch chassis.	All levels
<b>Assb ID or Assembly ID</b>	( <b>extensive</b> keyword only) Identification number that describes the FRU hardware.	<b>extensive</b>
<b>Assembly Version</b>	( <b>extensive</b> keyword only) Version number of the FRU hardware.	<b>extensive</b>
<b>Assembly Flags</b>	( <b>extensive</b> keyword only) Flags.	<b>extensive</b>
<b>FRU model number</b>	( <b>clei-models</b> , <b>extensive</b> , and <b>models</b> keyword only) Model number of FRU hardware component.	none specified
<b>CLEI code</b>	( <b>clei-models</b> and <b>extensive</b> keyword only) Common Language Equipment Identifier code. This value is displayed only for hardware components that use ID EEPROM format v2. This value is not displayed for components that use ID EEPROM format v1.	none specified
<b>EEPROM Version</b>	ID EEPROM version used by hardware component: <b>0x00</b> (version 0), <b>0x01</b> (version 1), or <b>0x02</b> (version 2).	<b>extensive</b>
<b>Description</b>	Brief description of the hardware item: <ul style="list-style-type: none"> <li>Type of power supply.</li> <li>Type of PIC. If the PIC type is not supported on the current software release, the output states <b>Hardware Not Supported</b>.</li> <li>Type of FPC: <b>FPC Type 1</b>, <b>FPC Type 2</b>, <b>FPC Type 3</b>, <b>FPC Type 4</b>, or <b>FPC Type OC192</b>. On J-EX Series switches, a brief description of the FPC.</li> <li><b>MPC M 16x 10GE</b>—16-port 10-Gigabit Module Port Concentrator that supports SFP+ optical transceivers. (Not on J-EX Series switches.)</li> <li>For hosts, the Routing Engine type.</li> </ul>	All levels

Table 107: show chassis hardware Output Fields (*continued*)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> <li>For small form-factor pluggable transceiver (SFP) modules, the type of fiber: LX, SX, LH, or T.</li> <li>LCD description for J-EX Series switches.</li> </ul>	

## Sample Output

```

show chassis hardware user@host> show chassis hardware
(J-EX8216 Switch) Hardware inventory:
Item                Version  Part number  Serial number  Description
Chassis             REV 06                CY0109260072  DELL J-EX8216
Midplane           REV 06    710-016845  BA0909160167  EX8216-MP
CB 0                REV 22    710-020771  AX0109197708  EX8216-RE320
Routing Engine 0    BUILTIN                BUILTIN        RE-EX8216
CB 1                REV 22    710-020771  AX0109197755  EX8216-RE320
Routing Engine 1    BUILTIN                BUILTIN        RE-EX8216
FPC 5              REV 20    710-020683  BC0109228159  EX8200-48F
CPU                REV 13    710-020598  BF0109197545  EX8200-CPU
PIC 0              BUILTIN                BUILTIN        48x 100 Base-FX/1000
Base-X
SIB 0              REV 10    710-021613  AY0109207864  EX8216-SF320
SIB 1              REV 10    710-021613  AY0109207808  EX8216-SF320
SIB 2              REV 10    710-021613  AY0109207917  EX8216-SF320
SIB 3              REV 10    710-021613  AY0109207831  EX8216-SF320
SIB 4              REV 10    710-021613  AY0109207811  EX8216-SF320
SIB 5              REV 10    710-021613  AY0109207881  EX8216-SF320
SIB 6              REV 10    710-021613  AY0109207837  EX8216-SF320
SIB 7              REV 10    710-021613  AY0109207819  EX8216-SF320
PSU 0              REV 01    740-030762  BG0709251730  EX8200-AC2K
PSU 1              REV 01    740-030762  BG0709251728  EX8200-AC2K
PSU 2              REV 01    740-030762  BG0709251743  EX8200-AC2K
PSU 3              REV 01    740-030762  BG0709251741  EX8200-AC2K
PSU 4              REV 01    740-030762  BG0709251729  EX8200-AC2K
PSU 5              REV 01    740-030762  BG0709251737  EX8200-AC2K
Top Fan Tray
FTC 0              REV 1     760-030533  CX1209110149  EX8216-FT
FTC 1              REV 1     760-030533  CX1209110149  EX8216-FT
Bottom Fan Tray
FTC 0              REV 1     760-030533  CX1209110121  EX8216-FT
FTC 1              REV 1     760-030533  CX1209110121  EX8216-FT
LCD 0              REV 04    710-025742  CE0109020194  EX8200 LCD

```

## Sample Output

```

show chassis hardware user@host> show chassis hardware clei-models
clei-models (J-EX8216 Switch) Hardware inventory:
Item                Version  Part number  CLEI code      FRU model number
Midplane           REV 08    710-016845                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 0              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 1              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 2              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 3              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 4              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR
PSU 5              REV 05    740-023002                COUPAEAEAA     EX8200-PWR-AC3KR

```

Top Fan Tray  
Bottom Fan Tray

### Sample Output

```

user@host> show chassis hardware detail
show chassis hardware detail (J-EX4200 Switch)
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               BM0208327733  DELL J-EX4200-24T
Routing Engine 0 REV 11   750-021256  BM0208327733  EX4200-24T, 8 POE
Routing Engine 0                               BM0208327733  EX4200-24T, 8 POE
FPC 0          REV 11   750-021256  BM0208327733  EX4200-24T, 8 POE
  CPU                               BUILTIN       BUILTIN       FPC CPU
  PIC 0                               BUILTIN       BUILTIN       24x 10/100/1000 Base-T
  PIC 1          REV 03B  711-021270  AR0208162285  4x GE SFP
  BRD            REV 08   711-021264  AK0208328289  EX4200-24T, 8 POE
Power Supply 0 REV 03   740-020957  AT0508346354  PS 320W AC
Fan Tray

```

### Sample Output

```

user@host> show chassis hardware models
show chassis hardware models (J-EX4500 Switch)
Hardware inventory:
Item          Version  Part number  Serial number  FRU model number
Routing Engine 0 REV 01   750-035700  GG0210271867  EX4500-40F-FB-C
FPC 0          REV 01   750-035700  GG0210271867  EX4500-40F-FB-C
  PIC 0                               BUILTIN       BUILTIN       EX4500-40F-FB-C
Power Supply 1 REV 01   740-029654  H884FS00JC09  EX4500-PWR1-AC-FB

```

## show chassis led

---

<b>Syntax</b>	<code>show chassis led</code> <code>&lt;fpc-slot &lt;fpc-slot-number&gt;&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the status and colors of the chassis LEDs on the front panel of the switch. A major alarm (red) indicates a critical error condition that requires immediate action. A minor alarm (yellow) indicates a noncritical condition that requires monitoring or maintenance. A minor alarm that is left unchecked might cause interruption in service or performance degradation.
<b>Options</b>	<p><code>none</code>—Display the status of the chassis status LEDs (for J-EX4200 switches configured as a Virtual Chassis, display the information for all Virtual Chassis members).</p> <p><code>fpc-slot &lt;fpc-slot-number&gt;</code>—(Optional) Display the information as follows:</p> <ul style="list-style-type: none"> <li>(Standalone J-EX4200 or J-EX4500 switches) Display the status of the chassis status LEDs for either an FPC slot with no <code>fpc-slot-number</code> value specified or for the FPC slot specified by <code>fpc-slot 0</code>. <code>fpc-slot</code> refers to the switch itself and <code>0</code> is the only valid value for <code>fpc-slot-number</code>. Output for these options is the same as for the <code>none</code> option.</li> <li>(J-EX4200 switches in a Virtual Chassis with two or more members) If no <code>fpc-slot-number</code> value is specified, display the status of the chassis status LEDs for all members of the Virtual Chassis. Output for this option is the same as for the <code>none</code> option. If the <code>fpc-slot-number</code> value is specified (it equals the <code>member-id</code> value), display the status of the chassis status LEDs for the specified member.</li> <li>(J-EX8200 switches)—Display the status of the chassis status LEDs for the line card in the line-card slot specified by the <code>fpc-slot-number</code> value.</li> </ul>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Chassis Status LEDs in J-EX4200 Switches</li> <li>Chassis Status LEDs in J-EX4500 Switches</li> <li>Chassis Status LEDs in a J-EX8200 Switch</li> </ul>
<b>Output Fields</b>	Table 108 on page 661 lists the output fields for the <code>show chassis led</code> command. Output fields are listed in the approximate order in which they appear.



Table 108: show chassis led Output Fields

Field Name	Field Description
<b>Front panel contents for slot</b>	FPC slot number of the switch whose content is being displayed. The number is always 0, except for J-EX4200 switches in a Virtual Chassis, where it is the member ID value.
<b>Front panel contents (J-EX8200 switches)</b>	On J-EX8200 switches, no slot number is displayed.
<b>Alarms LED</b>	Displays status of the ALM LED: <ul style="list-style-type: none"> <li>• Off—No alarm has been configured.</li> <li>• Green—No alarm has been triggered.</li> <li>• Red—Major alarm.</li> <li>• Yellow—Minor alarm</li> </ul>
<b>System LED</b>	Displays status of the SYS LED: <ul style="list-style-type: none"> <li>• Off—Switch is powered off.</li> <li>• Green—Switch is operating normally.</li> <li>• Yellow—Switch is booting.</li> </ul>
<b>Master LED:</b>	Displays status of the MST LED (on J-EX4200 and J-EX8200 switches): <ul style="list-style-type: none"> <li>• Green—On a J-EX4200 Virtual Chassis switch, indicates the switch is the master in the Virtual Chassis configuration. On other switches, indicates that the Routing Engine is operational.</li> <li>• Off <ul style="list-style-type: none"> <li>• On a J-EX4200 Virtual Chassis switch, indicates that this switch is not the master in the Virtual Chassis configuration.</li> <li>• On standalone J-EX4200 and J-EX8200 switches, indicates that the Routing Engine is not operational.</li> </ul> </li> </ul>
<b>Interface</b>	Names of the interfaces on the switch.
<b>LED (ADM/SPD/DPX/POE)</b>	State of the currently selected port parameter of the Status LED for the interface. The Status LED port parameters are: <p><b>NOTE:</b> J-EX4500 and J-EX8200 switches do not have the POE port parameter.</p> <ul style="list-style-type: none"> <li>• <b>ADM</b>—Administrative</li> <li>• <b>SPD</b>—Speed</li> <li>• <b>DPX</b>—Duplex</li> <li>• <b>POE</b>—Power over Ethernet</li> </ul>

**show chassis led**

```

user@switch> show chassis led

Front panel contents for slot: 0
-----
LEDs status:

```

```

Alarms LED: Off
System LED: Green
Master LED: Green
Interface      LED(ADM/SPD/DPX/POE)
-----
ge-0/0/0      Off
ge-0/0/1      Full Duplex
ge-0/0/2      Full Duplex
ge-0/0/3      Off
ge-0/0/4      Off
ge-0/0/5      Full Duplex
ge-0/0/6      Full Duplex
ge-0/0/7      Full Duplex
ge-0/0/8      Full Duplex
ge-0/0/9      Full Duplex
ge-0/0/10     Full Duplex
ge-0/0/11     Full Duplex
ge-0/0/12     Full Duplex
ge-0/0/13     Full Duplex
ge-0/0/14     Full Duplex
ge-0/0/15     Full Duplex
ge-0/0/16     Full Duplex
ge-0/0/17     Full Duplex
ge-0/0/18     Full Duplex
ge-0/0/19     Full Duplex
ge-0/0/20     Full Duplex
ge-0/0/21     Full Duplex
ge-0/0/22     Off
ge-0/0/23     Off
ge-0/0/24     Full Duplex
ge-0/0/25     Full Duplex
ge-0/0/26     Off
ge-0/0/27     Off
ge-0/0/28     Full Duplex
ge-0/0/29     Full Duplex

```

### show chassis led fpc-slot 0

```

user@switch> show chassis led fpc-slot 0
Front panel contents for slot: 0
-----
LEDs status:
  Alarms LED: Red
  System LED: Green
  Master LED: Green
Interface      LED(ADM/SPD/DPX/POE)
-----
ge-0/0/0      Off
ge-0/0/1      Off
ge-0/0/2      Off
ge-0/0/3      Off
ge-0/0/4      Off
ge-0/0/5      Off
ge-0/0/6      Off
ge-0/0/7      Off
ge-0/0/8      Off
ge-0/0/9      Off
ge-0/0/10     Off
ge-0/0/11     Off
ge-0/0/12     Off
ge-0/0/13     Off

```

ge-0/0/14	Off
ge-0/0/15	Off
ge-0/0/16	Off
ge-0/0/17	Off
ge-0/0/18	Off
ge-0/0/19	Off
ge-0/0/20	Off
ge-0/0/21	Off
ge-0/0/22	Off
ge-0/0/23	Off

## show chassis location

<b>Syntax</b>	show chassis location
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the physical location of the chassis. This command can only be used on the master Routing Engine.
<b>Options</b>	none—Display all information about the physical location of the chassis.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show chassis location on page 664</p> <p>show chassis location on page 664</p>
<b>Output Fields</b>	Table 109 on page 664 lists the output fields for the <b>show chassis location</b> command. Output fields are listed in the approximate order in which they appear.

**Table 109: show chassis location Output Fields**

Field Name	Field Description
country-code	Country code information.
postal-code	Postal code information.
Building	Building information.
Floor	Floor information.
Global FPC	Global FPC number. The FPC slot number, when all FPC slots in the Routing Matrix are considered. The range of values is 0 through 31.

### Sample Output

```
show chassis location user@host> show chassis location
country-code: US
postal-code: 94404
Building: Building 2, Floor: 2
```

### Sample Output

```
show chassis location user@host> show chassis location
country-code: US
postal-code: 94404
Building: Building 2, Floor: 2
```

## show chassis pic

<b>Syntax</b>	<code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display status information about the PIC installed in the specified Flexible PIC Concentrator (FPC) and PIC slot.
<b>Options</b>	<p><code>fpc-slot <i>slot-number</i></code>—Display information about the PIC in this particular FPC slot:</p> <ul style="list-style-type: none"> <li>J-EX Series switches: <ul style="list-style-type: none"> <li>J-EX4200 standalone switches—Replace <i>slot-number</i> with 0.</li> <li>J-EX4200 switches in a Virtual Chassis configuration—Replace <i>slot-number</i> with a value from 0 through 9 (switch's member ID).</li> <li>J-EX8208 switches—Replace <i>slot-number</i> with a value from 0 through 7 (line card).</li> <li>J-EX8216 switches—Replace <i>slot-number</i> with a value from 0 through 15 (line card).</li> </ul> </li> </ul> <p><code>pic-slot <i>slot-number</i></code>—Display information about the PIC in this particular PIC slot. For J-EX4200 switches, replace <i>slot-number</i> with 0 for built-in network interfaces and 1 for interfaces on uplink modules. For J-EX8208 and J-EX8216 switches, replace <i>slot-number</i> with 0.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>request chassis pic on page 236</li> </ul>
<b>List of Sample Output</b>	<p>show chassis pic fpc-slot pic-slot on page 667</p> <p>show chassis pic fpc-slot pic-slot (PIC Offline) on page 667</p> <p>show chassis pic fpc-slot pic-slot (FPC Offline) on page 667</p> <p>show chassis pic fpc-slot pic-slot (FPC Not Present) on page 667</p> <p>show chassis pic fpc-slot pic-slot (PIC Not Present) on page 667</p> <p>show chassis pic fpc-slot pic-slot (OTN) on page 667</p>
<b>Output Fields</b>	Table 110 on page 665 lists the output fields for the <code>show chassis pic</code> command. Output fields are listed in the approximate order in which they appear.

Table 110: show chassis pic Output Fields

Field Name	Field Description
Type	PIC type.
ASIC type	Type of ASIC on the PIC.

Table 110: show chassis pic Output Fields (*continued*)

Field Name	Field Description
<b>State</b>	Status of the PIC. State is displayed only when a PIC is in the slot. <ul style="list-style-type: none"> <li>• <b>Online</b>—PIC is online and running.</li> <li>• <b>Offline</b>—PIC is powered down.</li> </ul>
<b>PIC version</b>	PIC hardware version.
<b>Uptime</b>	How long the PIC has been online.
<b>Package</b>	(MultiServices PICs only) Services package supported: <b>Layer-2</b> or <b>Layer-3</b> .
<b>PIC Port Information</b>	Port-level information for the PIC.
<b>Port Number</b>	Port number for the PIC.
<b>Cable Type</b>	Type of cable connected to the port: <b>LH</b> , <b>LX</b> , or <b>SX</b>
<b>PIC Port Information (MX960 Router Bidirectional Optics)</b>	Port-level information for the PIC. <ul style="list-style-type: none"> <li>• Port—Port number</li> <li>• Cable type—Type of small form-factor pluggable (SFP) optical transceiver installed. Uplink interfaces display -U. Down link interfaces display -D.</li> <li>• Fiber type—Type of fiber. SM is single-mode.</li> <li>• Xcvr vendor—Transceiver vendor name.</li> <li>• Xcvr vendor part number—Transceiver vendor part number. <ul style="list-style-type: none"> <li>• BX10-10-km bidirectional optics.</li> <li>• BX40-40-km bidirectional optics.</li> <li>• SFP-LX-40-km SFP optics.</li> </ul> </li> <li>• Wavelength—Wavelength of the transmitted signal. Uplinks are always 1310 nm. Downlinks are either 1490 nm or 1550 nm.</li> </ul>
<b>PIC Port Information (next-generation SONET/SDH SFP)</b>	Port-level information for the next-generation SONET/SDH SFP PIC. <ul style="list-style-type: none"> <li>• Port—Port number</li> <li>• Cable type—Type of small form-factor pluggable (SFP) optical transceiver installed.</li> <li>• Fiber type—Type of fiber: <b>SM</b> (single-mode) or <b>MM</b> (multimode).</li> <li>• Xcvr vendor—Transceiver vendor name.</li> <li>• Xcvr vendor part number—Transceiver vendor part number.</li> <li>• Wavelength—Wavelength of the transmitted signal. Next-generation SONET/SDH SFPs use 1310 nm.</li> </ul>

## Sample Output

```

show chassis pic fpc-slot pic-slot user@host> show chassis pic fpc-slot 2 pic-slot 0
PIC fpc slot 2 pic slot 0 information:
  Type                10x 1GE(LAN), 1000 BASE
  ASIC type           H chip
  State               Online
  PIC version         1.1
  Uptime              1 day, 50 minutes, 58 seconds
PIC Port Information:
  Port      Cable
  Number    Type
  0         GIGE 1000LX
  6         GIGE 1000LX

show chassis pic fpc-slot pic-slot (PIC Offline) user@host> show chassis pic fpc-slot 1 pic-slot 0
PIC fpc slot 1 pic slot 0 information:
  State                Offline

show chassis pic fpc-slot pic-slot (FPC Offline) user@host> show chassis pic fpc-slot 1 pic-slot 0
FPC 1 is not online

show chassis pic fpc-slot pic-slot (FPC Not Present) user@host> show chassis pic fpc-slot 4 pic-slot 0
FPC slot 4 is empty

show chassis pic fpc-slot pic-slot (PIC Not Present) user@host> show chassis pic fpc-slot 5 pic-slot 2
FPC 5, PIC 2 is empty

show chassis pic fpc-slot pic-slot (OTN) user@host> show chassis pic fpc-slot 5 pic-slot 0
PIC fpc slot 5 pic slot 0 information:
  Type                1x10GE(LAN),OTN
  ASIC type           H chip
  State               Online
  PIC version         1.0
  Uptime              5 minutes, 50 seconds

```

## show chassis routing-engine

<b>Syntax</b>	show chassis routing-engine <bios   <i>slot</i> >
<b>Syntax (J-EX Series Switch)</b>	show chassis routing-engine < <i>slot</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the status of the Routing Engine.
<b>Options</b>	<p>none—Display information about one or more Routing Engines.</p> <p>bios—(Optional) Display the basic input/output system (BIOS) firmware version.</p> <p><i>slot</i>—(Systems with multiple Routing Engines) (Optional) Display information for an individual Routing Engine. Replace <i>slot</i> with 0 or 1.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>request chassis routing-engine master on page 237</li> </ul>
<b>List of Sample Output</b>	show chassis routing-engine (QFX Series) on page 669
<b>Output Fields</b>	Table 111 on page 668 lists the output fields for the show chassis routing-engine command. Output fields are listed in the approximate order in which they appear.

Table 111: show chassis routing-engine Output Fields

Field Name	Field Description
Slot	(Systems with single and multiple Routing Engines) Slot number.
Current state	(Systems with multiple Routing Engines) Current state of the Routing Engine: <b>Master</b> , <b>Backup</b> , or <b>Disabled</b> .
Election priority	(Systems with multiple Routing Engines) Election priority for the Routing Engine: <b>Master</b> or <b>Backup</b> .
Temperature	Temperature of the air flowing past the Routing Engine.
DRAM	Total DRAM available to the Routing Engine's processor.
Memory utilization	Percentage of Routing Engine memory being used.



Table 111: show chassis routing-engine Output Fields (*continued*)

Field Name	Field Description
CPU utilization	Information about the Routing Engine's CPU utilization: <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>
Model	Routing Engine model number.
Serial ID	(Systems with multiple Routing Engines) Identification number of the Routing Engine in this slot.
Start time	Time at which the Routing Engine started running.
Uptime	How long the Routing Engine has been running.
Last reboot reason	Reason for last reboot, including: <ul style="list-style-type: none"> <li>• <b>power cycle/failure</b>—Reboot due to the switching off of the power button behind the Routing Engine, not the power button on the chassis.</li> <li>• <b>watchdog</b>—Reboot due to a hardware watchdog.</li> <li>• <b>power-button hard power off</b>—Reboot due to pressing of the power button.</li> <li>• <b>misc hardware reason</b>—Reboot due to miscellaneous hardware reasons.</li> <li>• <b>thermal shutdown</b>—Reboot due to the router reaching a critical temperature point at which it is unsafe to continue operations.</li> <li>• <b>hard disk failure</b>—Reboot due to a hard disk failure.</li> <li>• <b>reset from debugger</b>—Reboot due to reset from the debugger.</li> <li>• <b>chassis control reset</b>—Reboot due to a chassis control reset.</li> <li>• <b>bios auto recovery reset</b>—Reboot due to a BIOS auto-recovery reset.</li> <li>• <b>could not be determined</b>—Reboot due to an undetermined reason.</li> <li>• <b>Router rebooted after a normal shutdown</b>—Reboot due to a normal shutdown.</li> </ul>
Load averages	Routing Engine load averages for the last 1, 5, and 15 minutes.

## Sample Output

```

show chassis routing-engine (QFX Series)
user@switch> show chassis routing-engine
Routing Engine status:
Slot 0:
Current state Master
Election priority Master (default)
DRAM 2820 MB
Memory utilization 49 percent
CPU utilization:
User 1 percent
Background 0 percent
Kernel 1 percent
Interrupt 0 percent
Idle 97 percent

```

```
Model QFX3500-48S4Q
Serial ID S/N ED3709
Uptime 3 days, 4 hours, 29 minutes, 42 seconds
Last reboot reason 0x200:chassis control reset
Load averages: 1 minute 5 minute 15 minute
0.37 0.26 0.19
```

## show chassis temperature-thresholds

<b>Syntax</b>	show chassis temperature-thresholds
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display chassis temperature threshold settings, in degrees Celsius.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><b>show chassis temperature-thresholds on page 671</b></p> <p><b>show chassis temperature-thresholds (QFX Series) on page 672</b></p>
<b>Output Fields</b>	Table 112 on page 671 lists the output fields for the <b>show chassis temperature-thresholds</b> command. Output fields are listed in the approximate order in which they appear.

Table 112: show chassis temperature-thresholds Output Fields

Field name	Field Description
<b>Item</b>	Chassis component. If per FRU per slot thresholds are configured, the components about which information is displayed include the chassis, the Routing Engines, FPCs, and FEBs. If per FRU per slot thresholds are not configured, the components about which information is displayed include the chassis and the Routing Engines.
<b>Fan speed</b>	<p>Temperature threshold settings, in degrees Celsius, for the fans to operate at normal and high speeds.</p> <ul style="list-style-type: none"> <li><b>Normal</b>—The fans operate at normal speed if the component is at or below this temperature and all the fans are present and functioning normally.</li> <li><b>High</b>—The fans operate at high speed if the component has exceeded this temperature or a fan has failed or is missing.</li> </ul> <p>An alarm is not triggered until the temperature exceeds the threshold settings for a yellow alarm or a red alarm.</p>
<b>Yellow alarm</b>	<p>Temperature threshold settings, in degrees Celsius, that trigger a yellow alarm.</p> <ul style="list-style-type: none"> <li><b>Normal</b>—The temperature that must be exceeded on the component to trigger a yellow alarm when the fans are running at full speed.</li> <li><b>Bad fan</b>—The temperature that must be exceeded on the component to trigger a yellow alarm when one or more fans have failed or are missing.</li> </ul>
<b>Red alarm</b>	<p>Temperature threshold settings, in degrees Celsius, that trigger a red alarm.</p> <ul style="list-style-type: none"> <li><b>Normal</b>—The temperature that must be exceeded on the component to trigger a red alarm when the fans are running at full speed.</li> <li><b>Bad fan</b>—The temperature that must be exceeded on the component to trigger a red alarm when one or more fans have failed or are missing.</li> </ul>

## Sample Output

```

show chassis temperature-thresholds user@host> show chassis temperature-thresholds
                                     Fan speed      Yellow alarm      Red alarm
                                     (degrees C)    (degrees C)      (degrees C)

```

Item	Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	48	54	65	55	75	65
Routing Engine 0	70	80	95	95	110	110
Routing Engine 1	70	80	95	95	110	110
FPC 0	55	60	75	65	90	80
FPC 1	55	60	75	65	90	80
FPC 2	55	60	75	65	90	80
FPC 3	55	60	75	65	90	80
FPC 4	55	60	75	65	90	80
FPC 5	55	60	75	65	90	80
FPC 6	55	60	75	65	90	80
FPC 7	55	60	75	65	90	80
FPC 8	55	60	75	65	90	80
FPC 9	55	60	75	65	90	80
FPC 10	55	60	75	65	90	80
FPC 11	55	60	75	65	90	80

**show chassis  
temperature-thresholds  
(QFX Series)**

user@switch> **show chassis temperature-thresholds**

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan
FPC Sensor TopLeft I	30	65	55	45	60	50
FPC Sensor TopRight I	30	65	55	45	60	50
FPC Sensor TopLeft E	30	65	55	45	60	50
FPC Sensor TopRight E	30	65	55	45	60	50
FPC Sensor TopMiddle I	30	65	55	45	60	50
FPC Sensor TopMiddle E	30	65	55	45	60	50
FPC Sensor Bottom I	30	65	55	45	60	50
FPC Sensor Bottom E	30	65	55	45	60	50
FPC Sensor Die Temp	30	65	55	45	60	50
FPC Sensor Mgmt Brd I	30	65	55	45	60	50

## show log

<b>Syntax</b>	<code>show log</code> <code>&lt;filename   user &lt;username&gt;&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	List log files, display log file contents, or display information about users who have logged in to the router or switch.
<b>Options</b>	<p><code>none</code>—List all log files.</p> <p><code>filename</code>—(Optional) Display the log messages in the specified log file.</p> <p><code>user &lt;username&gt;</code>—(Optional) Display logging information about users who have recently logged in to the router or switch. If you include <code>username</code>, display logging information about the specified user.</p>
<b>Required Privilege Level</b>	trace
<b>List of Sample Output</b>	<p><code>show log</code> on page 673</p> <p><code>show log filename</code> on page 673</p> <p><code>show log user</code> on page 674</p>

## Sample Output

```

user@host> show log
total 57518
-rw-r--r--  1 root  bin    211663 Oct  1 19:44 dcd
-rw-r--r--  1 root  bin    999947 Oct  1 19:41 dcd.0
-rw-r--r--  1 root  bin    999994 Oct  1 17:48 dcd.1
-rw-r--r--  1 root  bin    238815 Oct  1 19:44 rpd
-rw-r--r--  1 root  bin   1049098 Oct  1 18:00 rpd.0
-rw-r--r--  1 root  bin   1061095 Oct  1 12:13 rpd.1
-rw-r--r--  1 root  bin   1052026 Oct  1 06:08 rpd.2
-rw-r--r--  1 root  bin   1056309 Sep 30 18:21 rpd.3
-rw-r--r--  1 root  bin   1056371 Sep 30 14:36 rpd.4
-rw-r--r--  1 root  bin   1056301 Sep 30 10:50 rpd.5
-rw-r--r--  1 root  bin   1056350 Sep 30 07:04 rpd.6
-rw-r--r--  1 root  bin   1048876 Sep 30 03:21 rpd.7
-rw-rw-r--  1 root  bin     19656 Oct  1 19:37 wtmp

show log filename user@host> show log rpd
Oct  1 18:00:18 trace_on: Tracing to ?/var/log/rpd? started
Oct  1 18:00:18 EVENT <MTU> ds-5/2/0.0 index 24 <Broadcast PointToPoint Multicast
Oct  1 18:00:18
Oct  1 18:00:19 KRT recv len 56 V9 seq 148 op add Type route/if af 2 addr
13.13.13.21 nhop type local nhop 13.13.13.21
Oct  1 18:00:19 KRT recv len 56 V9 seq 149 op add Type route/if af 2 addr
13.13.13.22 nhop type unicast nhop 13.13.13.22
Oct  1 18:00:19 KRT recv len 48 V9 seq 150 op add Type ifaddr index 24 devindex
43
Oct  1 18:00:19 KRT recv len 144 V9 seq 151 op chnge Type ifdev devindex 44
Oct  1 18:00:19 KRT recv len 144 V9 seq 152 op chnge Type ifdev devindex 45
Oct  1 18:00:19 KRT recv len 144 V9 seq 153 op chnge Type ifdev devindex 46

```

```
Oct  1 18:00:19 KRT recv len 1272 V9 seq 154 op chnge Type ifdev devindex 47
...
```

```
show log user user@host> show log user
darius mg2546 Thu Oct  1 19:37 still logged in
darius mg2529 Thu Oct  1 19:08 - 19:36 (00:28)
darius mg2518 Thu Oct  1 18:53 - 18:58 (00:04)
root mg1575 Wed Sep 30 18:39 - 18:41 (00:02)
root ttyp2 jun.site.per Wed Sep 30 18:39 - 18:41 (00:02)
alex ttyp1 192.168.1.2 Wed Sep 30 01:03 - 01:22 (00:19)
```

## show pfe next-hop

---


<b>Syntax</b>	show pfe next-hop <interface <i>interface-name</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Packet Forwarding Engine next-hop information.
<b>Options</b>	none—Display all Packet Forwarding Engine next-hop information.  interface <i>interface-name</i> —(Optional) Display the Packet Forwarding Engine next-hop interface.
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	show pfe next-hop on page 676

## Sample Output

```
show pfe next-hop user@host> show pfe next-hop
NextHop Info:
  ID      Type      Interface  Protocol  Encap  Next Hop Addr  MTU
-----
  4       Mcast    -          IPv4      -      0.0.0.0         0
  5       Bcast    -          IPv4      -      -               0
  7       Discard  -          IPv4      -      -               0
  8       MDiscard -          IPv4      -      -               0
  9       Reject   -          IPv4      -      -               0
  13      Local    -          IPv4      -      192.168.4.60   0
  14      Resolve  fxp0.0     IPv4      Unspecified -           0
  17      Local    -          IPv4      -      127.0.0.1      0
  18      Unicast  fxp0.0     IPv4      Unspecified 192.168.4.254 0
  21      Local    -          IPv4      -      11.1.0.1       0
  22      Unicast  at-0/1/0.0 IPv4      ATM SNAP 11.1.0.2       4482
  ...
```



## show pfe route

<b>Syntax</b>	show pfe route <<inet6   ip   iso> <prefix <i>prefix</i> >   <table < <i>table-name</i> > <index <i>index</i> > <prefix <i>prefix</i> >>> <mpls> <summary>
<b>Syntax (J-EX Series Switch)</b>	show pfe route <<inet6   ip> <prefix <i>prefix</i> >   <table < <i>table-name</i> > <index <i>index</i> > <prefix <i>prefix</i> >>> <mpls> <summary>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the routes in the Packet Forwarding Engine forwarding table. The Packet Forwarding Engine forwards packets between input and output interfaces.
.....	
 <b>NOTE:</b> The Routing Engine maintains a master copy of the forwarding table. It copies the forwarding table to the Packet Forwarding Engine, which is the part of the router or switch responsible for forwarding packets. To display the routes in the Routing Engine forwarding table, use the <code>show route forwarding table</code> command. For more information, see the <i>Junos OS Routing Protocols and Policies Command Reference</i> .	
.....	
<b>Options</b>	<p>none—Display all Packet Forwarding Engine forwarding table information.</p> <p>inet6—(Optional) Display Packet Forwarding Engine IPv6 routes.</p> <p>ip—(Optional) Display Packet Forwarding Engine IPv4 routes.</p> <p>iso —(Optional) Display ISO version routing tables.</p> <p>mpls—(Optional) Display Packet Forwarding Engine Multiprotocol Label Switching (MPLS) information.</p> <p>prefix <i>prefix</i>—(Optional) IPv4 or IPv6 prefix for which to show table entries.</p> <p>summary—(Optional) Display summary of Packet Forwarding Engine information.</p> <p>table &lt;<i>table-name</i>&gt; &lt;index <i>index</i>&gt; &lt;prefix <i>prefix</i>&gt;—(Optional) Display table information. Optionally, specify the table name, index, or prefix.</p>
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	<p>show pfe route ip on page 677</p> <p>show pfe route iso on page 678</p>

## Sample Output

```
show pfe route ip user@host> show pfe route ip
```

```

IPv4 Route Table 0, default.0, 0x0:
Destination                NH IP Addr      Type      NH ID Interface
-----
default                    127.0.0.1      Discard   8
127.0.0.1                  127.0.0.1      Local    256
172.16/12                  192.168.71.254 Unicast   68 fxp0.0
192.168.0/18               192.168.71.254 Unicast   68 fxp0.0
192.168.40/22              192.168.71.254 Unicast   68 fxp0.0
192.168.64/18              192.168.71.254 Unicast   68 fxp0.0
192.168.64/21              192.168.71.254 Resolve   67 fxp0.0
192.168.71.249             192.168.71.249 Local     66
192.168.220.0/30           192.168.220.0 Resolve   303 fe-0/0/0.0
192.168.220.0              192.168.220.0 Receive   301 fe-0/0/0.0
224.0.0.1                  Mcast        5
255.255.255.255           Bcast        6

...

```

**show pfe route iso** user@host# show pfe route iso

```

CLNS Route Table 0, CLNP.0, 0x0:
Destination                Type      NH ID Interface
-----
default                    Reject    60
47.0005.80ff.f800.0000.0108.0001.0102.5508.2159/152 Local    514
49.0001.00a0.c96b.c491/72   Local    536

```

## show pfe statistics ip

<b>Syntax</b>	show pfe statistics ip <icmp   options>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display IPv4 Packet Forwarding Engine statistics.
<b>Options</b>	none—Display all IPv4 Packet Forward Engine statistics.  icmp—(Optional) Display Packet Forwarding Engine IP ICMP statistics.  options—(Optional) Display Packet Forwarding Engine IP options statistics.
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	<a href="#">show pfe statistics ip icmp on page 680</a> <a href="#">show pfe statistics ip options on page 681</a>
<b>Output Fields</b>	Table 113 on page 679 lists the output fields for the <b>show pfe statistics ip</b> command. Output fields are listed in the approximate order in which they appear.

**Table 113: show pfe statistics ip Output Fields**

Field Name	Field Description
ICMP Statistics	<p>ICMP statistics, including the following:</p> <ul style="list-style-type: none"> <li><b>requests</b>—Number of ICMP notifications sent to the PFE. If a throttler is configured, the number of notifications might not reflect all requests made. (See the <b>throttled icmps</b> field description.)</li> <li><b>network unreachable</b>—When route lookups fail, ICMP packets are sent to the source. These packets are ICMP TypeDestination Unreachable (3) and ICMP Code=Network Unreachable (0).</li> <li><b>ttl expired</b>—Number of notifications processed as a result of time-to-live (TTL) expiration packets.</li> <li><b>ttl captured</b>—Number of TTL expired packets sent by PFE interfaces to the Routing Engine.</li> <li><b>redirects</b>—Number of ICMP errors sent with Type=Redirect (5).</li> <li><b>mtu exceeded</b>—Number of ICMP errors sent with Type=Source Quench (4).</li> <li><b>icmp/option handoffs</b>—Number of packets that the PFE hardware requests the PFE software to process.</li> </ul>

Table 113: show pfe statistics ip Output Fields (*continued*)

Field Name	Field Description
ICMP errors	<p>ICMP errors, including the following:</p> <ul style="list-style-type: none"> <li>• <b>unknown unreachable</b>s—Unknown code (greater than 16) found for an unknown unreachable type ICMP error.</li> <li>• <b>unsupported ICMP type</b>—Any ICMP type other than UNREACH, REDIRECT, TIME_EXCEED, and PARAM_PROB.</li> <li>• <b>unprocessed redirects</b>—When trying to find the neighbor to send redirects to, the PFE could not find the next-hop information.</li> <li>• <b>invalid ICMP type</b>—Any ICMP type other than UNREACH, REDIRECT, TIME_EXCEED, and PARAM_PROB.</li> <li>• <b>invalid protocol</b>—An incorrect protocol was detected by the ICMP processor.</li> <li>• <b>bad input interface ifl</b>—The PFE software cannot map the interface index supplied by the chips to a proper data structure in the microkernel.</li> <li>• <b>throttled icmps</b>—Number of requests dropped because of rate limiting by the PFE.</li> <li>• <b>runts</b>—Number of packets for which the IP header length is less than the minimum length that is supported.</li> </ul>
ICMP Discards	<p>ICMP discard statistics, including the following:</p> <ul style="list-style-type: none"> <li>• <b>multicasts</b>—ICMP packets are not sent for link-layer multicast packets. These are counted as invalid source addresses (not a unicast address or all zeros).</li> <li>• <b>bad source addresses</b>—ICMP packets were received from an invalid source address (not a unicast address or all zeros).</li> <li>• <b>bad dest addresses</b>—ICMP packets were sent to an invalid destination address (not a unicast address or all zeros).</li> <li>• <b>IP fragments</b>—ICMP responses are sent only for the first fragments. The rest do not receive a response. This is the count for ICMP requests that receive no response.</li> <li>• <b>ICMP errors</b>—Number of ICMP error packets.</li> </ul>

## Sample Output

```

show pfe statistics ip user@host> show pfe statistics ip icmp
icmp ICMP Statistics:
      0 requests
      0 network unreachable
      0 ttl expired
      0 ttl captured
      0 redirects
      0 mtu exceeded
      0 icmp/option handoffs
ICMP Errors:
      0 unknown unreachable
      0 unsupported ICMP type
      0 unprocessed redirects
      0 invalid ICMP type
      0 invalid protocol
      0 bad input interface
      0 throttled icmps
      0 runts
ICMP Discards:
      0 multicasts
      0 bad source addresses

```

```
0 bad dest addresses
0 IP fragments
0 ICMP errors
```

```
show pfe statistics ip options user@host> show pfe statistics ip options
options IP Option Values:
        LSRR/SSRR forwarding enabled
IP Option Statistics:
        0 loose source routes
        0 strict source routes
        0 record routes
        889382 router alerts
        0 other options
IP Option Errors:
        0 runts
        2 bad versions
        0 runt header lengths
        0 giant header lengths
        0 null frames
        0 bad option lengths
        0 duplicate options
        0 bad option pointers
        0 source route frames dropped
        188 frames queued
        1126 frames dropped
```

## show pfe statistics ip6

<b>Syntax</b>	show pfe statistics ip6 <icmp>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Packet Forwarding Engine IPv6 statistics.
<b>Options</b>	none—Display all Packet Forwarding Engine IPv6 statistics.  icmp—(Optional) Display Packet Forwarding Engine IP ICMP statistics.
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	<b>show pfe statistics ip6 icmp on page 683</b>
<b>Output Fields</b>	Table 114 on page 682 lists the output fields for the <b>show pfe statistics ip6</b> command. Output fields are listed in the approximate order in which they appear.

**Table 114: show pfe statistics ip6 Output Fields**

Field Name	Field Description
ICMP6 Statistics	<p>ICMP6 statistics, including the following:</p> <ul style="list-style-type: none"> <li>• <b>requests</b>—Number of ICMP notifications sent to the PFE. If a throttler is configured, the number of notifications might not reflect all requests made. (See the <b>throttled icmps</b> field description.)</li> <li>• <b>network unreachable</b>—When route lookups fail, ICMP packets are sent to the source. These packets are ICMP Type= Destination Unreachable (3) and ICMP Code= Network Unreachable (0).</li> <li>• <b>ttl expired</b>—Number of notifications processed as a result of time-to-live (TTL) expiration packets.</li> <li>• <b>ttl captured</b>—Number of TTL expired packets sent by PFE interfaces to the Routing Engine.</li> <li>• <b>redirects</b>—Number of ICMP errors sent with Type=Redirect (5).</li> <li>• <b>mtu exceeded</b>—Number of ICMP errors sent with Type=Source Quench (4).</li> <li>• <b>icmp/option handoffs</b>—Number of packets that the PFE hardware requests the PFE software to process.</li> </ul>

Table 114: show pfe statistics ip6 Output Fields (*continued*)

Field Name	Field Description
ICMP6 errors	<p>ICMP6 errors, including the following:</p> <ul style="list-style-type: none"> <li>• <b>unknown unreachable</b>—Unknown code (greater than 16) found for an unknown unreachable type ICMP error.</li> <li>• <b>unsupported ICMP type</b>—Any ICMP type other than UNREACH, REDIRECT, TIME_EXCEED, and PARAM_PROB.</li> <li>• <b>unprocessed redirects</b>—When trying to find the neighbor to send redirects to, the PFE could not find the next-hop information.</li> <li>• <b>invalid ICMP type</b>—Any ICMP type other than UNREACH, REDIRECT, TIME_EXCEED, and PARAM_PROB.</li> <li>• <b>invalid protocol</b>—An incorrect protocol was detected by the ICMP processor.</li> <li>• <b>bad input interface if1</b>—The PFE software cannot map the interface index supplied by the chips to a proper data structure in the microkernel.</li> <li>• <b>throttled icmps</b>—Number of requests dropped because of rate limiting by the PFE.</li> <li>• <b>runts</b>—Number of packets for which the IP header length is less than the minimum length that is supported.</li> </ul>
ICMP6 Discards	<p>ICMP6 discard statistics, including the following:</p> <ul style="list-style-type: none"> <li>• <b>multicasts</b>—ICMP packets are not sent for link-layer multicast packets. These are counted as invalid source addresses (not a unicast address or all zeros).</li> <li>• <b>bad source addresses</b>—ICMP packets were received from an invalid source address (not a unicast address or all zeros).</li> <li>• <b>bad dest addresses</b>—ICMP packets were sent to an invalid destination address (not a unicast address or all zeros).</li> <li>• <b>IP fragments</b>—ICMP responses are sent only for the first fragments. The rest do not receive a response. This is the count for ICMP requests that receive no response.</li> <li>• <b>ICMP errors</b>—Number of ICMP error packets.</li> </ul>

## Sample Output

```

show pfe statistics ip6 icmp user@host> show pfe statistics ip6 icmp
                                ICMP6 Statistics:
                                    0 requests
                                    0 network unreachable
                                    0 ttl expired
                                    0 ttl captured
                                    0 redirects
                                    0 mtu exceeded
                                    0 icmp/option handoffs
                                ICMP6 Errors:
                                    0 unknown unreachable
                                    0 unsupported ICMP type
                                    0 unprocessed redirects
                                    0 invalid ICMP type
                                    0 invalid protocol
                                    0 bad input interface
                                    0 throttled icmps
                                    0 runts
                                ICMP6 Discards:
                                    0 multicasts
                                    0 bad source addresses

```

```
0 bad dest addresses
0 IP fragments
0 ICMP errors
```



## show pfe terse

---

<b>Syntax</b>	show pfe terse
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display Packet Forwarding Engine status information.
<b>Options</b>	none—Display brief information about the Packet Forwarding Engine.
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	show pfe terse (J-EX4200) on page 685

### Sample Output

```

show pfe terse user@switch> show pfe terse
(J-EX4200)    fpc0:
-----
Slot Type Slot      State   Uptime
0  HCM  Present Online  1w3d 23:57
0  SFI  Present Online  1w3d 23:56
0  PFEM Present Online  1w3d 23:55

{master:0}

```

## show system alarms

<b>Syntax</b>	show system alarms
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches..
<b>Description</b>	Display active system alarms.
<b>Options</b>	This command has no options.
<b>Additional Information</b>	<p>System alarms are preset. They include a <b>configuration</b> alarm that appears when no rescue configuration alarm is set and a <b>license</b> alarm that appears when a software feature is configured and no valid license is configured for the feature. For more information about system alarms, see the <i>Junos OS System Basics Configuration Guide</i>.</p> <p>In Junos OS release 11.1 and later, alarms for fans also show the slot number of the fans in the CLI output.</p>
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	<p>show system alarms on page 686</p> <p>show system alarms (Fan Tray) on page 686</p> <p>show system alarms (QFX Series) on page 686</p>

## Sample Output

<b>show system alarms</b>	<pre>user@host&gt; show system alarms 2 alarms currently active Alarm time           Class  Description 2005-02-24 17:29:34 UTC  Minor  IPsec VPN tunneling usage requires a license 2005-02-24 17:29:34 UTC  Minor  Rescue configuration is not sent</pre>
<b>show system alarms (Fan Tray)</b>	<pre>user@host&gt; show system alarms 4 alarms currently active Alarm time           Class  Description 2010-11-11 20:27:38 UTC  Major  Side Fan Tray 7 Failure 2010-11-11 20:27:13 UTC  Minor  Side Fan Tray 7 Overspeed 2010-11-11 20:27:13 UTC  Major  Side Fan Tray 5 Failure 2010-11-11 20:27:13 UTC  Major  Side Fan Tray 0 Failure</pre>
<b>show system alarms (QFX Series)</b>	<pre>user@switches&gt; show system alarms 2 alarms currently active Alarm time Class Description 2005-02-24 17:29:34 UTC Minor Rescue configuration is not sent</pre>

## show system audit

<b>Syntax</b>	show system audit <root-only>
<b>Syntax (J-EX Series)</b>	show system audit <all-members> <local> <member <i>member-id</i> > <root-only>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the state and checksum values for file systems.
<b>Options</b>	<p>none—Display the state and checksum values for all file systems.</p> <p>all-members—(J-EX4200 only) (Optional) Display file system MD5 hash and permissions information on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 only) (Optional) Display file system MD5 hash and permissions information on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 and only) (Optional) Display file system MD5 hash and permissions information on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p> <p>root-only—(Optional) Check only the root (/) file system.</p>
<b>Additional Information</b>	<p>To redirect the output to a file, issue the following command:</p> <pre>ssh <i>device-name</i> 'show system audit root-only' &gt; <i>output-file</i></pre> <p>If you save the output of the <b>show system audit root-only</b> command to a file, you can compare it to subsequent output from the command to determine whether anything has changed.</p>
<b>Required Privilege Level</b>	admin
<b>List of Sample Output</b>	<p>show system audit root-only on page 687</p> <p>show system audit root-only (QFX Series) on page 688</p>

### Sample Output

```
show system audit root-only user@host> show system audit root-only
# user: root
# machine: my-host
# tree: /
date: Fri Feb 11 21:21:46 2000

# .
/set type=file uid=0 gid=0 mode=0755 nlink=1
. type=dir nlink=23 size=1024 time=950252640.0
```

```

.cshrc      uid=3 gid=7 mode=0644 size=177 time=939182975.0 \
            md5digest=f414e06fea6bd646244b98e13d6e6226
.kernel.jkernel.backup \
            mode=0744 size=1934552 time=944688902.0 \
            md5digest=2c343cf0bd9fea8f04f78604feed7aa4
.profile    uid=3 gid=7 mode=0644 nlink=2 size=173 time=939182975.0 \
            md5digest=55a1e3c6c67789c9d3a1cce1ea39f670
COPYRIGHT  uid=3 gid=7 mode=0444 size=3425 time=939182975.0 \
            md5digest=7df8bc77dcee71382ea73eb0ec6a9243
boot.config mode=0644 size=3 time=945902618.0 \
            md5digest=93d722493ed38477338a1405d7dcb40
boot.help   uid=3 gid=7 mode=0444 size=411 time=939182876.0 \
            md5digest=9b7126385734bcae753f4179ab59d8e5
compat      type=link mode=0777 size=11 time=915149058.0 \
            link=/usr/compat
kernel      mode=0444 size=1947607 time=950230892.0 \
            md5digest=1a2a8aff2fec678a918ba0d6bf063980
kernel.avr  uid=1112 size=1947642 time=950252597.0 \
            md5digest=82e1637682d58ec28964dfee7fccb62e
kernel.config \
            mode=0644 size=0 time=915149058.0 \
            md5digest=d41d8cd98f00b204e9800998ecf8427e
sys         type=link mode=0777 size=11 time=915149029.0 \
            link=usr/src/sys

```

```

show system audit user@switch> show system audit root-only
root-only (QFX Series)

```

```

#          user: root
#          machine: my-host
#          tree: /
date: Fri Feb 11 21:21:46 2000

# .
/set type=file uid=0 gid=0 mode=0755 nlink=1
.
.cshrc      uid=3 gid=7 mode=0644 size=177 time=939182975.0 \
            md5digest=f414e06fea6bd646244b98e13d6e6226
.kernel.jkernel.backup \
            mode=0744 size=1934552 time=944688902.0 \
            md5digest=2c343cf0bd9fea8f04f78604feed7aa4
.profile    uid=3 gid=7 mode=0644 nlink=2 size=173 time=939182975.0 \
            md5digest=55a1e3c6c67789c9d3a1cce1ea39f670
COPYRIGHT  uid=3 gid=7 mode=0444 size=3425 time=939182975.0 \
            md5digest=7df8bc77dcee71382ea73eb0ec6a9243
boot.config mode=0644 size=3 time=945902618.0 \
            md5digest=93d722493ed38477338a1405d7dcb40
boot.help   uid=3 gid=7 mode=0444 size=411 time=939182876.0 \
            md5digest=9b7126385734bcae753f4179ab59d8e5
compat      type=link mode=0777 size=11 time=915149058.0 \
            link=/usr/compat
kernel      mode=0444 size=1947607 time=950230892.0 \
            md5digest=1a2a8aff2fec678a918ba0d6bf063980
kernel.avr  uid=1112 size=1947642 time=950252597.0 \
            md5digest=82e1637682d58ec28964dfee7fccb62e
kernel.config \
            mode=0644 size=0 time=915149058.0 \
            md5digest=d41d8cd98f00b204e9800998ecf8427e
sys         type=link mode=0777 size=11 time=915149029.0 \
            link=usr/src/sys

```

## show system buffers

---

<b>Syntax</b>	show system buffers
<b>Syntax (J-EX Series)</b>	show system buffers <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches..
<b>Description</b>	Display information about the buffer pool that the Routing Engine uses for local traffic. Local traffic is the routing and management traffic that is exchanged between the Routing Engine and the Packet Forwarding Engine within the router or switch, as well as the routing and management traffic from IP (that is, from OSPF, BGP, SNMP, ping operations, and so on).
<b>Options</b>	<p>none—Show all buffer statistics.</p> <p>all-members—(J-EX4200 switches only) (Optional) Show buffer statistics for on all members of the Virtual Chassis configuration.</p> <p>local—(J-EX4200 switches only) (Optional) Show buffer statistics for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Show buffer statistics for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Additional Information</b>	A special type of memory buffer called a <i>cluster</i> is 2 KB in size. For more information, see <i>The Design and Implementation of the 4.4BSD Operation System</i> by McKusic, Bostic, Karels, and Quarterman.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show system buffers on page 690</p> <p>show system buffers (QFX Series) on page 691</p>
<b>Output Fields</b>	Table 115 on page 690 describes the output fields for the <b>show system buffers</b> command. Output fields are listed in the approximate order in which they appear.

Table 115: show system buffers Output Fields

Field Name	Field Description
<b>mbufs in use</b>	Memory buffers (mbufs) are 128-byte buffers that are used for various purposes inside the kernel. Each memory buffer has a type, and the output itemizes the amount allocated for each type. Types with no memory buffers allocated are not displayed.
<b>mbufs allocated to packet headers</b>	Number of memory buffers currently holding packet headers
<b>mbufs allocated to control blocks</b>	Number of memory buffers currently holding the state for sockets.
<b>mbufs allocated to send data</b>	Number of memory buffers currently holding socket send data.
<b>mbufs allocated to pfe refill data</b>	Number of memory buffers currently holding Packet Forwarding Engine refill data.
<b>mbufs allocated to fxp data</b>	Number of memory buffers currently holding fxp data.
<b>mbufs allocated to socket names and addresses</b>	Number of memory buffers currently holding addresses for sockets.
<b>mbuf clusters in use</b>	Allocation statistics for mbuf clusters.
<b>allocated to network</b>	Total amount of memory in use by the networking and interprocess communication (IPC) code.
<b>requests for memory denied</b>	Number of times a memory allocation request within the IPC and networking code failed.
<b>requests for memory delayed</b>	Number of times a memory allocation request within the IPC and networking code was postponed.
<b>calls to protoocl drain routines</b>	Number of times a memory allocation request within the IPC and networking code triggered a memory reclamation attempt.

## Sample Output

```

show system buffers user@host> show system buffers
                        853 mbufs in use:
                        2 mbufs allocated to packet headers
                        37 mbufs allocated to protocol control blocks
                        28 mbufs allocated to socket names and addresses
                        2 mbufs allocated to socket send data
                        400 mbufs allocated to pfe refill data
                        384 mbufs allocated to fxp data
                        784/944 mbuf clusters in use
                        1994 Kbytes allocated to network (83% in use)
                        0 requests for memory denied

```

0 requests for memory delayed  
0 calls to protocol drain routines

```
show system buffers user@switch> show system buffers
(QFX Series)        6/1794/1800 mbufs in use (current/cache/total)
                    5/917/922/30000 mbuf clusters in use (current/cache/total/max)
                    0/640 mbuf+clusters out of packet secondary zone in use (current/cache)
                    0/0/0/0 4k (page size) jumbo clusters in use (current/cache/total/max)
                    0/0/0/0 9k jumbo clusters in use (current/cache/total/max)
                    0/0/0/0 16k jumbo clusters in use (current/cache/total/max)
                    11K/2282K/2294K bytes allocated to network (current/cache/total)
                    0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
                    0/0/0 requests for jumbo clusters denied (4k/9k/16k)
                    0/17/6656 sbufs in use (current/peak/max)
                    0 requests for sbufs denied
                    0 requests for sbufs delayed
                    0 requests for I/O initiated by sendfile
                    0 calls to protocol drain routines
```

## show system connections

<b>Syntax</b>	<pre>show system connections &lt;extensive&gt; &lt;all-chassis   all-lcc   lcc <i>number</i>   scc&gt; &lt;inet   inet6&gt; &lt;show-routing-instances&gt;</pre>
<b>Syntax (J-EX Series)</b>	<pre>show system connections &lt;extensive&gt; &lt;all-members&gt; &lt;inet   inet6&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt; &lt;show-routing-instances&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display information about the active IP sockets on the Routing Engine. Use this command to verify which servers are active on a system and what connections are currently in progress.
<b>Options</b>	<p>none—Display information about all active IP sockets on the Routing Engine.</p> <p>extensive—(Optional) Display exhaustive system process information, which, for TCP connections, includes the TCP control block. This option is useful for debugging TCP connections.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display system connection activity for all members of the Virtual Chassis configuration.</p> <p>inet   inet6—(Optional) Display IPv4 connections or IPv6 connections, respectively.</p> <p>local—(J-EX4200 switches only) (Optional) Display system connection activity for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display system connection activity for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p> <p>show-routing-instances—(Optional) Display routing instances.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><a href="#">show system connections on page 693</a></p> <p><a href="#">show system connections extensive on page 694</a></p> <p><a href="#">show system connections show-routing-instances on page 694</a></p>
<b>Output Fields</b>	Table 116 on page 693 describes the output fields for the <b>show system connections</b> command. Output fields are listed in the approximate order in which they appear.



Table 116: show system connections Output Fields

Field Name	Field Description
<b>Proto</b>	Protocol of the socket: <b>IP</b> , <b>TCP</b> , or <b>UDP</b> for IPv4 or IPv6.
<b>Recv-Q</b>	Number of input packets received by the protocol and waiting to be processed by the application.
<b>Send-Q</b>	Number of output packets sent by the application and waiting to be processed by the protocol.
<b>Local Address</b>	Local address and port of the socket, separated by a period. An asterisk (*) indicates that the bound address is the wildcard address. Server sockets typically have the wildcard address and a well-known port bound to them.
<b>Foreign Address</b>	Foreign address and port of the socket, separated by a period. An asterisk (*) indicates that the address or port is a wildcard.
<b>Routing Instance</b> (Displayed only when the <b>show-routing-instance</b> option is used.)	Routing instances associated with active IP sockets on the Routing Engine.
<b>(state)</b>	For TCP, the protocol state of the socket.

### Sample Output

```

user@host> show system connections
show system connections Active Internet connections (including servers)
Proto Recv-Q Send-Q Local Address      Foreign Address    (state)
tcp    0      2 192.168.4.16.513   208.197.169.254.894 ESTABLISHED
tcp    0      0 192.168.4.16.513   208.197.169.195.945 ESTABLISHED
tcp    0      0 *.23               *.*               LISTEN
tcp    0      0 *.22               *.*               LISTEN
tcp    0      0 *.513              *.*               LISTEN
tcp00 *.514           *.*               LISTEN
tcp 0 0*.21               *.*               LISTEN
tcp00 *.79           *.*               LISTEN
tcp 00 *.1023            *.*               LISTEN
tcp 00 *.111             *.*               LISTEN
udp00192.168.4.16.1634 208.197.169.249.2049
udp00192.168.4.16.1627 208.197.169.254.2049
udp00192.168.4.16.1371 208.197.169.195.2049
udp00*.*           *.*
udp00*.9999         *.*
udp00 *.161         *.*
udp00192.168.4.16.1039 192.168.4.16.1023
udp00192.168.4.16.1038 192.168.4.16.1023
udp 00 192.168.4.16.1037 192.168.4.16.1023
udp00192.168.4.16.1036 192.168.4.16.1023
udp00*.1022         *.*
udp00*.1023         *.*

```

```

udp00*.111    *.*
udp00*.*      *.*

```

**show system  
connections extensive**

```

user@host> show system connections extensive
Active Internet connections (including servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        (state)
tcp    0      2 192.168.4.16.513      208.197.169.254.894   ESTABLISHED
      iss: 3972677059      sndup: 3972693435      sndcc: 10
      snduna: 3972693435  sndnxt: 3972693437    sndwnd: 17376
      sndmax: 3972693437  sndcwnd: 65535        sndssthresh: 1073725440
      irs: 484187869     rcvup: 484188060     rcvcc: 98357
      rcvnxt: 484188070  rcvadv: 484205446    rcvwnd: 17376
      rtt: 1             srtt: 7              rttv: 5
      rxtcur: 120        rxtshift: 0           rtseq: 1103707591
      rttmin: 2         duration: 5011        mss: 1448
      flags: REQ_SCALE RCVD_SCALE REQ_TSTMP RCVD_TSTMP RCVD_CC [0x41e0]
tcp    0      0 192.168.4.16.513      208.197.169.195.945   ESTABLISHED
      iss: 1057609890     sndup: 1057790796     sndcc: 2
      snduna: 1057790810  sndnxt: 1057790810   sndwnd: 17376
      sndmax: 1057790810  sndcwnd: 39096        sndssthresh: 1073725440
      irs: 3551947312    rcvup: 3551947422    rcvcc: 0
      rcvnxt: 3551947422  rcvadv: 3551964798   rcvwnd: 17376
      rtt: 0             srtt: 17             rttv: 11
      rxtcur: 300        rxtshift: 0           rtseq: 0
      rttmin: 2         duration: 125814      mss: 1448
      flags: REQ_SCALE RCVD_SCALE REQ_TSTMP RCVD_TSTMP [0x1e0]
udp0   0192.168.4.16.1634208.197.169.249.2049
udp0   0192.168.4.16.1627208.197.169.254.2049
udp0   0192.168.4.16.1371208.197.169.195.2049
udp 0   0*.* *.*
udp0   0*.9999*.*
udp 0   0*.161*.*
udp0   0192.168.4.16.1039192.168.4.16.1023
udp0   0192.168.4.16.1038192.168.4.16.1023
udp0   0192.168.4.16.1037192.168.4.16.1023
udp0   0192.168.4.16.1036192.168.4.16.1023
udp0   0*.1022*.*
udp 0   0*.1023 *.*
udp0   0 *.111*.*
udp0   0*.*.*

```

**show system  
connections  
show-routing-instances**

```

user@host> show system connections show-routing-instances
Active Internet connections (including servers) (including routing-instances)
Proto Recv-Q Send-Q Local Address          Foreign Address        Routing Instance
(state)
tcp4   0      0 192.168.69.204.23     172.17.28.19.4267     default
ESTABLISHED
tcp4   0      0 192.168.69.204.58540  10.209.7.138.23       default
ESTABLISHED
tcp4   0      0 192.168.69.204.23     172.17.28.19.1098     default
ESTABLISHED
tcp4   0      0 192.168.7.1.57668     192.168.9.1.179       default
ESTABLISHED
tcp4   0      0 192.168.7.1.179       192.168.8.1.49209     default
ESTABLISHED
tcp4   0      0 128.0.0.1.6234        128.0.3.17.1024
__juniper_private1__ ESTABLISHED
tcp4   0      0 128.0.0.4.9000        128.0.0.4.59103
__juniper_private1__ ESTABLISHED
tcp4   0      0 128.0.0.4.59103       128.0.0.4.9000
__juniper_private1__ ESTABLISHED

```

```

tcp4      0      0 *.32012          *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.9000           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.33007          *.*
__juniper_private2__ LISTEN
tcp46     0      0 *.179            *.*          default
          LISTEN
tcp4      0      0 *.179            *.*          default
          LISTEN
tcp4      0      0 *.6154           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.6153           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.7000           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.6152           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.6156           *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.33005          *.*
__juniper_private2__ LISTEN
tcp4      0      0 *.31343          *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.31341          *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.32003          *.*
__juniper_private2__ LISTEN
tcp4      0      0 *.666            *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.38             *.*
__juniper_private1__ LISTEN
tcp4      0      0 *.3221           *.*          default
          LISTEN

```

## show system core-dumps

---

<b>Syntax</b>	show system core-dumps <brief   detail> <core-filename> <core-file-info>
<b>Syntax (J-EX Series Switches)</b>	show system core-dumps <all-members> <brief   detail> <core-filename> <core-file-info> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Show core files on all routers or switches running Junos OS. You can use the <b>show system core-dumps</b> command to show a list of system core files created when the router or switch has failed. This command can be useful for diagnostic purposes. Each list item includes the file permissions, number of links, owner, group, size, modification date, and path and filename.</p> <p>You can use the option <b>core-filename</b> and its options <b>core-file-info</b>, <b>brief</b>, and <b>detail</b> to display more information about the specified core-dump files.</p>
<b>Options</b>	<p>none—Display a list of all existing core-dump files.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display system core files on all members of the Virtual Chassis configuration.</p> <p>brief—(Optional) View details of binary.</p> <p>core-file-info—(Optional) Display the stack trace of a core file.</p> <p>core-filename—(Optional) Name of a specific core file to display.</p> <p>detail—(Optional) View stack trace with details of the binary file.</p> <p>local—(J-EX4200 switches only) (Optional) Display system core files on the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display system core files on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p>show system core-dumps on page 697</p> <p>show system core-dumps on page 697</p>

**Output Fields** Table 117 on page 697 describes the output fields for the `show system core-dumps` command. Output fields are listed in the approximate order in which they appear.

**Table 117: show system core-dumps Output Fields**

Field Name	Field Description
<i>Permissions</i>	Read/write permissions for the file named.
<i>Links</i>	Number of links to the file.
<i>Owner</i>	Name of the file owner.
<i>Group</i>	Name of the group with file access.
<i>File size</i>	File size in bytes.
<i>Modified</i>	Last file modification date and time.
<i>Path/filename</i>	File path where the file resides and the filename.

## Sample Output

**show system core-dumps** This example shows the command output if core files exist.

```
user@switcht> show system core-dumps
-rw----- 1 root wheel 268369920 Jun 18 17:59 /var/crash/vmcore.0
-rw-rw---- 1 root field 3371008 Jun 18 17:53 /var/tmp/rpd.core.0
-rw-r--r-- 1 root wheel 27775914 Jun 18 17:59 /var/crash/kernel.0
```

**show system core-dumps** This example shows the command output if core files do not exist.

```
user@host> show system core-dumps
/var/crash/*core*: No such file or directory
/var/tmp/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
```

## show system directory-usage

<b>Syntax</b>	show system directory-usage <depth <i>number</i> > < <i>path</i> >
<b>Syntax (J-EX Series)</b>	show system directory-usage <all-members> <depth <i>number</i> > <local> <member <i>member-id</i> > < <i>path</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display directory usage information.
<b>Options</b>	<p>none—Display all directory usage information.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display directory information for all members of the Virtual Chassis configuration.</p> <p>depth <i>number</i>—(Optional) Depth of the directory to traverse. This option is useful when you want to limit the output shown for a large file system.</p> <p>local—(J-EX4200 switches only) (Optional) Display directory information for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display directory information for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p> <p><i>path</i>—(Optional) Path or root directory to traverse.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show system directory-usage (J-EX4200) on page 699</a>
<b>Output Fields</b>	Table 118 on page 698 describes the output fields for the <b>show system directory-usage</b> command. Output fields are listed in the approximate order in which they appear.

**Table 118: show system directory-usage Output Fields**

Field Name	Field Description
<i>bytes</i>	Number of bytes used by files in a directory.
<i>directory-name</i>	Name of the directory.

## Sample Output

```
show system user@switch> show system directory-usage
directory-usage fpc0:
(J-EX4200) -----
                /var/tmp
2.0K            /var/tmp/.snap
14K            /var/tmp/gres-tp
2.0K            /var/tmp/rtsdb
78K            /var/tmp/if-rtsdb

{master:0}
```

## show system processes

<b>Syntax</b>	<pre>show system processes &lt;brief   detail   extensive   summary&gt; &lt;health (pid <i>process-identifier</i>   process-name <i>process-name</i>)&gt; &lt;providers&gt; &lt;resource-limits (brief   detail) <i>process-name</i>&gt; &lt;wide&gt;</pre>
<b>Syntax (J-EX Series Switch)</b>	<pre>show system processes &lt;all-members&gt; &lt;brief   detail   extensive   summary&gt; &lt;health (pid <i>process-identifier</i>   process-name <i>process-name</i>)&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt; &lt;providers&gt; &lt;resource-limits (brief   detail) <i>process-name</i>&gt; &lt;wide&gt;</pre>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display information about software processes that are running on the router or switch and that have controlling terminals.
<b>Options</b>	<p>none—Display standard information about system processes.</p> <p>all-members—(J-EX4200 switches only) (Optional) Display standard system process information for all members of the Virtual Chassis configuration.</p> <p>brief   detail   extensive   summary—(Optional) Display the specified level of detail.</p> <p>health (pid <i>process-identifier</i>   process-name <i>process-name</i>)—(Optional) Display process health information.</p> <p>local—(J-EX4200 switches only) (Optional) Display standard system process information for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(J-EX4200 switches only) (Optional) Display standard system process information for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.</p> <p>providers—(Optional) Display provider processes.</p> <p>resource-limits (brief   detail) <i>process-name</i>—(Optional) Display process resource limits.</p> <p>wide—(Optional) Display process information that might be wider than 80 columns.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><a href="#">show system processes on page 703</a></p> <p><a href="#">show system processes brief on page 703</a></p> <p><a href="#">show system processes detail on page 703</a></p>



**show system processes extensive on page 704**

**show system processes summary on page 705**

**Output Fields** Table 119 on page 701 describes the output fields for the **show system processes** command. Output fields are listed in the approximate order in which they appear.

**Table 119: show system processes Output Fields**

Field Name	Field Description	Level of Output
last PID	Last process identifier assigned to the process.	brief extensive summary
load averages	Three load averages followed by the current time.	brief extensive summary
processes	Number of existing processes and the number of processes in each state (sleeping, running, starting, zombies, and stopped).	brief extensive summary
Mem	Information about physical and virtual memory allocation.	brief extensive summary
Swap	Information about physical and virtual memory allocation.	brief extensive summary
PID	Process identifier.	detail extensive summary
TT	Control terminal name.	none detail

Table 119: show system processes Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>STAT</b>	<p>Symbolic process state. The state is given by a sequence of letters. The first letter indicates the run state of the process:</p> <ul style="list-style-type: none"> <li>• <b>D</b>—In disk or other short-term, uninterruptible wait</li> <li>• <b>I</b>—Idle (sleeping longer than about 20 seconds)</li> <li>• <b>R</b>—Runnable</li> <li>• <b>S</b>—Sleeping for less than 20 seconds</li> <li>• <b>T</b>—Stopped</li> <li>• <b>Z</b>—Dead (zombie)</li> <li>• <b>+</b> —The process is in the foreground process group of its control terminal.</li> <li>• <b>&lt;</b> —The process has raised CPU scheduling priority.</li> <li>• <b>&gt;</b> —The process has specified a soft limit on memory requirements and is currently exceeding that limit; such a process is not swapped.</li> <li>• <b>A</b>—The process requested random page replacement.</li> <li>• <b>E</b>—The process is trying to exit.</li> <li>• <b>L</b>—The process has pages locked in core.</li> <li>• <b>N</b>—The process has reduced CPU scheduling priority.</li> <li>• <b>S</b>—The process requested first-in, first-out (FIFO) page replacement.</li> <li>• <b>s</b>—The process is a session leader.</li> <li>• <b>V</b>—The process is temporarily suspended.</li> <li>• <b>W</b>—The process is swapped out.</li> <li>• <b>X</b>—The process is being traced or debugged.</li> </ul>	none <b>detail</b>
<b>UID</b>	User identifier.	<b>detail</b>
<b>USERNAME</b>	Process owner.	<b>extensive summary</b>
<b>PPID</b>	Parent process identifier.	<b>detail</b>
<b>CPU</b>	<p>(D)—Short-term CPU usage.</p> <p>(E and S)—Raw (unweighted) CPU usage. The value of this field is used to sort the processes in the output.</p>	<b>detail extensive summary</b>
<b>RSS</b>	Resident set size.	<b>detail</b>
<b>WCHAN</b>	Symbolic name of the wait channel.	<b>detail</b>
<b>STARTED</b>	Local time when the process started running.	<b>detail</b>
<b>PRI</b>	Current priority of the process. A lower number indicates a higher priority.	<b>detail extensive summary</b>
<b>NI or NICE</b>	UNIX "niceness" value. A lower number indicates a higher priority.	<b>detail extensive summary</b>
<b>SIZE</b>	Total size of the process (text, data, and stack), in kilobytes.	<b>extensive summary</b>

Table 119: show system processes Output Fields (*continued*)

Field Name	Field Description	Level of Output
RES	Current amount of resident memory, in kilobytes.	extensive summary
STATE	Current state of the process (for example, <i>sleep</i> , <i>wait</i> , <i>run</i> , <i>idle</i> , <i>zombie</i> , or <i>stop</i> ).	extensive summary
TIME	(S)—Number of system and user CPU seconds that the process has used. (None, D, and E)—Total amount of time that the command has been running.	detail extensive summary
WCPU	Weighted CPU usage.	extensive summary
COMMAND	Command that is currently running.	detail extensive summary

### Sample Output

```

show system processes user@host> show system processes
PID  TT  STAT      TIME COMMAND
  0  ??  DLs      0:00.70 (swapper)
  1  ??  Is       0:00.35 /sbin/init --
  2  ??  DL       0:00.00 (pagedaemon)
  3  ??  DL       0:00.00 (vmdaemon)
  4  ??  DL       0:42.37 (update)
  5  ??  DL       0:00.00 (if_jnx)
 80  ??  Ss       0:14.66 syslogd -s
 96  ??  Is       0:00.01 portmap
128  ??  Is       0:02.70 cron
173  ??  Is       0:02.24 /usr/local/sbin/sshd (sshd1)
189  ??  S        0:03.80 /sbin/watchdog -t180
190  ??  I        0:00.03 /usr/sbin/tnetd -N
191  ??  S        2:24.76 /sbin/ifd -N
192  ??  S<       0:55.44 /usr/sbin/xntpd -N
195  ??  S        0:53.11 /usr/sbin/snmpd -N
196  ??  S        1:15.73 /usr/sbin/mib2d -N
198  ??  I        0:00.75 /usr/sbin/inetd -N
2677 ??  I        0:00.01 /usr/sbin/mgd -N
2712 ??  Ss       0:00.24 rlogind
2735 ??  R        0:00.00 /bin/ps -ax
1985 p0- S      0:07.41 ./rpd -N
2713 p0  Is       0:00.24 -tcsh (tcsh)
2726 p0  S+      0:00.07 cli

show system processes brief user@host> show system processes brief
last pid: 543; load averages: 0.00, 0.00, 0.00 18:29:47
37 processes: 1 running, 36 sleeping

Mem: 25M Active, 3976K Inact, 19M Wired, 8346K Buf, 202M Free
Swap: 528M Total, 64K Used, 528M Free

show system processes detail user@host> show system processes detail
PID  UID  PPID CPU PRI NI  RSS WCHAN  STARTED  TT  STAT      TIME COMMAND
3151 1049 3129  2  28  0  672 -          1:13PM  p0  R+       0:00.00 ps -ax -r
  1   0   0   0  10  0  376 wait    1:51PM  ??  Is       0:00.29 /sbin/init
  2   0   0   0  -18 0   12 psleep 1:51PM  ??  DL       0:00.00 (pagedae

```

```

 3   0   0   0 28   0   12 psleep  1:51PM  ?? DL   0:00.00 (vmdaemo
 4   0   0   0 28   0   12 update  1:51PM  ?? DL   0:07.15 (update)
 5   0   0   0  2   0   12 pfesel  1:51PM  ?? IL   0:02.90 (if_pfe)
27   0   1   0 10   0 17936 mfsidl  1:51PM  ?? Is   0:00.46 mfs /dev/
81   0   1   0  2   0   496 select  1:52PM  ?? Ss   0:31.21 syslogd -
119  1   1   0  2   0   492 select  1:52PM  ?? Is   0:00.00 portmap
134  0   1   0  2   0   580 select  1:52PM  ?? S    0:02.95 amd -p -a
151  0   1   0 18   0   532 pause   1:52PM  ?? Is   0:00.34 cron
183  0   1   0  2   0   420 select  1:52PM  ?? Ss   0:00.07 /usr/loca
206  0   1   0 18   0   72  pause   1:52PM  ?? S    0:00.51 /sbin/wat
207  0   1   0  2   0   520 select  1:52PM  ?? I    0:00.16 /usr/sbin
208  0   1   0  2   0   536 select  1:52PM  ?? S    0:08.21 /sbin/dcd
210  0   1 255  2 -12 740 select  1:52PM  ?? S<   0:05.83 /usr/sbin
211  0   1   0  2   0   376 select  1:52PM  ?? S    0:00.03 /usr/sbin
215  0   1   0  2   0   548 select  1:52PM  ?? I    0:00.50 /usr/sbin
219  0   1   0  3   0   540 ttyin   1:52PM  v0 Is+  0:00.02 /usr/libe
220  0   1   0  3   0   540 ttyin   1:52PM  v1 Is+  0:00.01 /usr/libe
221  0   1   0  3   0   540 ttyin   1:52PM  v2 Is+  0:00.01 /usr/libe
222  0   1   0  3   0   540 ttyin   1:52PM  v3 Is+  0:00.01 /usr/libe
735  0   1   0  2   0   468 select  2:47PM  ?? S    0:19.14 /usr/sbin
736  0   1   0  2   0   212 select  2:47PM  ?? S    0:14.13 /usr/sbin
1380 0   1   0  3   0   888 ttyin   7:32PM  d0 Is+  0:00.46 bash
3019 0   207  0  2   0   636 select 10:49AM  ?? Ss   0:02.93 tnp.chass
3122 0 1380  0  2   0 1764 select 12:33PM  d0 S    0:00.77 ./rpd -N
3128 0 215  0  2   0   580 select 12:45PM  ?? Ss   0:00.12 rlogind
3129 1049 3128 0 18  0   944 pause  12:45PM  p0 Ss   0:00.14 -tcsh (tc
 0   0   0   0 -18  0    0 sched  1:51PM  ?? DLs  0:00.10 (swapper

```

**show system processes extensive**

```

user@host> show system processes extensive
last pid: 544; load averages: 0.00, 0.00, 0.00 18:30:33
37 processes: 1 running, 36 sleeping

```

```

Mem: 25M Active, 3968K Inact, 19M Wired, 8346K Buf, 202M Free
Swap: 528M Total, 64K Used, 528M Free

```

PID	USERNAME	PRI	NICE	SIZE	RES	STATE	TIME	WCPU	CPU	COMMAND
544	root	30	0	604K	768K	RUN	0:00	0.00%	0.00%	top
3	root	28	0	0K	12K	psleep	0:00	0.00%	0.00%	vmdaemon
4	root	28	0	0K	12K	update	0:03	0.00%	0.00%	update
528	aviva	18	0	660K	948K	pause	0:00	0.00%	0.00%	tcsh
204	root	18	0	300K	544K	pause	0:00	0.00%	0.00%	csh
131	root	18	0	332K	532K	pause	0:00	0.00%	0.00%	cron
186	root	18	0	196K	68K	pause	0:00	0.00%	0.00%	watchdog
27	root	10	0	512M	16288K	mfsidl	0:00	0.00%	0.00%	mount_mfs
1	root	10	0	620K	344K	wait	0:00	0.00%	0.00%	init
304	root	3	0	884K	900K	ttyin	0:00	0.00%	0.00%	bash
200	root	3	0	180K	540K	ttyin	0:00	0.00%	0.00%	getty
203	root	3	0	180K	540K	ttyin	0:00	0.00%	0.00%	getty
202	root	3	0	180K	540K	ttyin	0:00	0.00%	0.00%	getty
201	root	3	0	180K	540K	ttyin	0:00	0.00%	0.00%	getty
194	root	2	0	2248K	1640K	select	0:11	0.00%	0.00%	rpd
205	root	2	0	964K	800K	select	0:12	0.00%	0.00%	tnp.chassisd
189	root	2	-12	352K	740K	select	0:03	0.00%	0.00%	xntpd
114	root	2	0	296K	612K	select	0:00	0.00%	0.00%	amd
188	root	2	0	780K	600K	select	0:00	0.00%	0.00%	dcd
527	root	2	0	176K	580K	select	0:00	0.00%	0.00%	rlogind
195	root	2	0	212K	552K	select	0:00	0.00%	0.00%	inetd
187	root	2	0	192K	532K	select	0:00	0.00%	0.00%	tnetd
83	root	2	0	188K	520K	select	0:00	0.00%	0.00%	syslogd
538	root	2	0	1324K	516K	select	0:00	0.00%	0.00%	mgd
99	daemon	2	0	176K	492K	select	0:00	0.00%	0.00%	portmap
163	root	2	0	572K	420K	select	0:00	0.00%	0.00%	nsrexecd

```

192 root      2   0   560K   400K select  0:10  0.00%  0.00% snmpd
191 root      2   0  1284K   376K select  0:00  0.00%  0.00% mgd
537 aviva     2   0   636K   364K select  0:00  0.00%  0.00% cli
193 root      2   0   312K   204K select  0:07  0.00%  0.00% mib2d
   5 root      2   0     0K    12K pfesel  0:00  0.00%  0.00% if_pfe
   2 root     -18  0     0K    12K psleep  0:00  0.00%  0.00% pagedaemon
   0 root     -18  0     0K     0K sched   0:00  0.00%  0.00% swapper

```

**show system  
processes summary**

```
user@host> show system processes summary
```

```
last pid: 543; load averages: 0.00, 0.00, 0.00 18:29:47
37 processes: 1 running, 36 sleeping
```

```
Mem: 25M Active, 3976K Inact, 19M Wired, 8346K Buf, 202M Free
Swap: 528M Total, 64K Used, 528M Free
```

```

PID USERNAME PRI NICE SIZE   RES STATE  TIME  WCPU   CPU COMMAND
527 root      2   0   176K   580K select  0:00  0.04%  0.04% rlogind
543 root     30   0    604K   768K RUN     0:00  0.00%  0.00% top

```



## PART 10

# J-EX4200 and J-EX4500 Virtual Chassis

- J-EX4200 and J-EX4500 Virtual Chassis—Overview, Components, and Configurations on page 709
- J-EX4200 and J-EX4500 Virtual Chassis—Configuration Examples on page 735
- Configuring J-EX4200 and J-EX4500 Virtual Chassis on page 821
- Verifying J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 857
- Troubleshooting J-EX4200 and J-EX4500 Virtual Chassis on page 869
- Configuration Statements for J-EX4200 and J-EX4500 Virtual Chassis on page 871
- Operational Commands for J-EX4200 and J-EX4500 Virtual Chassis on page 891





# J-EX4200 and J-EX4500 Virtual Chassis—Overview, Components, and Configurations

- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected on page 717
- Understanding Software Upgrade in a J-EX4200 or J-EX4500 Virtual Chassis on page 718
- Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis on page 718
- Understanding Nonvolatile Storage in a J-EX4200 or J-EX4500 Virtual Chassis on page 721
- Understanding the High-Speed Interconnection of the J-EX4200 and J-EX4500 Virtual Chassis Members on page 721
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation on page 721
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Switch Version Compatibility on page 724
- Understanding Fast Failover in a J-EX4200 Virtual Chassis on page 725
- Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis on page 731
- Understanding Automatic Software Update on J-EX4200 and J-EX4500 Virtual Chassis Member Switches on page 734

## J-EX4200 and J-EX4500 Virtual Chassis Overview

---

The Dell PowerConnect J-EX Series J-EX4200 Ethernet Switch and the Dell PowerConnect J-EX Series J-EX4500 Ethernet Switch support the *Virtual Chassis* flexible, scaling switch solution. You can connect individual J-EX4200 switches and J-EX4500 switches together to form one unit and manage the unit as a single chassis.

Up to ten J-EX4200 switches can be interconnected into a single J-EX4200 Virtual Chassis, a Virtual Chassis composed exclusively of J-EX4200 switches.

Up to two J-EX4500 switches can be interconnected into a single J-EX4500 Virtual Chassis, a Virtual Chassis composed exclusively of J-EX4500 switches.

J-EX4200 and J-EX4500 switches can be interconnected into the same Virtual Chassis to form a mixed J-EX4200 and J-EX4500 Virtual Chassis. A mixed J-EX4200 and J-EX4500 Virtual Chassis supports up to two J-EX4500 switches and up to eight J-EX4200 switches.

The available bandwidth increases as you include more members within any Virtual Chassis configuration. See “Understanding the High-Speed Interconnection of the J-EX4200 and J-EX4500 Virtual Chassis Members” on page 721.

This topic describes:

- Basic Configuration of a Virtual Chassis with Master and Backup Switches on page 710
- Expanding Configurations—Within a Single Wiring Closet and Across Wiring Closets on page 710
- Global Management of Member Switches in a Virtual Chassis on page 711
- High Availability Through Redundant Routing Engines on page 711
- Adaptability as an Access Switch or Distribution Switch on page 712

## Basic Configuration of a Virtual Chassis with Master and Backup Switches

You need to interconnect at least two J-EX4200 or J-EX4500 switches in a Virtual Chassis configuration. A dedicated VCP is included on all J-EX4200 switches and is on the Virtual Chassis module on J-EX4500 switches. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.

## Expanding Configurations—Within a Single Wiring Closet and Across Wiring Closets

As your needs grow, you can easily expand the Virtual Chassis configuration to include more member switches. Within a single wiring closet, simply add member switches by cabling together the dedicated VCPs. For more information about expanding Virtual Chassis configurations within a single wiring closet, see:

- Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832
- Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 837
- Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838
- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840

You can also expand a Virtual Chassis configuration beyond a single wiring closet. Interconnect switches located in multiple wiring closets or in multiple data center racks by installing SFP or SFP+ uplink modules and connecting the uplink module ports on J-EX4200 member switches or by connecting the 10-Gigabit Ethernet SFP+ network

interfaces on the J-EX4500 member switches. To use SFP and SFP+ uplink module ports or network interfaces for interconnecting member switches, you must first explicitly configure them as VCPs. See:

- Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846
- Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure) on page 850

When you are creating a Virtual Chassis configuration with multiple members, you might want to deterministically control the role and member ID assigned to each member switch. You can do this by creating a preprovisioned configuration. We recommend using a preprovisioned configuration in a mixed J-EX4200 and J-EX4500 Virtual Chassis to ensure the switch roles are properly configured. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822 or “Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 828.

You can add switches to a preprovisioned configuration by using the autoprovisioning feature to automatically configure the uplink module ports as VCPs on the switches being added. See “Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure)” on page 832 for detailed information.

## Global Management of Member Switches in a Virtual Chassis

The interconnected member switches in a Virtual Chassis configuration operate as a single network entity. You run EZSetup only once to specify the identification parameters for the master, and these parameters implicitly apply to all members of the Virtual Chassis configuration. You can view the Virtual Chassis configuration as a single device in the J-Web user interface (J-EX4200 Virtual Chassis only) and apply various device management functions to all members of the Virtual Chassis configuration.

The serial console port and dedicated out-of-band management port that are on the individual switches have global virtual counterparts when the switches are interconnected in a Virtual Chassis configuration. A virtual console allows you to connect to the master by connecting a terminal directly to the console port of any member switch. A *virtual management Ethernet (VME)* interface allows you to remotely manage the Virtual Chassis configuration by connecting to the out-of-band management port of any member switch through a single IP address. See “Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis” on page 718.

## High Availability Through Redundant Routing Engines

A Virtual Chassis configuration has a master and a backup, each of which has a Routing Engine. These redundant Routing Engines handle all routing protocol processes and control the Virtual Chassis configuration. See “High Availability Features for J-EX Series Switches Overview” on page 22 for further information on redundant Routing Engines and additional high availability features.

## Adaptability as an Access Switch or Distribution Switch

A Virtual Chassis configuration supports a variety of user environments, because it can be composed on different models of J-EX4200 and J-EX4500 switches. You can select different switch models to support various functions. For example, you could set up a Virtual Chassis configuration with partial PoE models to support the company's internal servers and configure one more Virtual Chassis configuration with partial PoE models to support the company's external servers. Alternatively, the Virtual Chassis configuration can be used as a distribution switch.

### Related Documentation

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected on page 717
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Switch Version Compatibility on page 724
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation on page 721
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723
- J-EX4200 Switch Models on page 31
- J-EX4500 Switch Models on page 34

## Understanding J-EX4200 and J-EX4500 Virtual Chassis Components

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You can interconnect up to ten Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches in a J-EX4200 Virtual Chassis, up to two Dell PowerConnect J-EX Series J-EX4500 Ethernet Switches in a J-EX4500 Virtual Chassis, and up to two J-EX4500 Ethernet Switches and up to eight J-EX4200 switches in a mixed J-EX4200 and J-EX4500 Virtual Chassis.

This topic covers:

- Virtual Chassis Ports (VCPs) on page 712
- Master Role on page 713
- Backup Role on page 713
- Linecard Role on page 714
- Member Switch and Member ID on page 714
- Mastership Priority on page 715
- Virtual Chassis Identifier (VCID) on page 716

### Virtual Chassis Ports (VCPs)

There are two dedicated Virtual Chassis ports (VCPs) on the rear panel of the J-EX4200 switch that are used exclusively to interconnect a J-EX4200 switch to another J-EX4200 switch or a J-EX4500 switch in a Virtual Chassis configuration. The interfaces for these dedicated ports are operational by default when the ports are properly cabled. In addition, you can interconnect the switch with another J-EX4200 switch across a wider distance

by installing an optional SFP or SFP+ uplink module in a J-EX4200 switch or by using the network interfaces in a J-EX4200-24F switch. To do this using uplink module ports, you need to install one uplink module in at least one J-EX4200 switch at each end of the link. You must set the uplink module ports or the J-EX4200-24F network interfaces to function as VCPs in order for the interconnected switches to be recognized as members of the same Virtual Chassis configuration.

There are two dedicated Virtual Chassis ports (VCPs) on the Virtual Chassis module on a J-EX4500 switch. These dedicated VCPs can be used to interconnect the J-EX4500 switch with a J-EX4200 switch or a J-EX4500 switch to form a Virtual Chassis. Additionally, you can interconnect two J-EX4500 switches across a wider distance within a Virtual Chassis by configuring any 10-Gigabit Ethernet SFP+ port as a VCP.

## Master Role

The member that functions in the master role in the Virtual Chassis:

- Manages the member switches.
- Runs the Junos operating system (Junos OS) for J-EX Series Switches in a master role.
- Runs the chassis management processes and control protocols.
- Represents all the member switches interconnected within the Virtual Chassis configuration. (The hostname and other properties that you assign to this switch during setup apply to all members of the Virtual Chassis configuration.)

When a J-EX4200 or J-EX4500 switch is powered on as a standalone switch, it is considered the master member. In a multimember Virtual Chassis configuration, one member functions as the master and a second member functions as the backup:

- In a preprovisioned configuration, one of the two members assigned as **routing-engine** functions as the master member. The selection of which member assigned as **routing-engine** functions as master and which as backup is determined by the software based on the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717.
- In a configuration that is not preprovisioned, the selection of the master and backup is determined by the mastership priority value and secondary factors in the master election algorithm.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 switches must always be in the master and backup roles and, therefore, be assigned the **routing-engine** role in a preprovisioned configuration.

## Backup Role

The member that functions in the backup role in the Virtual Chassis:

- Maintains a state of readiness to take over the master role if the master fails.
- Runs Junos OS for J-EX Series switches in a backup role.

- Synchronizes with the master in terms of protocol states, forwarding tables, and so forth, so that it is prepared to preserve routing information and maintain network connectivity without disruption in case the master is unavailable.

You must have at least two member switches in the Virtual Chassis configuration to have a backup member.

- In a preprovisioned configuration, one of the two members assigned as **routing-engine** functions in the backup role. The selection of which member assigned as **routing-engine** functions as master and which as backup is determined by the software based on the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717.
- In a configuration that is not preprovisioned, the selection of the master and backup is determined by the mastership priority value and secondary factors in the master election algorithm.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 switches must always be assigned the **routing-engine** roles and must always be acting in the master or backup roles.

## Linecard Role

A member that functions in the linecard role in the Virtual Chassis:

- Runs only a subset of Junos OS for J-EX Series switches.
- Does not run the chassis control protocols.
- Can detect certain error conditions (such as an unplugged cable) on any interfaces that have been configured on it through the master.

The Virtual Chassis configuration must have at least three members to include a linecard member.

- In a preprovisioned configuration, you can explicitly configure a member with the role of linecard, which makes it ineligible for functioning as a master or backup.
- In a configuration that is not preprovisioned, the members that are not selected as master or backup function as linecard members of the Virtual Chassis configuration. The selection of the master and backup is determined by the mastership priority value and secondary factors in the master election algorithm. A switch with a mastership priority of 0 will always be in the linecard role.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4200 switches must always be assigned the linecard role.

## Member Switch and Member ID

Each physically discrete J-EX4200 or J-EX4500 switch is a potential member of a Virtual Chassis configuration. When a J-EX4200 or J-EX4500 switch is powered on, it receives a member ID that is displayed on the front-panel LCD. If the switch is powered on as a standalone switch, its member ID is always 0. When the switch is interconnected with other switches in a Virtual Chassis configuration, its member ID (0 through 9) is assigned

by the master based on various factors, such as the order in which the switch was added to the Virtual Chassis configuration or the member ID assigned by a preprovisioned configuration.

If the Virtual Chassis configuration previously included a member switch and that member was physically disconnected or removed from the Virtual Chassis configuration, its member ID is not available for assignment as part of the standard sequential assignment by the master. For example, you might have a Virtual Chassis configuration composed of member 0, member 2, and member 3, because member 1 was removed. When you add another member switch and power it on, the master assigns it as member 4.

The member ID distinguishes the member switches from one another. You use the member ID:

- To assign a mastership priority value to a member switch
- To configure interfaces for a member switch
- To apply some operational commands to a member switch
- To display status or characteristics of a member switch

## Mastership Priority

In a configuration that is not preprovisioned, you can designate the role (master, backup, or linecard) that a member switch performs within the Virtual Chassis configuration by configuring its mastership priority (from **0** to **255**). The mastership priority value is the factor with the highest precedence for selecting the master of the Virtual Chassis configuration. A switch with a mastership priority of **0** will never assume the backup or master role.

The default value for mastership priority is **128** for both J-EX4200 and J-EX4500 switches. When a switch is powered on, it receives the default mastership priority value. Because it is the only member of the Virtual Chassis configuration, it is also the master. When you interconnect a standalone switch to an existing Virtual Chassis configuration (which implicitly includes its own master), we recommend that you explicitly configure the mastership priority of the members that you want to function as the master and backup.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis that is not configuring using a preprovisioned configuration, we recommend setting the mastership priority to **255** for the J-EX4500 switches and to **0** for the J-EX4200 switches. This configuration ensures the J-EX4500 switches maintain the master and backup roles, even in the event of a J-EX4500 switch failure. A mixed J-EX4200 and J-EX4500 Virtual Chassis does not function properly when a J-EX4200 switch is working in the master or backup role.



**NOTE:** Configuring the same mastership priority value for both the master and backup helps to ensure a smooth transition from master to backup in case the master becomes unavailable. It prevents the old master from preempting control from the backup in situations where the backup has taken control of the Virtual Chassis configuration due to the original master being unavailable.

We also recommend that you configure the highest possible mastership priority value (255) for those two members, because that guarantees that these two members continue to function as the master and backup when other members are added to the Virtual Chassis configuration. Any other members of the Virtual Chassis configuration (members with lower mastership priority) are considered linecard members.

In a preprovisioned configuration, the mastership priority value is assigned by the software, based on the specified role.

## Virtual Chassis Identifier (VCID)

All members of a Virtual Chassis configuration share one Virtual Chassis identifier (VCID). This identifier is derived from internal parameters. When you are monitoring a Virtual Chassis configuration, the VCID is displayed in the user interface.

### Related Documentation

- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Example: Configuring a J-EX4500 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 740
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846
- Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure) on page 850



## Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected

All switches that are interconnected in a J-EX4200 or J-EX4500 Virtual Chassis configuration are member switches of that Virtual Chassis. Each Virtual Chassis configuration has one member that functions as the *master* and controls the Virtual Chassis configuration. In a mixed J-EX4200 and J-EX4500 Virtual Chassis, a J-EX4500 switch must be in the master role.

When a Virtual Chassis configuration boots, the Junos operating system (Junos OS) for the switches automatically runs a master election algorithm to determine which member switch takes the role of master.

The algorithm that the software uses to determine the master is as follows:

1. Choose the member with the highest user-configured mastership priority (255 is the highest possible value). A switch with a configured mastership priority of 0 will always stay in the linecard role.
2. Choose the member that was master the last time the Virtual Chassis configuration booted.
3. Choose the member that has been included in the Virtual Chassis configuration for the longest period of time. (For this to be a deciding factor, there has to be a minimum time lapse of 1 minute between the power-ons of the individual interconnected member switches.)
4. Choose the member with the lowest MAC address.

The variations among switches and switch models do not impact the master election algorithm. To ensure that a specific member is elected as the master:

1. Power on only the switch that you want to configure as master of the Virtual Chassis configuration.
2. Configure the mastership priority of that member to have the highest possible value (255).



**NOTE:** In a mixed J-EX4200 and J-EX4500 Virtual Chassis that is not preprovisioned, you must assign the highest possible value to the J-EX4500 switches to ensure they are acting in the master and backup roles. You should also assign a mastership priority value of 0 to the J-EX4200 switches to ensure they stay in the linecard role.

3. Continue to configure other members through the master member, as desired.
4. Power on the other members.

### Related Documentation

- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723

## Understanding Software Upgrade in a J-EX4200 or J-EX4500 Virtual Chassis

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A Virtual Chassis can be composed of multiple J-EX4200 and J-EX4500 switches, and each member switch is running a Junos operating system (Junos OS) package. For ease of management, the Virtual Chassis configuration provides flexible methods to upgrade software releases.

A new software release can be upgraded for the entire Virtual Chassis configuration or for a particular member in the Virtual Chassis configuration through a CLI command. You can add software packages to either a single member of the Virtual Chassis configuration or to all members of the Virtual Chassis configuration at the same time.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the member switches must be running the same version of the Junos OS. You can upgrade all member switches simultaneously by specifying a path to both a J-EX4200 Junos OS image and a J-EX4500 Junos OS image in the same **request system software add** command-line statement.

### Related Documentation

- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding Automatic Software Update on J-EX4200 and J-EX4500 Virtual Chassis Member Switches on page 734
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80

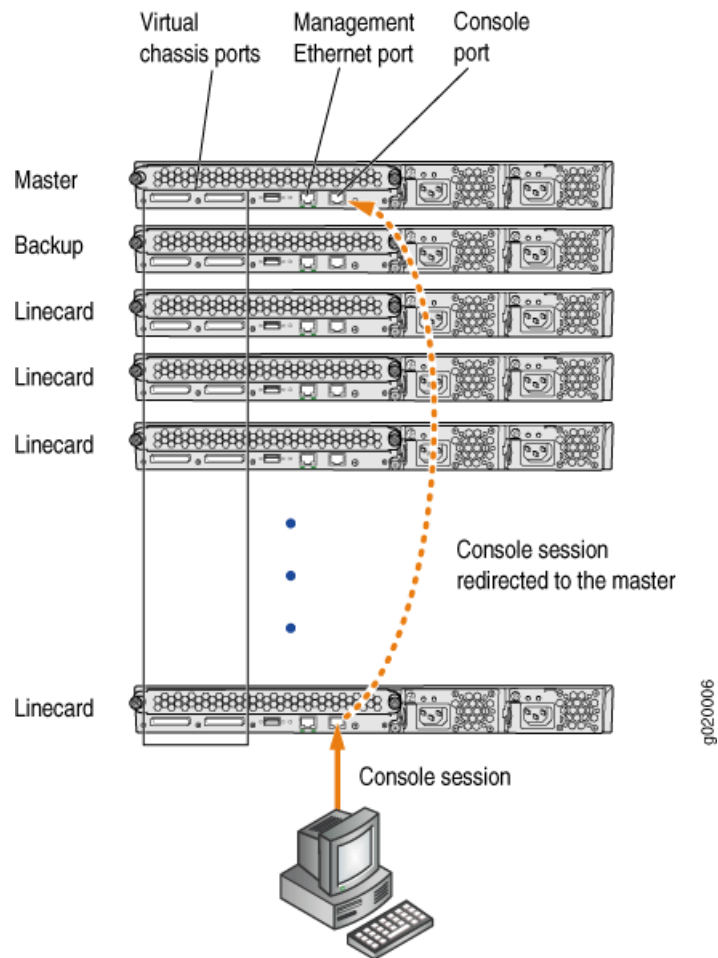
## Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis

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A J-EX4200 or J-EX4500 Virtual Chassis is composed of multiple J-EX4200 or J-EX4500 switches, so it has multiple console ports and multiple out-of-band management Ethernet ports located on the switches.

You can connect a PC or laptop directly to a console port of any member switch to set up and configure the Virtual Chassis. When you connect to the console port of any member switch, the console session is redirected to the master switch, as shown in Figure 9 on page 719.

Figure 9: Console Session Redirection (J-EX4200 Virtual Chassis Pictured)

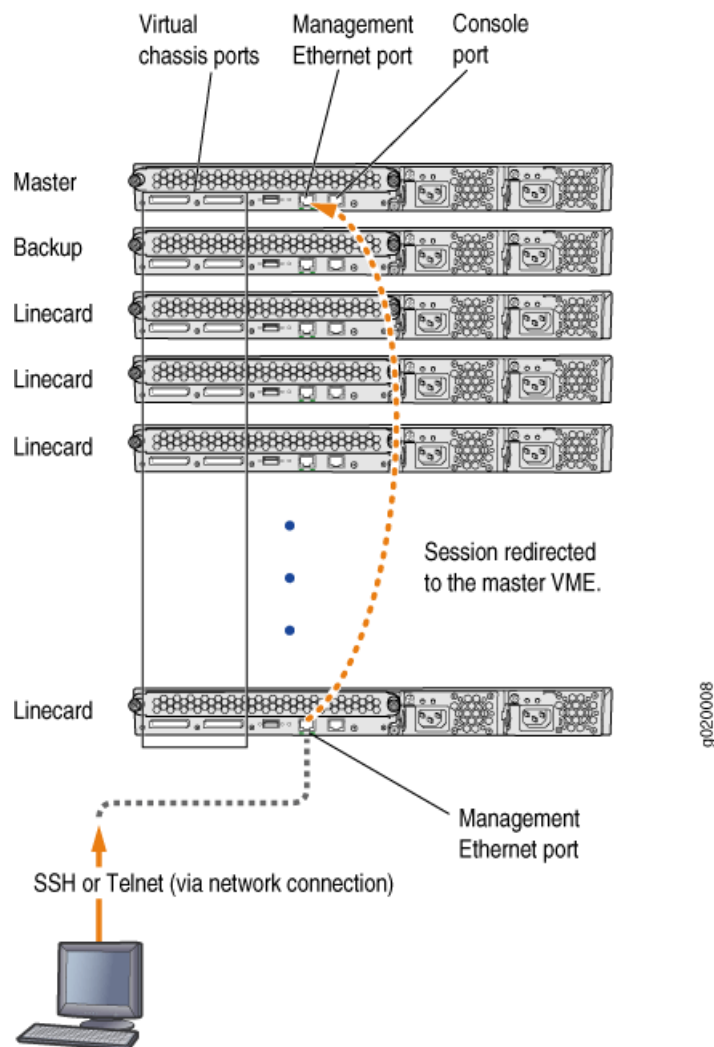


If the master becomes unavailable, the console session is disconnected from the old master and a new session is established with the newly elected master.

An out-of-band management Ethernet port is often referred to simply as a management Ethernet port. It uses a dedicated management channel for device maintenance and allows a system administrator to monitor and manage the switch by remote control.

The Virtual Chassis configuration can be managed remotely through SSH or Telnet using a global management interface called the virtual management Ethernet (VME) interface. The VME interface is a logical interface representing any and all of the out-of-band management ports on the member switches. When you connect to the Virtual Chassis configuration using the VME interface's IP address, the connection is redirected to the master member as shown in Figure 10 on page 720.

Figure 10: Management Ethernet Port Redirection to the VME Interface



If the master management Ethernet link is unavailable, the session is redirected through the backup management Ethernet link. If there is no active management Ethernet link on the backup, the VME interface chooses a management Ethernet link on one of the linecard members, selecting the linecard member with the lowest member ID as its first choice.

You can configure an IP address for the VME global management interface at any time.

You can perform remote configuration and administration of all members of the Virtual Chassis configuration through the VME interface.

**Related Documentation**

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736

- Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852

## Understanding Nonvolatile Storage in a J-EX4200 or J-EX4500 Virtual Chassis

The J-EX4200 and J-EX4500 switches store the Junos operating system (Junos OS) system files in internal flash memory. In the Virtual Chassis configurations, both the master switch and the backup switch store the configuration information for all the member switches.

- Nonvolatile Memory Features on page 721

### Nonvolatile Memory Features

Junos OS optimizes the way the Virtual Chassis stores its configuration if a member switch or the Virtual Chassis configuration is shut down improperly:

- If the master is not available, the backup switch takes on the role of the master and its internal flash memory takes over as the alternate location for maintaining nonvolatile configuration memory.
- If a member switch is taken offline for repair, the master stores the configuration of the member switch.

#### Related Documentation

- Command Forwarding Usage with a J-EX4200 or J-EX4500 Virtual Chassis on page 857
- Monitoring System Properties on page 578

## Understanding the High-Speed Interconnection of the J-EX4200 and J-EX4500 Virtual Chassis Members

Two high-speed Virtual Chassis ports (VCPs) on the J-EX4200 and J-EX4500 switches enable the member switches to be interconnected and operate as a single, powerful device. Each VCP interface is 32 Gbps bidirectional. When VCP interfaces are used to form a ring topology, each segment provides 64 Gbps bidirectional bandwidth. Because the VCP links act as point-to-point links, multiple segments of the ring can be used simultaneously. This allows the Virtual Chassis configuration bandwidth to scale as you interconnect more members within the ring topology.

#### Related Documentation

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Virtual Chassis Cabling Configuration Examples for J-EX4200 Switches

## Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation

You can combine physical Ethernet ports belonging to different member switches of a J-EX4200 or J-EX4500 Virtual Chassis configuration to form a logical point-to-point link, known as a *link aggregation group (LAG) or bundle*. A LAG provides more bandwidth than a single Ethernet link can provide. Additionally, link aggregation provides network

redundancy by load-balancing traffic across all available links. If one of the links fails, the system automatically load-balances traffic across all remaining links.

You can select up to four uplink module ports or SFP network ports on a J-EX4200 switch that have been configured as Virtual Chassis ports (VCPs) to form a LAG. When you set uplink module ports or SFP network ports on Virtual Chassis member switches as uplink VCPs, connect two or more of those uplink VCPs on one member to at least two uplink VCPs on another member, and configure those uplink VCPs to operate at the same link speed, the uplink VCPs automatically form a LAG. Each LAG is assigned a positive-integer identifier called a *trunk ID*.

You can also convert the SFP+ 10-Gigabit Ethernet ports on a J-EX4500 switch to VCP ports. These VCP ports can only be used to connect J-EX4500 switches. Up to 8 VCPs can be a part of the same LAG between two J-EX4500 switches.

A LAG over uplink VCPs provides higher overall bandwidth for forwarding traffic between the member switches connected by the uplink VCPs, faster management communications, and greater redundancy of operations among the members than would be available without the LAG. All J-EX4200 switches as well as J-EX4500 switches using a VCP module have two dedicated VCPs. A LAG over uplink VCPs provides an additional Virtual Chassis link throughput of 20 Gbps for the switches. Up to eight Virtual Chassis LAGs can be created per member.

See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846 for information about configuring uplink module ports and SFP network ports as uplink VCPs.



**NOTE:** The interfaces that are included within a bundle or LAG are sometimes referred to as *member interfaces*. Do not confuse this term with *member switches*, which refers to J-EX4200 or J-EX4500 switches that are interconnected as a Virtual Chassis. It is possible to create a LAG that is composed of member interfaces that are located in different member switches of a Virtual Chassis.

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#### Related Documentation

- J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770

- Example: Configuring Link Aggregation Groups Using J-EX4200 Uplink Virtual Chassis Ports on page 809

## Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration

You configure and manage almost all aspects of a J-EX4200 or J-EX4500 Virtual Chassis configuration through the master of the Virtual Chassis. However, you can also configure Virtual Chassis parameters when a switch is a standalone switch not interconnected with other members.

J-EX4200 and J-EX4500 switches have some innate characteristics of a Virtual Chassis by default. A standalone switch is assigned member ID **0** and is the master of itself. Therefore, you can edit its Virtual Chassis configuration. When the standalone switch is interconnected with an existing Virtual Chassis configuration, the Virtual Chassis configuration statements and any uplink Virtual Chassis port (VCP) settings that you previously specified on the standalone switch remain part of its configuration.

A switch is not recognized as a member of a Virtual Chassis until it is interconnected with the master or interconnected with an existing member of the Virtual Chassis. When a switch is located too far away to be interconnected through dedicated VCPs, you can specify an uplink module port or a network interface as a VCP by using the **request virtual-chassis vc-port** command. You must issue the **request virtual-chassis vc-port** command on the switch you are adding to the Virtual Chassis as well as on the existing member switch that you will connect to the new member. Because the to-be-added switch is not yet a member, the master switch will not recognize that added switch unless the latter has an uplink VCP. A link aggregation group (LAG) will be formed automatically when the new switch is added to the configuration if more than one such link with the same speed is detected between uplink VCPs on the new member and an existing member. See “Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation” on page 721.

When an uplink module port or a network interface is set as a VCP, it cannot be used for any additional purpose. If you want to use the uplink module port or network interface for another purpose, you can delete the VCP setting by using the **request virtual-chassis vc-port** command. You can execute this command directly on the member whose uplink VCP setting you want to delete or through the master of the Virtual Chassis configuration.



**CAUTION:** Deleting a VCP in a Virtual Chassis chain configuration can cause the Virtual Chassis configuration to split. For more information, see “Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis” on page 731.

You can create a preprovisioned configuration. This type of configuration allows you to deterministically control the member ID and role assigned to a member switch by associating the switch with its serial number. Preprovisioned configuration is highly recommended for a mixed J-EX4200 and J-EX4500 Virtual Chassis. For an example of

a preprovisioned configuration, see “Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File” on page 788.



**NOTE:** If a switch is interconnected with other switches in a Virtual Chassis configuration, each individual switch that is included as a member of the configuration is identified with a member ID. The member ID functions as an FPC slot number. When you are configuring interfaces for a Virtual Chassis configuration, you specify the appropriate member ID (0 through 9) as the *slot* element of the interface name.

The default factory settings for a Virtual Chassis configuration include FPC 0 as a member of the default VLAN because FPC 0 is configured as part of the `ethernet-switching` family. In order to include FPC 1 through FPC 9 in the default VLAN, add the `ethernet-switching` family to the configurations for those interfaces.

#### Related Documentation

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected on page 717
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- **request virtual-chassis vc-port on page 900**

## Understanding J-EX4200 and J-EX4500 Virtual Chassis Switch Version Compatibility

J-EX4200 or J-EX4500 switches must be running the same software versions to be interconnected into a Virtual Chassis. The master checks the hardware version, the Junos operating system (Junos OS) version, and other component versions running in a switch that is physically interconnected to its Virtual Chassis port (VCP). Different hardware models can be members of the same Virtual Chassis configuration. However, the master will not assign a member ID to a switch that is running a different software version. A switch that is running a different version of software will not be allowed to join the Virtual Chassis configuration.

#### Related Documentation

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712
- Understanding Software Upgrade in a J-EX4200 or J-EX4500 Virtual Chassis on page 718
- Understanding Software Installation on J-EX Series Switches on page 69
- Installing Software on a J-EX Series Switch with a Single Routing Engine (CLI Procedure) on page 80
- Installing Software on J-EX Series Switches (J-Web Procedure) on page 86



## Understanding Fast Failover in a J-EX4200 Virtual Chassis

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The Virtual Chassis fast failover feature is a hardware-assisted failover mechanism that automatically reroutes traffic and reduces traffic loss in the event of a link failure or switch failure in a Virtual Chassis. If a link between two members fails, traffic flow between those members must be rerouted quickly so that there is minimal traffic loss.

Fast failover is effective only for Virtual Chassis members configured in ring topologies using identical port types.



**NOTE:** Fast failover is not supported in a mixed J-EX4200 and J-EX4500 Virtual Chassis or in a J-EX4500 Virtual Chassis.

This topic describes the following:

- Supported Topologies for Fast Failover on page 725
- How Fast Failover Works on page 725
- Effects of Topology Changes on a Fast Failover Configuration on page 730

### Supported Topologies for Fast Failover

For fast failover to be effective, the Virtual Chassis members must be configured in a ring topology. The ring topology can be formed by using either dedicated Virtual Chassis ports (VCPs) or user-configured uplink module VCPs. Fast failover is supported only in a ring topology that uses identical port types—for example, either a topology that uses all dedicated VCPs or one that uses all uplink module VCPs. Fast failover is not supported in a ring topology that includes both dedicated VCPs and uplink module VCPs. Fast failover is supported, however, in a Virtual Chassis configuration that consists of multiple rings.

### How Fast Failover Works

When fast failover is activated, each VCP is automatically configured with a backup port of the same type (dedicated VCP, SFP uplink VCP, or SFP+ uplink VCP). If a VCP fails, its backup port is used to send traffic. These backup ports act as standby ports and are not meant for load-balancing traffic or any other purposes.

#### Fast Failover in a Ring Topology Using Dedicated VCPs

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When fast failover is activated in a ring topology that uses dedicated VCPs, each VCP is automatically configured with a backup port of the same type. If a VCP fails, its backup port is used to send traffic. Figure 11 on page 726 shows normal traffic flow in a ring topology using dedicated VCPs.

Figure 11: Normal Traffic Flow in a Ring Topology Using Dedicated VCPs

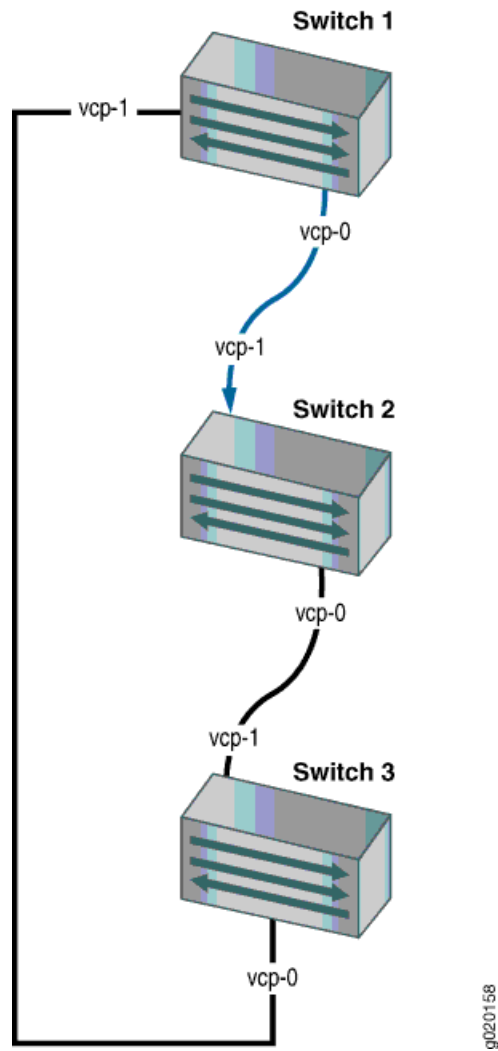
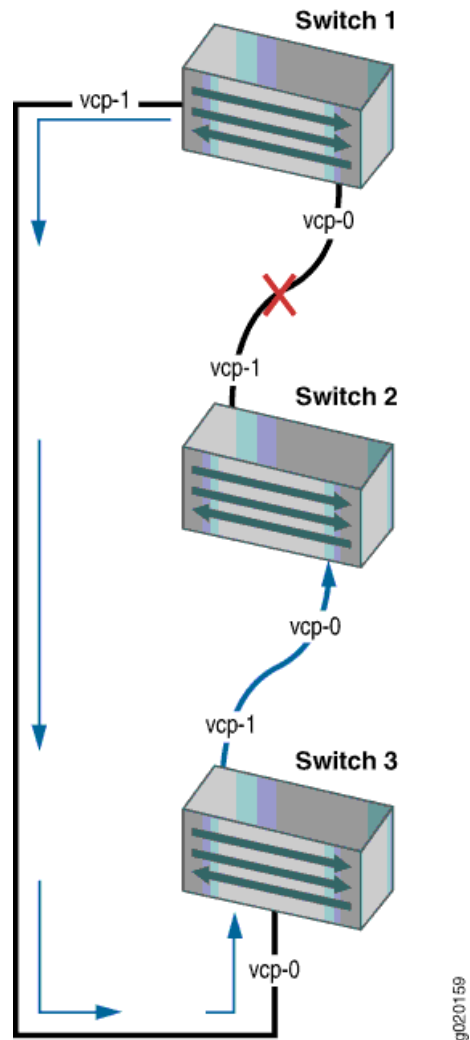


Figure 12 on page 727 shows traffic redirected by fast failover.

Figure 12: Traffic Redirected by Fast Failover After a Dedicated VCP Link Failure



When the failed link is restored, the Virtual Chassis reconfigures the topology to the topology's original state.

### Fast Failover in a Ring Topology Using Uplink Module VCPs

In a ring topology that uses uplink module VCPs, each uplink module VCP is automatically configured with a backup uplink module VCP. If an uplink module VCP fails, its backup port is used to send traffic. Figure 13 on page 728 shows normal traffic flow in a ring topology using SFP uplink module VCPs.



**NOTE:** To use SFP uplink module ports as VCPs, you must configure them to be VCPs using the `request virtual-chassis vc-port` command. Once configured, they are converted into VCPs. For example, `xe-0/1/0` becomes `vcp-255/1/0` after you configure it to be a VCP.

Figure 13: Normal Traffic Flow in a Ring Topology Using SFP Uplink Module VCPs

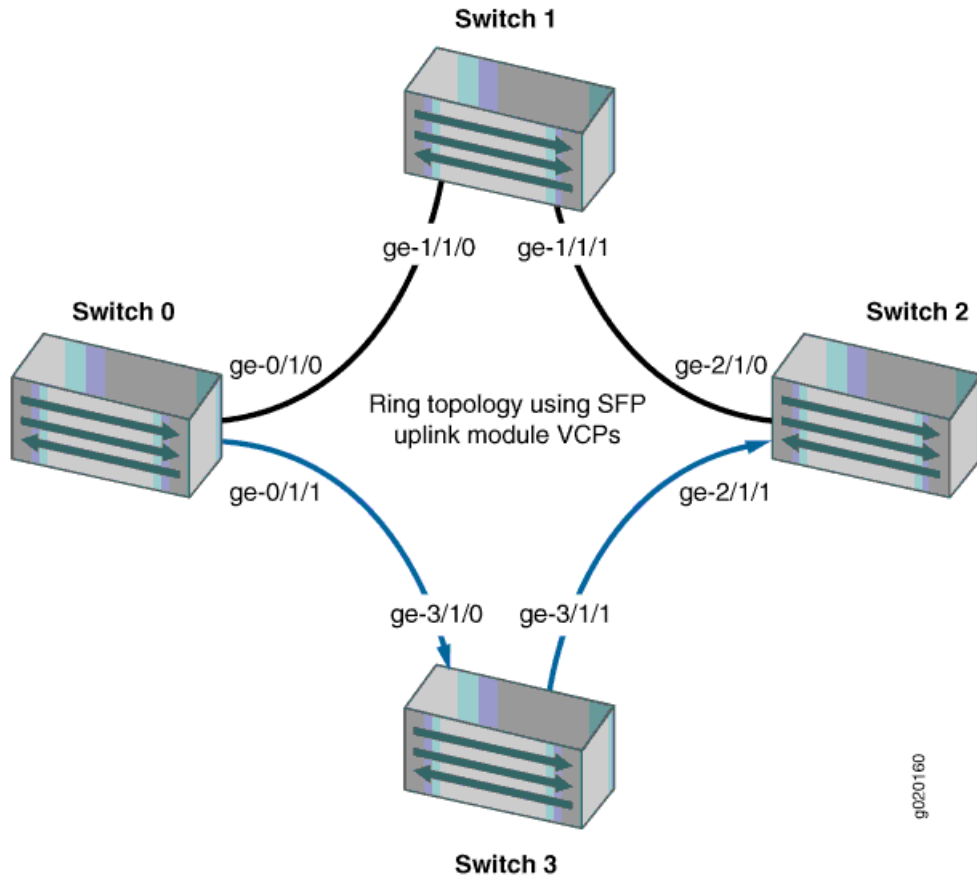
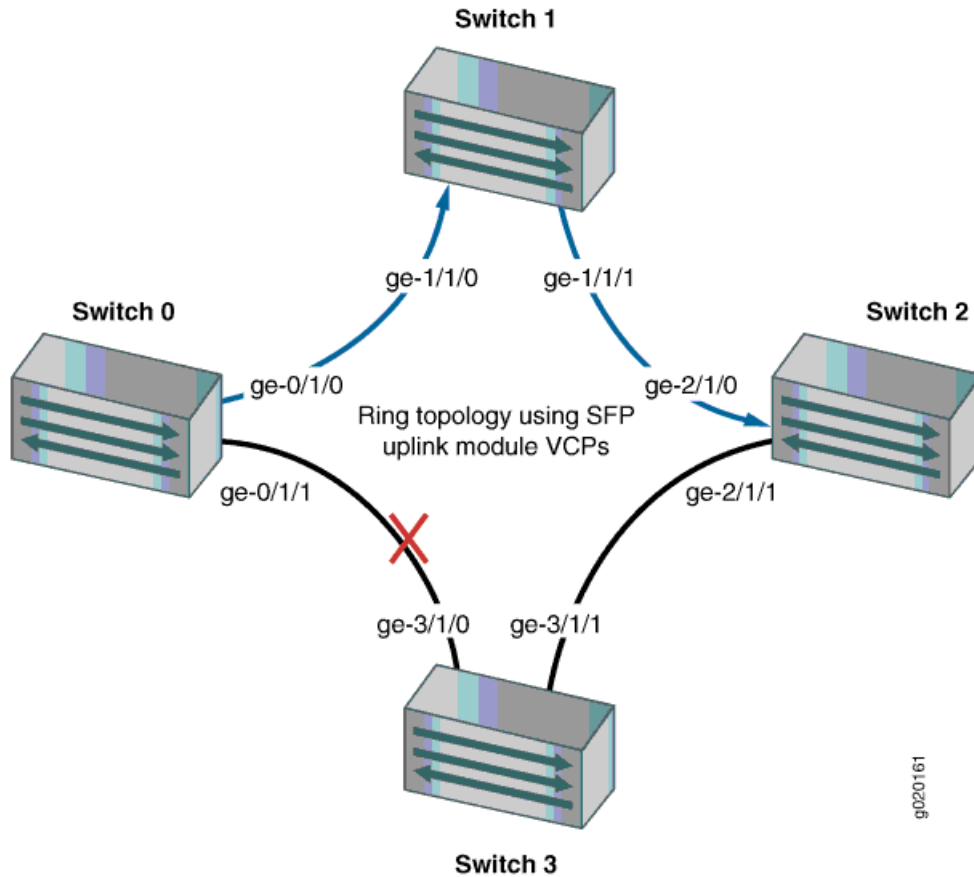


Figure 14 on page 729 shows traffic redirected by fast failover.

Figure 14: Traffic Redirected by Fast Failover After SFP Uplink Module VCP Link Failure

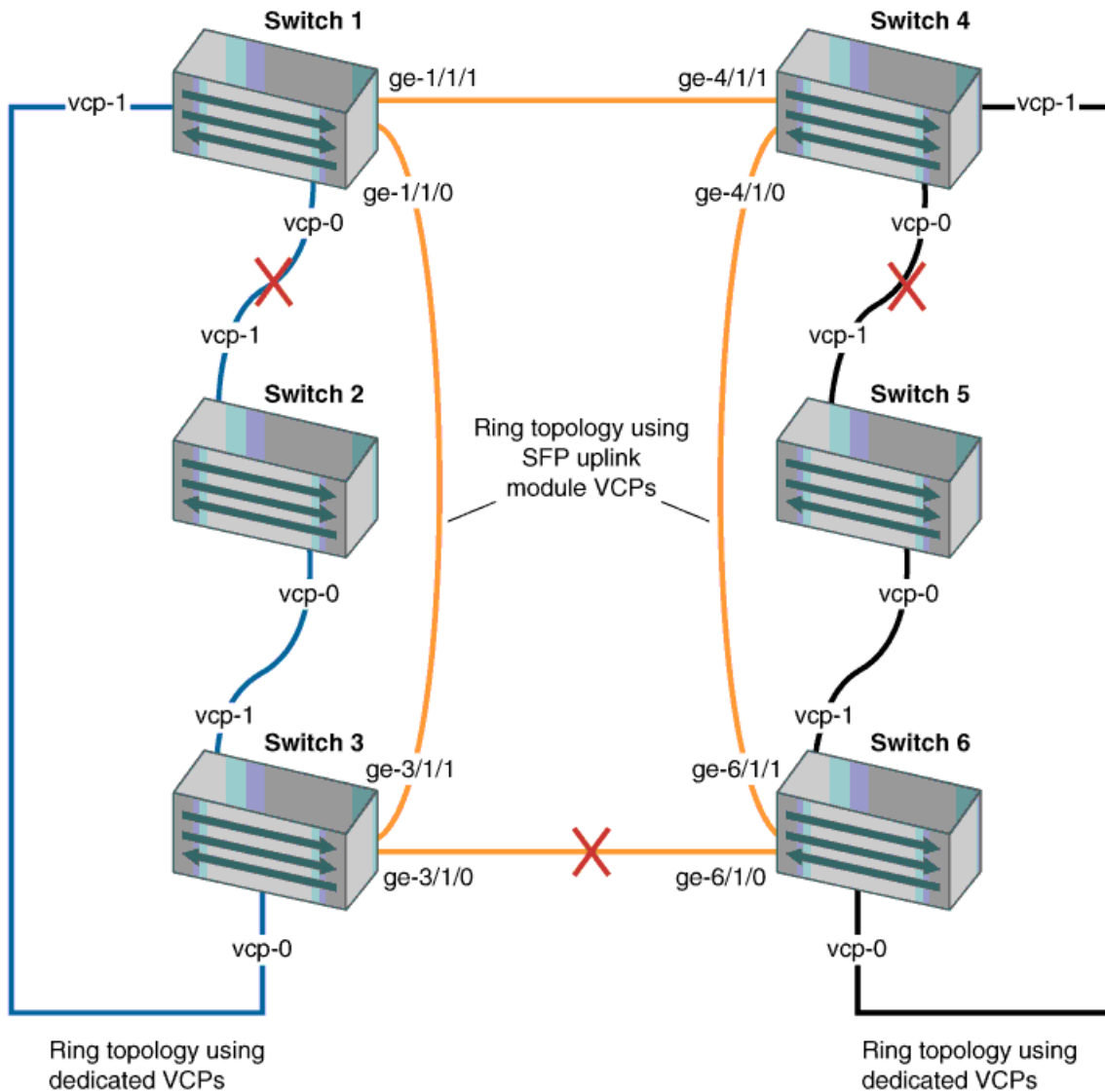


In a ring topology that uses SFP uplink module VCPs, there are four ports per module. Consecutive pairs of ports are automatically configured as backup ports for each other. For example, if a Virtual Chassis member has an SFP uplink module installed, uplink module VCPs `ge-0/1/0` and `ge-0/1/1` are automatically configured as backup ports for each other. Similarly, ports `ge-0/1/2` and `ge-0/1/3` are automatically configured as backup ports for each other.

#### Fast Failover in a Virtual Chassis Configuration Using Multiple Ring Topologies

Fast failover is supported in a Virtual Chassis configuration with a multiple-ring topology, as shown in Figure 15 on page 730.

Figure 15: Traffic Redirected by Fast Failover After VCP Link Failures in a Topology with Multiple Rings



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In this scenario, the Virtual Chassis configuration has three rings: two rings that use dedicated VCPs and one ring that uses SFP uplink module VCPs. Fast failover works independently on each ring. Each dedicated VCP in a ring is backed up by another dedicated VCP. Similarly, each SFP uplink module VCP is backed up by another SFP uplink module VCP. Fast failover does not support a ring topology consisting of a mix of dedicated VCPs and uplink module VCPs.

### Effects of Topology Changes on a Fast Failover Configuration

Once the fast failover feature has been activated, topology changes to the Virtual Chassis configuration do not affect the fast failover configuration. In the event of a link or switch failure, fast failover functions normally.

- Related Documentation**
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723
  - Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804
  - Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846

## Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis

In a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis, two or more switches are connected together to form a unit that is managed as a single chassis. If there is a disruption to the Virtual Chassis configuration due to member switches failing or being removed from the configuration, the Virtual Chassis configuration splits into two separate Virtual Chassis. This situation could cause disruptions in the network if the two separate configurations share common resources, such as global IP addresses. The split and merge feature provides a method to prevent the separate Virtual Chassis configurations from adversely affecting the network and also allows the two parts to merge back into a single Virtual Chassis configuration.



**NOTE:** If a Virtual Chassis configuration splits into separate parts, we recommend that you resolve the problem that caused the Virtual Chassis configuration to split as soon as possible.

You can also use this feature to merge two active but separate Virtual Chassis that have not previously been part of the same configuration into one Virtual Chassis configuration.



**NOTE:** The split and merge feature is enabled by default on J-EX4200 and J-EX4500 switches. You can disable the split and merge feature by using the `set virtual-chassis no-split-detection` command.

This topic describes:

- What Happens When a Virtual Chassis Configuration Splits on page 731
- Merging Virtual Chassis Configurations on page 732

### What Happens When a Virtual Chassis Configuration Splits

When a Virtual Chassis configuration splits into two separate Virtual Chassis configurations, the individual member switches detect this topology change and run the master election algorithm to select a new master for each of the two Virtual Chassis configurations. The new masters then determine whether their Virtual Chassis configuration remains active. One of the configurations remains active based on the following:

- It contains both the stable master and the stable backup (that is, the master and backup from the original Virtual Chassis configuration before the split).
- It contains the stable master and the configuration is greater than half the Virtual Chassis size.
- It contains the stable backup and is at least half the Virtual Chassis size.

In accordance with the rules given in the second and third list items, if the Virtual Chassis configuration splits into two equal parts and the stable master and stable backup are in different parts, then the part that contains the stable backup becomes active.



**NOTE:** The number of members in the Virtual Chassis configuration includes all member switches connected to date minus the number whose Virtual Chassis member IDs have been recycled (that is, made available for reassignment). Therefore, the size of the Virtual Chassis configuration increases when a new member switch is detected and decreases when a member switch's ID is recycled.

These rules ensure that only one of the two separate Virtual Chassis configurations created by the split remains active. The member switches in the inactive Virtual Chassis configuration remain in a linecard role. For the inactive members to become active again, one of the following things must happen:

- The problem that caused the original Virtual Chassis configuration to split is resolved, allowing the two Virtual Chassis configurations to merge.
- You load the factory default configuration on the inactive members, which causes the inactive members to function as standalone switches or become part of a different Virtual Chassis configuration.



**NOTE:** When you remove a member switch from a Virtual Chassis configuration, we recommend that you recycle the member ID using the `request virtual-chassis recycle` command.

## Merging Virtual Chassis Configurations

There are two scenarios in which separate Virtual Chassis merge:

- A Virtual Chassis configuration that had split into two is now merging back into a single configuration because the problem that had caused it to split has been resolved.
- You want to merge two Virtual Chassis that had not previously been configured together.

Every Virtual Chassis configuration has a unique ID (VCID) that is automatically assigned when the Virtual Chassis configuration is formed. You can also explicitly assign a VCID using the `set virtual-chassis id` command. A VCID that you assign takes precedence over automatically assigned VCIDs.



When you reconnect the separate Virtual Chassis configurations or connect them for the first time, the members determine whether or not the separate Virtual Chassis configurations can merge. The members use the following rules to determine whether a merge is possible:

- If the Virtual Chassis configurations have the same VCID, then the configurations can merge. If the two Virtual Chassis were formed as the result of a split, they have the same VCID.
- If the VCIDs are different, then the two configurations can merge only if both are active (inactive configurations cannot merge, ensuring that members removed from one Virtual Chassis configuration do not become members of another Virtual Chassis configuration). If the configurations to merge are both active and one of them has a user-configured VCID, this ID becomes the ID of the merged Virtual Chassis. If neither Virtual Chassis has a user-configured VCID, then the VCID of the configuration with the highest mastership priority becomes the ID of the merged Virtual Chassis. The resulting merged Virtual Chassis configuration is active.

When you connect two Virtual Chassis configurations, the following events occur:

1. Connecting the two split Virtual Chassis configurations triggers the shortest-path-first (SPF) algorithm. The SPF algorithm computes the network topology and then triggers the master election algorithm. The master election algorithm waits for the members to synchronize the topology information before running.
2. The master election algorithm merges the VCIDs of all the members.
3. Each member runs the master election algorithm to select a master and a backup from among all members with the same VCIDs. For more information, see “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717.
4. The master determines whether the Virtual Chassis configuration is active or inactive. (See “What Happens When a Virtual Chassis Configuration Splits” on page 731.)
5. If the Virtual Chassis configuration is active, the master assigns roles to all members. If the Virtual Chassis configuration is inactive, the master assigns all members the role of linecard.
6. When the other members receive their role from the master, they change their role to backup or linecard. They also use the active or inactive state information sent by the master to set their own state to active or inactive and to construct the Virtual Chassis member list from the information sent by the master.
7. If the Virtual Chassis state is active, the master waits for messages from the members indicating that they have changed their roles to the assigned roles, and then the master changes its own role to master.



**NOTE:** When you merge two Virtual Chassis that had not previously been part of the same Virtual Chassis configuration, any configuration settings (such as the settings for Telnet and FTP services, GRES, fast failover, VLANs, and so on) that exist on the new master become the configuration settings for all members of the new Virtual Chassis, overwriting any other configuration settings.

---

**Related Documentation**

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723
- Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807
- Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge (CLI Procedure) on page 855
- Disabling Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 854

## Understanding Automatic Software Update on J-EX4200 and J-EX4500 Virtual Chassis Member Switches

---

The automatic software update feature automatically updates the Junos operating system (Junos OS) version on prospective member switches as they are added to the Virtual Chassis. The new member switch immediately joins the Virtual Chassis configuration and is put in the active state.

For a standalone J-EX4200 or J-EX4500 switch to join an existing Virtual Chassis configuration, it must be running the same version of Junos OS that is running on the Virtual Chassis master. When the master in a Virtual Chassis configuration detects that a new switch has been added to the configuration, it checks the software version on the new switch. If the software version on the new switch is not the same as the version running on the master, the master keeps the new switch in the inactive state. If you have not enabled the automatic software update feature, you have to manually install the correct software version on each prospective member switch as it is added to the Virtual Chassis configuration.

**Related Documentation**

- Understanding Software Upgrade in a J-EX4200 or J-EX4500 Virtual Chassis on page 718
- Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818
- Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure) on page 855

# J-EX4200 and J-EX4500 Virtual Chassis—Configuration Examples

- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Example: Configuring a J-EX4500 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 740
- Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet on page 745
- Example: Adding a J-EX4500 Switch to a Nonprovisioned Virtual Chassis on page 750
- Example: Adding J-EX4500 Switches to a Preprovisioned Virtual Chassis on page 754
- Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Example: Configuring a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis on page 799
- Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804
- Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807

- Example: Configuring Link Aggregation Groups Using J-EX4200 Uplink Virtual Chassis Ports on page 809
- Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818

## Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet

---

A Virtual Chassis configuration is a scalable switch. You can provide secure, redundant network accessibility with a basic two-member J-EX4200 Virtual Chassis and later expand the Virtual Chassis configuration to provide additional access ports as your office grows.

This example describes how to configure a J-EX4200 Virtual Chassis with a master and backup in a single wiring closet:

- Requirements on page 736
- Overview and Topology on page 736
- Configuration on page 738
- Verification on page 738
- Troubleshooting the Virtual Chassis on page 740

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- One J-EX4200-48T switch
- One J-EX4200-24T switch
- One uplink module

Before you begin, be sure you have:

1. Rack-mounted the switches.
2. Installed the uplink module. .
3. Cabled the switches..

For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

### Overview and Topology

A Virtual Chassis configuration allows you to accommodate the networking needs of a growing office. The default configuration of a two-member Virtual Chassis includes a master and a backup switch. In addition to providing more access ports than a single switch can provide, a Virtual Chassis configuration provides high availability through redundancy.

This example shows a Virtual Chassis configuration composed of two J-EX4200 switches. One of the switches has an uplink module with ports that can be configured to connect to a distribution switch or customer edge (CE) router or that can be configured as Virtual Chassis ports (VCPs) to interconnect with a member switch that is located too far for the dedicated VCP cabling. (The network interfaces on J-EX4200-24F switches can also be configured as VCPs.) For information on configuring the uplink ports as trunk ports to a distribution switch, see “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042. For an example of configuring uplink ports as VCPs, see “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.

By default, after you interconnect the switches with the dedicated VCPs and power on the switches, the VCPs are operational. The mastership priorities and member IDs are assigned by the software. The software elects a master based on several criteria, including how long a member switch has belonged to the Virtual Chassis configuration. For additional details, see “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717. Therefore, we recommend that you start by powering on only one member switch, the one that you want to function as the master.



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

The Virtual Chassis configuration provides networking access for 50 onsite workers, who are sitting within range of a single wiring closet. The workers all use personal computers and VoIP phones. As the office grows, you can add more J-EX4200 switches to meet increased needs for access ports.

The topology for this example consists of two switches, one of which contains an uplink module:

- One J-EX4200-48T switch (SWA-0) with 48 access ports, all of which support PoE
- One J-EX4200-24T switch (SWA-1) with 24 access ports, including eight ports that support PoE
- One uplink module, with two 10-Gigabit Ethernet ports, is installed in SWA-1.

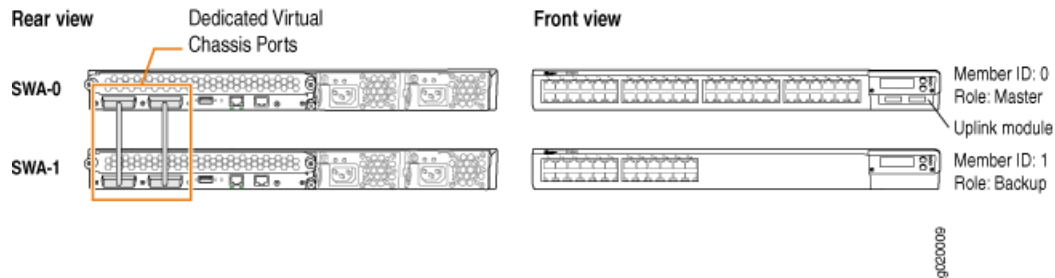
Table 120 on page 737 shows the default configuration settings for the two-member Virtual Chassis.

**Table 120: Components of the Basic Virtual Chassis Access Switch Topology**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4200-48T switch	0	Master: mastership priority 128
SWA-1	J-EX4200-48T switch	1	Backup: mastership priority 128

Figure 16 on page 738 shows that SWA-0 and SWA-1 are interconnected with their dedicated VCPs on the rear panel. The LCD on the front displays the member ID and role. SWA-0 also includes an uplink module. Its uplink ports can be used to connect to a distribution switch.

Figure 16: Basic J-EX4200 Virtual Chassis with Master and Backup



## Configuration

Configure a Virtual Chassis with a default master and backup in a single wiring closet:

### Step-by-Step Procedure

To configure a Virtual Chassis with master and backup:

1. Make sure the VCPs on the rear panel of the member switches are properly cabled. For Virtual Chassis cabling examples, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
2. Power on SWA-0 (the member switch that you want to function as the master).
3. Check the front-panel LCD to confirm that the switch has powered on correctly.
4. Run the EZSetup program on SWA-0, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 or “Connecting and Configuring a J-EX Series Switch (J-Web Procedure)” on page 187 for details.
5. Configure SWA-0 with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired.

[edit]

```
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```

6. Power on SWA-1.

## Verification

To confirm that the Virtual Chassis configuration is operational, perform these tasks:

- Verifying That the Mastership Priority Is Assigned Appropriately on page 738
- Verifying That the VCPs Are Operational on page 739

### Verifying That the Mastership Priority Is Assigned Appropriately

**Purpose** Verify that the master, which has been selected by default, is the member switch that you want to function in that role.

- Action**
1. Check the front-panel LCD to confirm that the switch has powered on correctly and that a member ID has been assigned.
  2. List the member switches of the Virtual Chassis configuration.

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0019.e250.47a0
```

Member ID	Status	Serial No	Model	Mastership priority	Role	Neighbor List ID Interface
0 (FPC 0)	Prsnt	AK0207360276	ex4200-48t	128	Master*	1 vcp-0 1 vcp-1
1 (FPC 1)	Prsnt	AK0207360281	ex4200-24t	128	Backup	0 vcp-0 0 vcp-1

```
Member ID for next new member: 2 (FPC 2)
```

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected in a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected. The output shows that SWA-0, member 0, has been assigned default mastership priority 128. Because SWA-0 is the first member to be powered on, it has the most seniority and is therefore assigned the role of master. SWA-1 is powered on after member 0, so it is assigned the role of backup. The member IDs are displayed on the front panel of the switches. Check and confirm whether the default assignment is satisfactory.

### Verifying That the VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting the switches are operational.

**Action** Display the VCPs of all the members:

```
user@SWA-0> show virtual-chassis vc-port all-members
fpc0:
```

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	Up	32000	1	vcp-1
vcp-1	Dedicated	Up	32000	1	vcp-0

```
fpc1:
```

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	Up	32000	1	vcp-0
vcp-1	Dedicated	Up	32000	1	vcp-1

**Meaning** The `show virtual-chassis vc-port` command lists the interfaces that are enabled for the member switches of the Virtual Chassis configuration and shows the status of the interfaces. The output in this example shows that two of the VCPs are operational and two VCPs are not. A single cable has been used to interconnect vcp-0 of member ID 0

and vcp-0 of member ID 1. That interconnection is sufficient for the switch to be operational. However, we recommend that you connect the second set of VCPs for redundancy.

## Troubleshooting the Virtual Chassis

To troubleshoot the configuration of a Virtual Chassis, perform these tasks:

### [Troubleshooting the Assignment of Roles](#)

---

**Problem** The master and backup roles are not assigned to the member switches that you want to function in these roles.

**Solution** Modify the mastership priority values.

To quickly modify the mastership priority of SWA-1 (member ID 1), copy the following command and paste it into the switch terminal window:

```
[edit virtual-chassis]
user@SWA-1# set member 1 mastership-priority 255
```

### [Troubleshooting the VCPs](#)

---

**Problem** The VCPs are down.

**Solution**

1. Check to make sure that you have cabled the appropriate ports.
2. Check to make sure that the cables are seated properly.

You should generally cable and interconnect both of the VCPs on the member switches, for redundancy and high availability.

#### **Related Documentation**

- Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet on page 745
- Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826

## [Example: Configuring a J-EX4500 Virtual Chassis with a Master and Backup in a Single Wiring Closet](#)

---

A Virtual Chassis configuration is a scalable switch. You can provide secure, redundant network accessibility with a basic two-member J-EX4500 Virtual Chassis configuration and later expand the Virtual Chassis configuration to provide additional access ports as your office grows.



This example describes how to configure a J-EX4500 Virtual Chassis with a master and backup in a single wiring closet:

- Requirements on page 741
- Overview and Topology on page 741
- Configuration on page 742
- Verification on page 743
- Troubleshooting the Virtual Chassis on page 744

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1 or later for J-EX Series switches
- Two J-EX4500 switches with Virtual Chassis modules

Before you begin, be sure you have:

1. Rack-mounted the switches. For instructions, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
2. Cabled the switches but not the VCPs.

## Overview and Topology

A Virtual Chassis configuration allows you to accommodate the networking needs of a growing office. The default configuration of a two-member Virtual Chassis includes a master and a backup switch. In addition to providing more access ports than a single switch can provide, a Virtual Chassis configuration provides high availability through redundancy.

After you interconnect the switches with the dedicated VCPs and power on the switches, the VCPs are operational. The mastership priorities and member IDs are assigned by the software. The software elects a master based on several criteria, including how long a member switch has belonged to the Virtual Chassis configuration. For additional details, see “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717. Therefore, we recommend that you start by powering on only one member switch, the one that you want to function as the master.



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

The Virtual Chassis configuration provides networking access for onsite workers who are sitting within range of a single wiring closet. The workers all use personal computers and VoIP phones. As the office grows, you can add J-EX4200 switches to meet increased needs for access ports.

The topology for this example consists of two J-EX4500 switches.

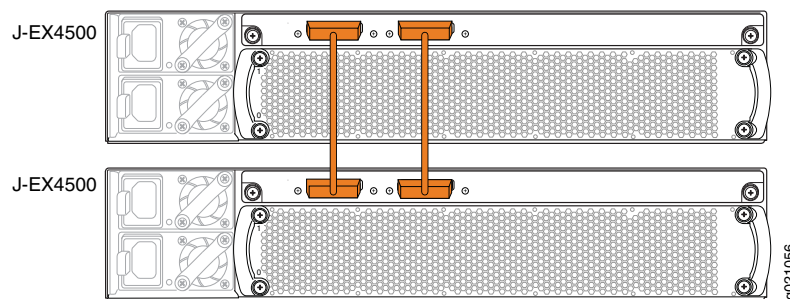
Table 121 on page 742 shows the default configuration settings for the two-member Virtual Chassis.

**Table 121: Components of the Basic Virtual Chassis Access Switch Topology**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4500 switch	0	Master: mastership priority 128
SWA-1	J-EX4500 switch	1	Backup: mastership priority 128

Figure 17 on page 742 shows that SWA-0 and SWA-1 are interconnected with their dedicated VCPs on the rear panel. The LCD on the front displays the member ID and role.

**Figure 17: Basic J-EX4500 Virtual Chassis with Master and Backup**



## Configuration

Configure a Virtual Chassis with a default master and backup in a single wiring closet:

### Step-by-Step Procedure

To configure a Virtual Chassis with master and backup:

1. Power on SWA-0 (the member switch that you want to function as the master).
2. Power on SWA-1 (the member switch that you want to function as the backup).
3. Set the PIC mode to Virtual Chassis mode on both switches:
 

```
user@swi tch> request chassis pic-mode virtual-chassis
```
4. Run the EZSetup program on SWA-0, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.
5. Cable the Virtual Chassis member switches together.
6. Configure SWA-0 with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired:

```
[edit]
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```

## Verification

To confirm that the Virtual Chassis configuration is operational, perform these tasks:

- Verifying That the Mastership Priority Is Assigned Appropriately on page 743
- Verifying That the VCPs Are Operational on page 743

### Verifying That the Mastership Priority Is Assigned Appropriately

**Purpose** Verify that the master, which has been selected by default, is the member switch that you want to function in that role.

- Action**
1. Check the front-panel LCD to confirm that the switch has powered on correctly and that a member ID has been assigned.
  2. List the member switches of the Virtual Chassis configuration.

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0019.e250.47a0
```

Member ID	Status	Serial No	Model	Mastership priority	Role	Neighbor ID	List Interface
0 (FPC 0)	Prsnt	AK0207360276	ex4500-40f	128	Master*	1	vcp-0
						1	vcp-1
1 (FPC 1)	Prsnt	AK0207360281	ex4500-40f	128	Backup	0	vcp-0
						0	vcp-1

```
Member ID for next new member: 2 (FPC 2)
```

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected in a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected. The output shows that SWA-0, member 0, has been assigned default mastership priority 128. Because SWA-0 is the first member to be powered on, it has the most seniority and is therefore assigned the role of master. SWA-1 is powered on after member 0, so it is assigned the role of backup. The member IDs are displayed on the front panel of the switches. Check and confirm whether the default assignment is satisfactory.

### Verifying That the VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting the switches are operational.

- Action** Display the VCPs of all the members:

```
user@SWA-0> show virtual-chassis vc-port all-members
fpc0:
```

```
-----
```

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	Up	32000	1	vcp-1
vcp-1	Dedicated	Up	32000	1	vcp-0

```
fpc1:
```

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	Up	32000	1	vcp-0
vcp-1	Dedicated	Up	32000	1	vcp-1

**Meaning** The `show virtual-chassis vc-port` command lists the interfaces that are enabled for the member switches of the Virtual Chassis configuration and shows the status of the interfaces. The output in this example shows that two of the VCPs are operational. A single cable has been used to interconnect vcp-0 of member ID 0 and vcp-0 of member ID 1. That interconnection is sufficient for the switch to be operational. However, we recommend that you connect the second set of VCPs for redundancy.

## Troubleshooting the Virtual Chassis

To troubleshoot the configuration of a Virtual Chassis, perform these tasks:

### [Troubleshooting the Assignment of Roles](#)

**Problem** The master and backup roles are not assigned to the member switches that you want to function in these roles.

**Solution** Modify the mastership priority values.

To quickly modify the mastership priority of SWA-1 (member ID 1), copy the following command and paste it into the switch terminal window:

```
[edit virtual-chassis]
user@SWA-1# set member 1 mastership-priority 255
```

### [Troubleshooting the VCPs](#)

**Problem** The VCPs are down.

**Solution**

1. Check to make sure that you have cabled the appropriate ports.
2. Check to make sure that the cables are seated properly.

You should generally cable and interconnect both of the VCPs on the member switches, for redundancy and high availability.

**Related Documentation**

- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770
- Example: Configuring a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis on page 799
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822

## Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet

---

A Virtual Chassis is a scalable switch composed of multiple interconnected J-EX4200 and/or J-EX4500 switches.

This example describes how to configure an expanding J-EX4200 Virtual Chassis within a single wiring closet:

- Requirements on page 745
- Overview and Topology on page 745
- Configuration on page 747
- Verification on page 748
- Troubleshooting on page 749

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- One J-EX4200-48T switch
- Two J-EX4200-24T switches
- One uplink module

Before you begin, be sure you have confirmed that the existing J-EX4200 Virtual Chassis configuration is operating correctly. See “Verifying That Virtual Chassis Ports on a J-EX4200 or J-EX4500 Switch Are Operational” on page 862.

### Overview and Topology

A Virtual Chassis configuration can be expanded without disrupting the site's network connectivity. This example describes adding a member switch to an existing Virtual Chassis configuration to provide additional access ports for connecting more PCs and Voice over IP (VoIP) phones at this location. You can continue to expand the Virtual Chassis configuration with additional members in the same wiring closet, using the same procedure. If you want to expand the Virtual Chassis configuration to include member switches in another wiring closet, see “Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets” on page 762.

If you want to retain the roles of the existing master and backup switches, explicitly configure the mastership priority of these switches, specifying the highest possible value (255) for both the master and the backup.

During expansion, the existing Virtual Chassis configuration can remain powered on and connected to the network. Before powering up the new switch, interconnect it to the other switches using the dedicated VCPs on the rear panel. Do not run the EZSetup program on the added member switch.

This example shows an existing Virtual Chassis configuration composed of two J-EX4200 switches. The Virtual Chassis configuration is being expanded to include J-EX4200-24T switch.

The topology for this example consists of:

- One J-EX4200-48T switch (SWA-0) with 48 access ports, 8 of which support Power over Ethernet (PoE)
- Two J-EX4200-24T switch (SWA-1 and SWA-2) each with 24 access ports, including 8 ports that support PoE
- One uplink module with two 10-gigabit Ethernet ports is installed in the J-EX4200-48T switch. These ports can be configured as trunk ports to connect to a distribution switch or customer edge (CE) router or as Virtual Chassis ports (VCPs) to interconnect with a member switch that is located too far for dedicated VCP cabling. (The uplink module ports on the SFP and SFP+ uplink modules and the SFP network interfaces on the J-EX4200-24F switches can also be used for these purposes.) For information on configuring the uplink ports as trunk ports to a distribution switch, see “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042 or “Configuring Gigabit Ethernet Interfaces (J-Web Procedure)” on page 1045. For information on configuring uplink ports as Virtual Chassis ports, see “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.

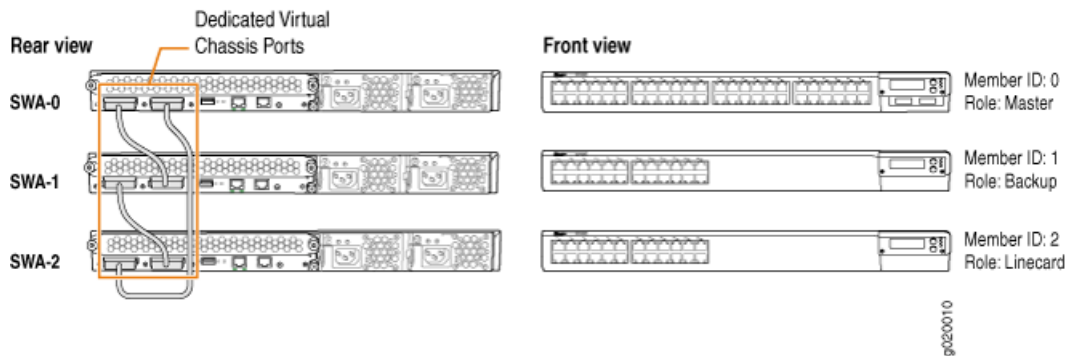
Table 122 on page 746 shows the configuration settings for the expanded Virtual Chassis.

**Table 122: Components of the Expanded Virtual Chassis Access Switch**

Member Switch	Hardware	Member ID	Role in Virtual Chassis
SWA-0	J-EX4200-48T switch	0	master; mastership priority 255
SWA-1	J-EX4200-24T switch	1	backup; mastership priority 255
SWA-2	J-EX4200-24T switch	2	linecard; mastership priority 128

Figure 18 on page 747 shows that the three member switches ( SWA-0, SWA-1 and SWA-2) are interconnected with their dedicated VCPs on the rear panel. The LCD on the front displays the member ID and role. SWA-0 also includes an uplink module. Its uplink ports can be used to connect to a distribution switch.

Figure 18: Expanded J-EX4200 Virtual Chassis in a Single Wiring Closet



## Configuration

To expand a Virtual Chassis configuration to include additional member switches within a single wiring closet, perform these tasks:



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis configuration.

### CLI Quick Configuration

To maintain the master and backup roles of the existing members and ensure that the new member switch functions in a linecard role, copy the following commands and paste them into the terminal window:

```
[edit]
user@SWA-0# set virtual-chassis member 0 mastership-priority 255
user@SWA-1# set virtual-chassis member 1 mastership-priority 255
```

### Step-by-Step Procedure

To ensure that the existing member switches retain their current roles and to add another member switch in a linecard role:

1. Configure the mastership priority of SWA-0 (member 0) to be the highest possible value, thereby ensuring that it functions as the master of the expanded Virtual Chassis configuration.

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
```

2. Configure the mastership priority of SWA-1 (member 1) to be the highest possible value. This setting is recommended for high availability and smooth transition of mastership in case the original master becomes unavailable.

```
[edit virtual-chassis]
user@SWA-1# set member 1 mastership-priority 255
```

3. Interconnect the unpowered SWA-2 with SWA-0 and SWA-1 using the dedicated VCPs on the rear panel. For Virtual Chassis cabling examples, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
4. Power on SWA-2.

You do not need to run EZSetup on SWA-2. The identification parameters that were set up for the master apply implicitly to all members of the Virtual Chassis configuration. SWA-2 functions in a linecard role, because SWA-0 and SWA-1 have been configured to the highest mastership priority values.

## Verification

To verify that the new switch has been added in the linecard role and that its VCPs are operational, perform these tasks:

- Verifying That the New Switch Has Been Added in a Linecard Role on page 748
- Verifying That the VCPs Are Operational on page 748

### Verifying That the New Switch Has Been Added in a Linecard Role

**Purpose** Verify that SWA-2 has been added in a linecard role to the Virtual Chassis configuration.

**Action** Use the `show virtual-chassis status` command to list the member switches with their member IDs, mastership priority values, and assigned roles.

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0000.e255.00e0
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	255	Master*	1 vcp-0 2 vcp-1
1 (FPC 1)	Prsnt	def456	ex4200-24t	255	Backup	2 vcp-0 0 vcp-1
2 (FPC 2)	Prsnt	abd231	ex4200-24t	128	Linecard	0 vcp-0 1 vcp-1

**Meaning** The `show virtual-chassis status` command lists the member switches of the Virtual Chassis configuration with the member IDs and mastership priority values. It also displays the neighbor members with which each member is interconnected. This output shows that SWA-2 has been assigned member ID 2 and has the default mastership priority value 128. Because the mastership priority is lower than the mastership priority of the other members, SWA-2 functions in the linecard role. You can continue to add more member switches, following the same procedure. It is possible to have multiple members in linecard roles with the same mastership priority value.

### Verifying That the VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting the member switches are operational.

**Action** List the VCP interfaces on the Virtual Chassis configuration.

```
user@SWA-0> show virtual-chassis vc-port all-members
fpc0:
```

```
-----
Interface      Type      Status
```



```

or
PIC / Port
vcp-0          Dedicated    Up
vcp-1          Dedicated    Up

```

```
fpc1:
```

```

-----
Interface      Type          Status
or
PIC / Port
vcp-0          Dedicated    Up
vcp-1          Dedicated    Up

```

```
fpc2:
```

```

-----
Interface      Type          Status
or
PIC / Port
vcp-0          Dedicated    Up
vcp-1          Dedicated    Up

```

**Meaning** The `show virtual-chassis vc-port all-members` command lists all the interfaces for the Virtual Chassis configuration. In this case, no VCP uplinks have been configured. However, the VCP interfaces are automatically configured and enabled when you interconnect member switches using the dedicated VCPs. We recommend that you interconnect the member switches using both VCPs for redundancy. The VCP interfaces are identified simply as `vcp-0` and `vcp-1`. The `fpc` number is the same as the member ID.

## Troubleshooting

To troubleshoot the configuration of an expanded Virtual Chassis, perform these tasks:

### Troubleshooting Mastership Priority

**Problem** You want to designate a different member as the master.

**Solution** Change the mastership priority value or values of the switches, designating the highest mastership priority value for the switch that you want to be master.

1. Lower the mastership priority of the existing master (member 0).

```

[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 1

```

2. Set the mastership priority of the member that you want to be the master to the highest possible value (255):

```

[edit virtual-chassis]
user@SWA-2# set member 2 mastership-priority 255

```

### Troubleshooting Nonoperational VCPs

**Problem** The VCP interface shows a status of `down`.

**Solution** Check the cable to make sure that it is properly and securely connected to the VCPs.

- Related Documentation**
- Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757
  - Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
  - Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826

## Example: Adding a J-EX4500 Switch to a Nonprovisioned Virtual Chassis

---

A Virtual Chassis is multiple switches operating as a single network entity. You might want to expand an existing Virtual Chassis by adding one or two J-EX4500 switches to your Virtual Chassis configuration. Up to two J-EX4500 switches can be part of a mixed J-EX4200 and J-EX4500 Virtual Chassis.

This example describes how to add two J-EX4500 switches to an existing J-EX4200 Virtual Chassis that was nonprovisioned. A nonprovisioned configuration is a Virtual Chassis whose roles were assigned automatically rather than configured statically (preprovisioned).

- Requirements on page 750
- Overview and Topology on page 750
- Configuration on page 752
- Verification on page 753

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1 or later for J-EX Series switches
- Two J-EX4200 switches interconnected into a Virtual Chassis
- Two standalone J-EX4500 switches with Virtual Chassis modules

Before you begin, be sure you have:

1. An operational J-EX4200 Virtual Chassis with two member J-EX4200 switches that was configured using a nonprovisioned configuration.
2. Installed the same version of Junos OS Release 11.1 or later for all members of the Virtual Chassis and on the J-EX4500 switches.
3. Rack-mounted the switches. For rack-mounting instructions, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

### Overview and Topology

You can create a J-EX4200 Virtual Chassis by cabling two operational J-EX4200 switches together using the dedicated Virtual Chassis port (VCP) on each J-EX4200 switch. When you create a Virtual Chassis using this method, the switches run a master election algorithm that decides the Virtual Chassis roles for each member switch. The master

election algorithm first checks the mastership priority ID. The mastership priority ID is any number between 0 and 255. The switch with the highest mastership priority ID is elected into the master role and the switch with the second highest mastership priority ID is elected into the backup role.

The default mastership priority ID for a J-EX4200 or J-EX4500 switch is 128. Both J-EX4200 switches are using this default mastership priority ID in the operational J-EX4200 Virtual Chassis in this example.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 switches must assume and remain in the master and backup roles. The mastership priorities are set as part of this procedure.



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

Table 123 on page 751 shows the default configuration settings for the two-member Virtual Chassis before the J-EX4500 member switches are added to the Virtual Chassis.

**Table 123: Components of the J-EX4200 Virtual Chassis Before the J-EX4500 Member Switches Are Added**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4200 switch	0	Master: mastership priority 128
SWA-1	J-EX4200 switch	1	Backup: mastership priority 128

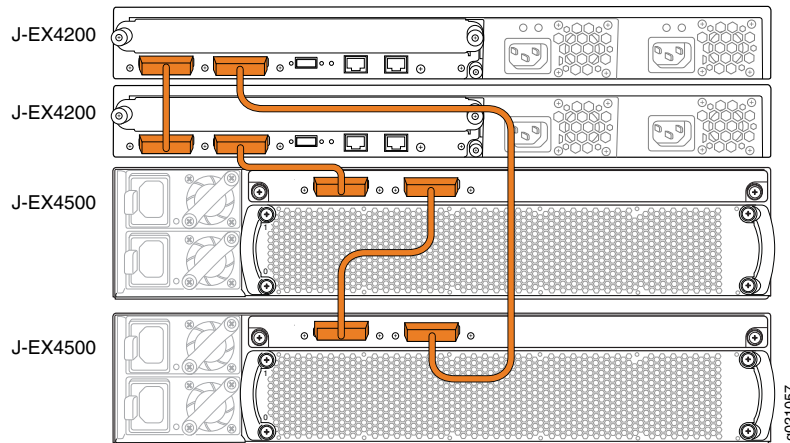
Table 124 on page 751 shows the configuration of the mixed J-EX4200 and J-EX4500 Virtual Chassis after the J-EX4500 member switches are added to the Virtual Chassis.

**Table 124: Final Mixed J-EX4200 and J-EX4500 Virtual Chassis Components**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4200 switch	0	Linecard: mastership priority 0
SWA-1	J-EX4200 switch	1	Linecard: mastership priority 0
SWA-2	J-EX4500 switch	2	Master: mastership priority 255
SWA-3	J-EX4500 switch	3	Backup: mastership priority 255

Figure 19 on page 752 shows the hardware topology of the mixed J-EX4200 and J-EX4500 Virtual Chassis.

Figure 19: Mixed J-EX4200 and J-EX4500 Virtual Chassis Topology (Nonprovisioned Configuration)



## Configuration

To add two J-EX4500 switches to an existing J-EX4200 Virtual Chassis:

### Step-by-Step Procedure

1. Log in to the J-EX4200 Virtual Chassis
2. Set all member switches into mixed mode:
 

```
user@switch> request virtual-chassis mode mixed all-members
```
3. Reboot all member switches in the Virtual Chassis:
 

```
user@switch> request system reboot
```
4. Power on SWA-2, the J-EX4500 switch that you want to function in the master role.
5. Power on SWA-3, the J-EX4500 switch that you want to function in the backup role.
6. Set the PIC mode to the Virtual Chassis mode on both SWA-0 and SWA-3:
 

```
user@switch> request chassis pic-mode virtual-chassis
```
7. On each of the switches SWA-2 and SWA-3, configure the switch as a member of the mixed J-EX4200 and J-EX4500 Virtual Chassis:
 

```
user@switch> request virtual-chassis mode mixed
```
8. Reboot the J-EX4500 switches.
9. Cable SWA-2 into the Virtual Chassis using the dedicated VCPs on the back of the J-EX4200 and J-EX4500 member switches.
10. Cable SWA-3 into the Virtual Chassis using the dedicated VCPs on the back of the J-EX4200 and J-EX4500 member switches.
11. Log onto the Virtual Chassis and set the mastership priority for the J-EX4200 switches to **0** and the J-EX4500 switches to **255**:

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 0
user@SWA-0# set member 1 mastership-priority 0
```

```
user@SWA-0# set member 2 mastership-priority 255
user@SWA-0# set member 3 mastership-priority 255
```



**NOTE:** A switch with a mastership priority ID of 0 never assumes the master or backup role within a Virtual Chassis. This configuration ensures that the J-EX4200 member switches remain in the linecard roles even during Virtual Chassis topology changes.

## Verification

To confirm that the Virtual Chassis configuration is operational, perform these tasks:

- Verifying Virtual Chassis Availability and Roles on page 753

### Verifying Virtual Chassis Availability and Roles

**Purpose** Verify that the Virtual Chassis is up and that the member switches are in the correct roles.

**Action** List the member switches and roles.

```
user@SWA-2> show virtual-chassis status
```

```
Virtual Chassis ID: 0019.e250.47a0
```

Member ID	Status	Serial No	Model	Mastership priority	Role	Neighbor List ID	Interface
0 (FPC 0)	Prsnt	AK02073602764	ex4200-48t	0	Linecard	1	vcp-0
1 (FPC 1)	Prsnt	AK02073602814	ex4200-48t	0	Linecard	3	vcp-1
						0	vcp-0
						2	vcp-1
2 (FPC 2)	Prsnt	AK02073602844	ex4500-40f	255	Master*	1	vcp-0
						3	vcp-1
3 (FPC 3)	Prsnt	AK02073602088	ex4500-40f	255	Backup	2	vcp-0
						0	vcp-1

```
Member ID for next new member: 4 (FPC 4)
```

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected in a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected. The output shows that the switches have the correct mastership priorities and roles.

**Related Documentation**

- Example: Adding a J-EX4500 Switch to a Nonprovisioned Virtual Chassis on page 750

- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770
- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822

## Example: Adding J-EX4500 Switches to a Preprovisioned Virtual Chassis

---

A Virtual Chassis is multiple switches operating as a single network entity. You might want to expand your existing Virtual Chassis by adding one or two J-EX4500 switches to your Virtual Chassis configuration. Up to two J-EX4500 switches can be part of a mixed J-EX4200 and J-EX4500 Virtual Chassis.

This example describes how to add two J-EX4500 switches to an existing J-EX4200 Virtual Chassis that was preprovisioned. A preprovisioned configuration is a Virtual Chassis configuration in which the roles were statically assigned to each member switch:

- Requirements on page 754
- Overview and Topology on page 754
- Configuration on page 756
- Verification on page 756

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1 or later for J-EX Series switches
- Two J-EX4200 switches interconnected into a Virtual Chassis
- Two standalone J-EX4500 switches with Virtual Chassis modules

Before you begin, be sure you have:

1. An operational J-EX4200 Virtual Chassis with two member J-EX4200 switches that was configured using a preprovisioned configuration.
2. Installed the same version of Junos OS Release 11.1 or later on all members of the Virtual Chassis and on the J-EX4500 switches.
3. Rack-mounted the switches. For rack-mounting instructions, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

### Overview and Topology

You can create a J-EX4200 Virtual Chassis by cabling two operational J-EX4200 switches together using the dedicated Virtual Chassis port (VCP) on each J-EX4200 switch. When you preprovision a Virtual Chassis, you configure the roles for each member switch.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 switches must assume and remain in the master and backup roles. The steps in this procedure ensure that the J-EX4500 switches are set and remain in the master or backup roles.

Table 125 on page 755 shows the configuration of the two-member J-EX4200 Virtual Chassis before the J-EX4500 member switches are added.

**Table 125: Components of the J-EX4200 Virtual Chassis Before the J-EX4500 Member Switches Are Added**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4200 switch	0	Master
SWA-1	J-EX4200 switch	1	Backup

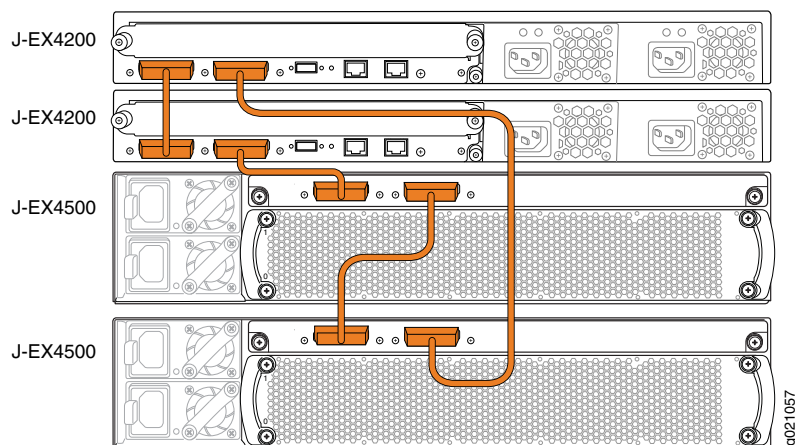
Table 126 on page 755 shows the configuration of the mixed J-EX4200 and J-EX4500 Virtual Chassis after the J-EX4500 member switches are added to the Virtual Chassis.

**Table 126: Final Mixed J-EX4200 and J-EX4500 Virtual Chassis Components**

Member Switch	Hardware	Member ID	Role and Priority
SWA-0	J-EX4200 switch	0	Linecard
SWA-1	J-EX4200 switch	1	Linecard
SWA-2	J-EX4500 switch	2	Master
SWA-3	J-EX4500 switch	3	Backup

Figure 20 on page 755 shows the hardware topology of the mixed J-EX4200 and J-EX4500 Virtual Chassis.

**Figure 20: Mixed J-EX4200 and J-EX4500 Virtual Chassis Topology (Preprovisioned Configuration)**



## Configuration

To add two J-EX4500 switches to an existing J-EX4200 Virtual Chassis that was preprovisioned:

### Step-by-Step Procedure

1. Log into the J-EX4200 Virtual Chassis
2. Set all member switches into mixed mode:
 

```
user@switch> request virtual-chassis mode mixed all-members
```
3. Reboot all member switches in the Virtual Chassis:
 

```
user@switch> request system reboot
```
4. Power on SWA-2 and SWA-3, the J-EX4500 switches.
5. Set the PIC mode to the Virtual Chassis mode on both SWA-2 and SWA-3:
 

```
user@switch> request chassis pic-mode virtual-chassis
```
6. On each of the switches SWA-2 and SWA-3, configure the switch as a member of the mixed J-EX4200 and J-EX4500 Virtual Chassis:
 

```
user@switch> request virtual-chassis mode mixed
```
7. Reboot the J-EX4500 switches.
8. Log onto the J-EX4200 Virtual Chassis and change the roles of the J-EX4200 member switches to **line-card**:
 

```
[edit virtual-chassis]
user@SWA-0# set member 0 role line-card
user@SWA-0# set member 1 role line-card
```
9. Add the J-EX4500 switches to the Virtual Chassis configuration:
 

```
[edit virtual-chassis]
user@SWA-0# set member 2 serial-number ghi789 role master
user@SWA-0# set member 3 serial-number jkl012 role backup
```
10. Cable SWA-2 and SWA-3 into the Virtual Chassis using the dedicated VCPs on the back of the J-EX4200 and J-EX4500 member switches.

## Verification

To confirm that the Virtual Chassis configuration is operational, perform these tasks:

- Verifying Virtual Chassis Availability and Roles on page 756

### [Verifying Virtual Chassis Availability and Roles](#)

**Purpose** Verify that the Virtual Chassis is up and that the member switches are in the correct roles.

**Action** List the member switches and roles.

```
user@SWA-2> show virtual-chassis status
```

```
Virtual Chassis ID: 0019.e250.47a0
```

```
Mastership
```

```
Neighbor List
```



Member ID	Status	Serial No	Model	priority	Role	ID	Interface
0 (FPC 0)	Prsnt	AK02073602764	ex4200-48t	0	Linecard	1	vcp-0
1 (FPC 1)	Prsnt	AK02073602814	ex4200-48t	0	Linecard	3 0	vcp-1 vcp-0
2 (FPC 2)	Prsnt	AK02073602844	ex4500-40f	129	Master*	2	vcp-1
3 (FPC 3)	Prsnt	AK02073602088	ex4500-40f	129	Backup	1 3	vcp-0 vcp-1
						2	vcp-0
						0	vcp-1

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected in a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected. The output shows that the switches have the correct mastership priorities and roles.

**Related Documentation**

- Example: Adding J-EX4500 Switches to a Preprovisioned Virtual Chassis on page 754
- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770
- Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822

## Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration

You can configure a multimember J-EX4200 Virtual Chassis access switch in a single wiring closet without setting any parameters—by simply cabling the switches together, using the dedicated Virtual Chassis ports (VCPs). You do not need to modify the default configuration to enable these ports. They are operational by default. The Virtual Chassis configuration automatically assigns the master, backup, and linecard roles, based on the sequence in which the switches are powered on and other factors in the master election algorithm.



**TIP:** We recommend that you explicitly configure the mastership priority of the switches to ensure that the switches continue to perform the desired roles when additional switches are added or other changes occur. However, it is possible to use the default configuration described in this example.

This example describes how to configure a multimember Virtual Chassis in a single wiring closet, using the default role assignments:

- Requirements on page 758
- Overview and Topology on page 758
- Configuration on page 759
- Verification on page 760
- Troubleshooting on page 762

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX4200-48T switches
- Four J-EX4200-24T switches

## Overview and Topology

A Virtual Chassis configuration is easily expandable. This example shows a Virtual Chassis configuration composed of six J-EX4200 switches. It provides networking access for 180 onsite workers, who are sitting within range of a single wiring closet. The six combined switches are identified by a single host name and managed through a global management IP address.

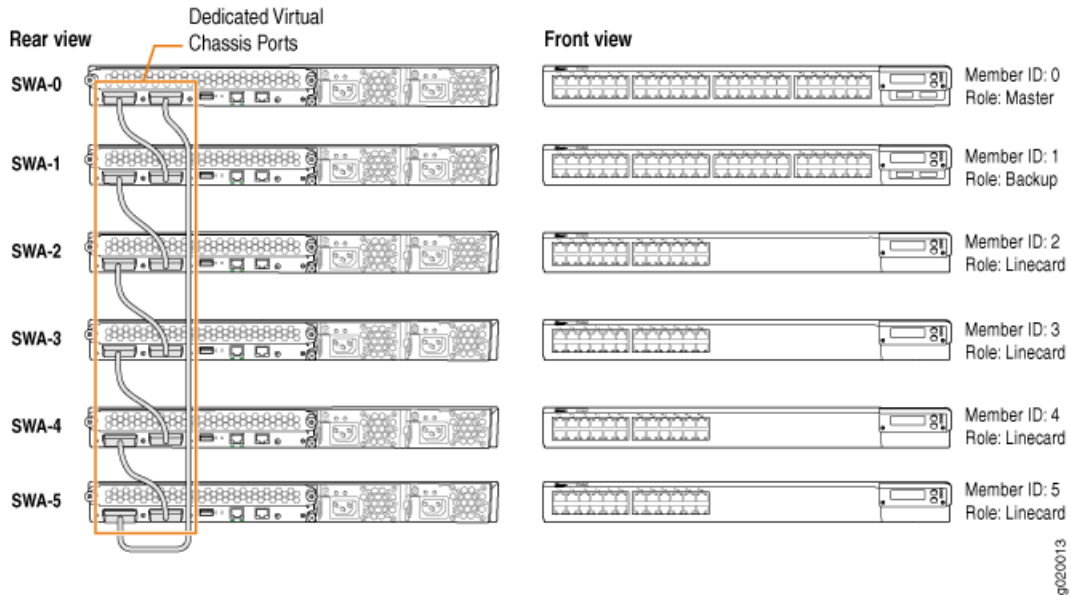
To set up a multimember Virtual Chassis configuration within a single wiring closet, you need to run the EZSetup program only once. Connect to the master and run EZSetup to specify its identification, time zone, and network properties. When additional switches are connected through the Virtual Chassis ports (VCPs), they automatically receive the same properties that were specified for the master.

The topology for this example (see Figure 21 on page 759) consists of six switches:

- Two J-EX4200-48T switches (SWA-0 and SWA-1) with 48 access ports, 8 of which support Power over Ethernet (PoE)
- Four J-EX4200-24T switches (SWA-2, SWA-3, SWA-4, and SWA-5) with 24 access ports, 8 of which support PoE

Figure 21 on page 759 shows that all the member switches are interconnected with the dedicated VCPs on the rear panel. The LCD on the front displays the member ID and role.

Figure 21: Default Configuration of a Multimember J-EX4200 Virtual Chassis in a Single Wiring Closet



## Configuration

To configure a multimember Virtual Chassis access switch in a single wiring closet using the factory defaults, perform this task:

### Step-by-Step Procedure

To configure a multimember Virtual Chassis with default role assignments:

1. Make sure the dedicated VCPs on the rear panel are properly cabled. For cabling instructions and examples, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
2. Power on the switch that you want to function as the master (SWA-0). This example uses one of the larger switches (J-EX4200-48T) as the master.
3. Check the front panel LCD to confirm that the switch has powered on correctly and that a member ID has been assigned.
4. Run the EZSetup program on SWA-0, the master, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.
5. Configure SWA-0 with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired.
 

```
[edit]
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```
6. After a lapse of at least 1 minute, power on SWA-1. This example uses the second J-EX4200-48T switch as the backup.
7. Check the front panel LCD to confirm that the switch has powered on correctly and that a member ID has been assigned.

8. Power on SWA-2, and check the front panels to make sure that the switch is operating correctly.
9. Continue to power on the member switches one by one, checking the front panels as you proceed.

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 760
- Verifying That the VCPs Are Operational on page 760

### Verifying the Member IDs and Roles of the Member Switches

**Purpose** Verify that all the interconnected member switches are included within the Virtual Chassis configuration and that their roles are assigned appropriately.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0000.e255.00e0
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	128	Master*	1 vcp-0 5 vcp-1
1 (FPC 1)	Prsnt	def123	ex4200-48p	128	Backup	2 vcp-0 0 vcp-1
2 (FPC 2)	Prsnt	abd231	ex4200-24t	128	Linecard	3 vcp-0 1 vcp-1
3 (FPC 3)	Prsnt	cab123	ex4200-24t	128	Linecard	4 vcp-0 2 vcp-1
4 (FPC 4)	Prsnt	fed456	ex4200-24t	128	Linecard	5 vcp-0 3 vcp-1
5 (FPC 5)	Prsnt	jkl231	ex4200-24t	128	Linecard	0 vcp-0 4 vcp-1

**Meaning** The `show virtual-chassis status` command lists the member switches of the Virtual Chassis configuration with the member IDs and mastership priority values. It also displays the neighbor members with which each member is interconnected. The `fpc` number is the same as the member ID.

### Verifying That the VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting the member switches are operational.

**Action** Display the VCP interfaces.

```
user@SWA-0> show virtual-chassis vc-port all-members
```

```
fpc0:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up

fpc1:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up

fpc2:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up

fpc3:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up

fpc4:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up

fpc5:
-----
Interface      Type      Status
or
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up
```

**Meaning** The `show virtual-chassis vc-port all-members` command lists the VCP interfaces that are enabled for the member switches of the Virtual Chassis configuration and shows the status of the interfaces. In this case, no VCP uplinks have been configured. However, the VCP interfaces are automatically configured and enabled when you interconnect member switches using the dedicated VCPs. The dedicated VCP interfaces are identified simply as vcp-0 and vcp-1. They do not use the standard interface address (in which the member ID is represented by the first digit). The output in this example shows that all interfaces are operational. The **fpc** number is the same as the member ID.

## Troubleshooting

To troubleshoot the configuration of a multimember Virtual Chassis in a single wiring closet, perform these tasks:

### Troubleshooting Mastership Priority

**Problem** You want to explicitly designate one member as the master and another as backup.

**Solution** Change the mastership priority value of the member that you want to function as master, assigning the highest mastership priority value to that member.



**NOTE:** These configuration changes are made through the current master, SWA-0.

1. Configure mastership priority of member 0 to be the highest possible value.

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
```

2. Set the mastership priority of another member that you want to function as the backup member as the same value:

```
[edit virtual-chassis]
user@SWA-0# set member 2 mastership-priority 255
```

### Troubleshooting Nonoperational VCPs

**Problem** The VCP interface shows a status of **down**.

**Solution** Check the cable to make sure that it is properly and securely connected to the VCPs.

- Related Documentation**
- Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected on page 717
  - Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
  - Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
  - Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
  - Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826

## Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets

A J-EX4200 Virtual Chassis can be composed of multiple J-EX4200 switches in different locations. You can install member switches in different wiring closets, interconnecting

the member switches by cabling and configuring uplink module ports or SFP network ports on J-EX4200-24F switches as Virtual Chassis ports (VCPs).

This example shows how to use uplink VCPs to connect Virtual Chassis members that are located too far apart to be connected using the dedicated VCPs. Uplink VCPs can also be used to connect Virtual Chassis members to form link aggregation groups (LAGs). For the latter usage, see “Example: Configuring Link Aggregation Groups Using J-EX4200 Uplink Virtual Chassis Ports” on page 809.



**NOTE:** You can also configure the SFP network ports on J-EX4200-24F switches as VCPs to connect Virtual Chassis member switches across wiring closets and to form LAGs.

---

This example describes how to configure a Virtual Chassis access switch interconnected across wiring closets:

- Requirements on page 763
- Overview and Topology on page 764
- Configuration on page 766
- Verification on page 768
- Troubleshooting on page 770

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Four J-EX4200 switches
- Four uplink modules

Before you interconnect the members of the Virtual Chassis configuration across wiring closets, be sure you have:

1. Installed an uplink module in each member switch. For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
2. Powered on and connected the switch in the master role, SWA-0, and run the EZSetup program (see Table 128 on page 772 for switch names used in this example). See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.
3. Configured SWA-0 with the virtual management Ethernet (VME) interface for remote, out-of-band management of the Virtual Chassis configuration, if desired. See “Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 852.
4. Interconnected SWA-0 and SWA-1 using the dedicated VCPs on the rear panel. SWA-1 must not be powered on at this time.
5. Interconnected SWA-2 and SWA-3 using the dedicated VCPs on the rear panel. SWA-2 and SWA-3 must not be powered on at this time.

## Overview and Topology

In this example, four J-EX4200 switches will be interconnected in a Virtual Chassis configuration. Two of these switches (SWA-0 and SWA-1) are located in wiring closet A, and the two other switches (SWA-2 and SWA-3) are located in wiring closet B.

For ease of monitoring and manageability, we want to interconnect all four switches as members of a Virtual Chassis configuration. Prior to configuring the Virtual Chassis, we installed uplink modules in each of the member switches. In this example, uplink modules are installed in all four members so that there are redundant VCP connections across the wiring closets. If you want to expand this configuration to include more members within these wiring closets, you do not need to add any more uplink modules. Simply use the dedicated VCPs on the rear panel. The redundancy of uplink VCPs provided in this example is sufficient.

We have interconnected the switches in wiring closet A and also interconnected the ones in wiring closet B using the dedicated VCPs. The interfaces for the dedicated VCPs are operational by default. They do not need to be configured.

However, the Virtual Chassis cables that interconnect the dedicated VCPs of member switches within a single wiring closet are not long enough to connect member switches across wiring closets. Instead, we will use the fiber-optic cable connections in the uplink modules to interconnect the member switches in wiring closet A to the member switches in wiring closet B. You only need to interconnect one member switch in wiring closet A to one in wiring closet B to form the Virtual Chassis configuration. However, for redundancy, this example connects uplink module ports from the two member switches in wiring closet A to the two member switches in wiring closet B.

We will specify the highest mastership priority value (255) for SWA-0 to make it the master before we power on SWA-1. Because SWA-0 and SWA-1 are interconnected with



the dedicated VCPs, the master detects that SWA-1 is a member of its Virtual Chassis configuration and assigns it a member ID.

We configure SWA-2 in wiring closet B without running EZSetup by directly connecting to the console port. If you wish, you can run EZSetup and specify identification parameters. Later, when you interconnect SWA-2 with SWA-0, the master of the Virtual Chassis configuration, the master overwrites any conflicting parameters.

We will use SWA-2 as the backup of the Virtual Chassis configuration. If a problem occurs in wiring closet A, SWA-2 would take control of the Virtual Chassis configuration and maintain the network connections. We will configure the same mastership priority value for SWA-2 (255) that we configured for the master. Because we power on SWA-0 before we power on SWA-2, SWA-0 has additional prioritization properties that allow it to retain mastership of the Virtual Chassis configuration. We recommend setting identical mastership priority values for the master and backup members for high availability and smooth transition of mastership in case the original master becomes unavailable. (Setting identical mastership priority values for the master and backup members prevents the previous master from pre-empting the master role from the new master when the previous master comes back online.)

After we have configured SWA-2 and set one of its uplink module ports as an uplink VCP, we will interconnect its uplink VCP with an uplink VCP on SWA-0.

Finally, we will power on SWA-3. Because SWA-3 is interconnected with SWA-2 using the dedicated VCPs on the rear panel, the master will detect that SWA-3 is part of the expanded Virtual Chassis configuration and assign it member ID 3. For redundancy, we will configure an uplink VCP on SWA-3 through the master and interconnect that uplink VCP with an uplink VCP on SWA-1.

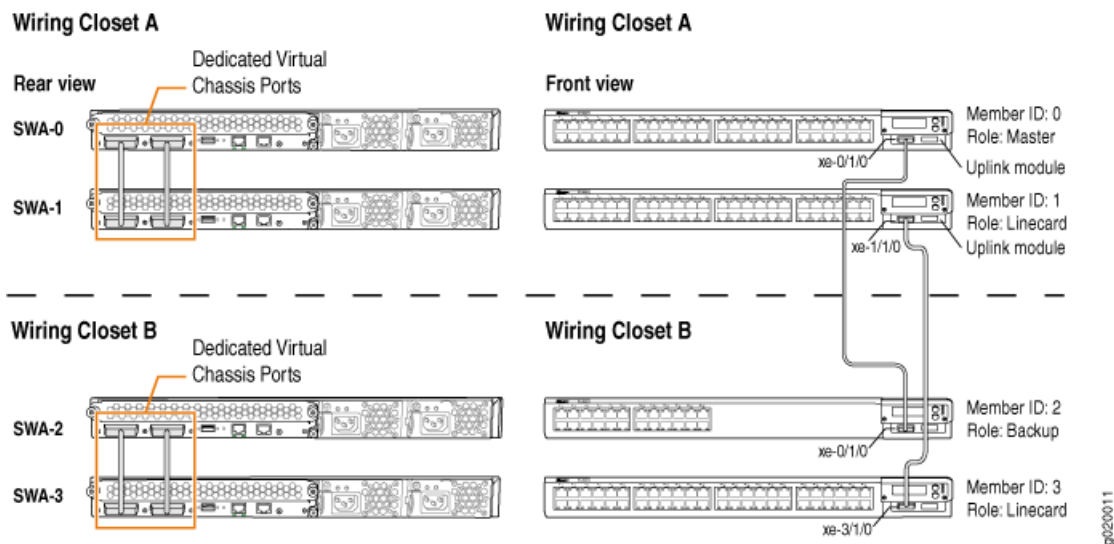
Table 127 on page 765 shows the Virtual Chassis configuration settings for a Virtual Chassis composed of member switches in different wiring closets.

**Table 127: Components of a Virtual Chassis Interconnected Across Multiple Wiring Closets**

Switch	Member ID	Role and Priority	Location
SWA-0	0	master; mastership priority 255	Wiring closet A
SWA-1	1	linecard; mastership priority 128	Wiring closet A
SWA-2	2	backup; mastership priority 255	Wiring closet B
SWA-3	3	linecard; mastership priority 128	Wiring closet B

Figure 22 on page 766 shows the different types of interconnections used for this Virtual Chassis configuration. The rear view shows the member switches within each wiring closet interconnected to each other using the dedicated VCPs. The front view shows the uplink VCPs interconnected across the wiring closets.

Figure 22: J-EX4200 Virtual Chassis Interconnected Across Wiring Closets



## Configuration

To configure the Virtual Chassis across multiple wiring closets, perform this task:

### Step-by-Step Procedure

To configure a Virtual Chassis across multiple wiring closets:

1. Configure the mastership priority of SWA-0 (member 0) to be the highest possible value (255), thereby ensuring that it functions as the master of the expanded Virtual Chassis configuration:

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
```

2. Prepare the members in wiring closet A for interconnecting with the member switches in wiring closet B by setting uplink VCPs for member 0 and member 1:

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0 member 1
```



#### NOTE:

- For redundancy, this example configures an uplink VCP in both SWA-0 and SWA-1.
- This example omits the specification of the member *member-id* option in configuring an uplink VCP for SWA-0 (and, later, for SWA-2). The command applies by default to the switch where it is executed.

3. Prepare SWA-2 in wiring closet B for interconnecting with the Virtual Chassis configuration by configuring its mastership priority to be the highest possible value (255). Its member ID is currently 0, because it is not yet interconnected with the other members of the Virtual Chassis configuration. It is operating as a standalone switch. Its member ID will change when it is interconnected.

```
[edit virtual-chassis]
user@SWA-2# set member 0 mastership-priority 255
```



**NOTE:** SWA-2 is configured with the same mastership priority value that we configured for SWA-0. However, the longer uptime of SWA-0 ensures that, once the interconnection is made, SWA-0 functions as the master and SWA-2 functions as the backup.

- Specify one uplink module port in SWA-2 as an uplink VCP. Its member ID is 0, because it is not yet interconnected with the other members of the Virtual Chassis configuration.



**NOTE:** The setting of the uplink VCP remains intact when SWA-2 reboots and joins the Virtual Chassis configuration as member 2.

```
user@SWA-2> request virtual-chassis vc-port set pic-slot 1 port 0
```

- Physically interconnect SWA-0 and SWA-2 across wiring closets using their uplink VCPs. Although SWA-0 and SWA-2 have the same mastership priority value (255), SWA-0 was powered on first and thus has longer uptime. This results in SWA-0 retaining mastership while SWA-2 reboots and joins the now expanded Virtual Chassis configuration as the backup, with member ID 2.
- Power on SWA-3. It joins the expanded Virtual Chassis configuration as member 3.



**NOTE:** Member ID 3 is assigned to SWA-3 because SWA-3 was powered on after members 0, 1, and 2.

- Because SWA-3 is now interconnected as a member of the Virtual Chassis configuration, you can specify a redundant uplink VCP on SWA-3 through the master of the Virtual Chassis configuration:

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0 member 3
```

- Physically interconnect SWA-3 and SWA-1 across wiring closets using their uplink VCPs. Both SWA-1 and SWA-3 have the default mastership priority value (128) and function in a linecard role.



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

**Results** Display the results of the configuration on SWA-0:

```
[edit]
user@SWA-0# show virtual-chassis
```

```

member 0 {
  mastership-priority 255;
}
member 1 {
  mastership-priority 128;
}
member 2 {
  mastership-priority 255;
}
member 3 {
  mastership-priority 128;
}
}

```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 768
- Verifying that the Dedicated VCPs and Uplink VCPs Are Operational on page 769

### [Verifying the Member IDs and Roles of the Member Switches](#)

**Purpose** Verify that all the interconnected member switches are included within the Virtual Chassis configuration and that their roles are assigned appropriately.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0000.e255.00e0
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	255	Master*	1 vcp-0 2 vcp-1 2 vcp-255/1/0
1 (FPC 1)	Prsnt	def456	ex4200-24t	128	Linecard	0 vcp-0 0 vcp-1 3 vcp-255/1/0
2 (FPC 2)	Prsnt	ghi789	ex4200-48t	255	Backup	3 vcp-0  3 vcp-1 0 vcp-255/1/0
3 (FPC 3)	Prsnt	jk1012	ex4200-24t	128	Linecard	2 vcp-0 2 vcp-1 3 vcp-255/1/0

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected as a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected.

### Verifying that the Dedicated VCPs and Uplink VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting member switches in wiring closet A and the uplink VCPs interconnecting the member switches between wiring closets are operational.

**Action** Display the VCP interfaces:

```
user@SWA-0> show virtual-chassis status all-members
```

fpc0:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000		
vcp-1	Dedicated	2	Up	32000	1	vcp-0
1/0	Auto-Configured	-1	Up	1000	2	vcp-255/1/0

fpc1:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	0	vcp-0
vcp-1	Dedicated	2	Up	32000	0	vcp-1
1/0	Auto-Configured	-1	Up	1000	3	vcp-255/1/0

fpc2:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	3	vcp-0
vcp-1	Dedicated	2	Up	32000		
1/0	Auto-Configured	-1	Up	1000	0	vcp-255/1/0

fpc3:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	2	vcp-0
vcp-1	Dedicated	2	Up	32000	2	vcp-1
1/0	Auto-Configured	-1	Up	1000	1	vcp-255/1/0

**Meaning** The dedicated VCPs are displayed as **vcp-0** and **vcp-1**. The interface on the switch that has been set as an uplink VCP is displayed as **1/0**. The member interface names of uplink VCPs are of the form **vcp-255/pic/port**—for example, **vcp-255/1/0**. In that name, **vcp-255** indicates that the interface is an uplink VCP, **1** is the uplink PIC number, and **0** is the uplink port number. The **fpc** number is the same as the member ID. The **Trunk ID** is a positive number ID assigned to the LAG formed by the Virtual Chassis. If no LAG is formed, the value is **-1**.

## Troubleshooting

To troubleshoot a Virtual Chassis configuration that is interconnected across wiring closets, perform these tasks:

### Troubleshooting Nonoperational VCPs

- |                              |  |
|------------------------------|--|
| <b>Problem</b>               | An uplink VCP shows a status of <b>down</b> .  |
| <b>Solution</b>              | <ul style="list-style-type: none"> <li>• Check the cable to make sure that it is properly and securely connected to the ports.</li> <li>• If the VCP is an uplink module port, make sure that it has been explicitly set as an uplink VCP.</li> <li>• If the VCP is an uplink module port, make sure that you have specified the options (<i>pic-slot</i>, <i>port</i>, and <i>member</i>) correctly.</li> </ul>   |
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736</li> <li>• Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet on page 745</li> <li>• Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757</li> <li>• Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846</li> </ul> |

## Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets

A J-EX4500 switch can be a member of a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis. A J-EX4500 Virtual Chassis can be composed of two J-EX4500 switches in different wiring closets or locations; a mixed J-EX4200 and J-EX4500 Virtual Chassis can be composed of J-EX4200 and J-EX4500 switches in different locations or wiring closets provided that at least one J-EX4200 switch is connected to one J-EX4500 switch using the dedicated Virtual Chassis port (VCP) connections available on both switches.

You connect J-EX4500 member switches in a Virtual Chassis together by installing them in different wiring closets and configuring a 10-Gigabit Ethernet SFP+ connection connecting the switches as a Virtual Chassis port (VCP).



**NOTE:** You can only use the procedure provided in this example to connect J-EX4500 switches together in a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis. User-configured VCPs between J-EX4200 switches and J-EX4500 switches are not supported.

This example shows how to use the 10-Gigabit Ethernet SFP+ ports on J-EX4500 switches to connect two J-EX4500 member switches that are located too far apart to be connected using the dedicated VCPs in a mixed J-EX4200 and J-EX4500 Virtual Chassis. The procedure to connect two J-EX4500 switches in a J-EX4500 Virtual Chassis is identical to the procedure shown in this example.



**NOTE:** Any 10-Gigabit Ethernet SFP+ connection on a J-EX4500 switch can be configured as a VCP. A J-EX4500 switch has network and uplink ports that support 10-Gigabit Ethernet SFP+ transceivers.

This example describes how to connect two J-EX4500 member switches across wiring closets:

- Requirements on page 771
- Overview and Topology on page 771
- Configuration on page 773
- Verification on page 775
- Troubleshooting on page 776

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1 or later for J-EX Series switches
- Two J-EX4500 member switches
- Four J-EX4200 member switches

Before you interconnect the members of the Virtual Chassis configuration across wiring closets, be sure you have:

1. Preprovisioned the Virtual Chassis so that the J-EX4500 switches are in the master role, SWA-0, and backup role, SWA-3. See “Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 828 for details.
2. Configured SWA-0 with the virtual management Ethernet (VME) interface for remote, out-of-band management of the Virtual Chassis configuration, if desired. See “Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 852.
3. Interconnected SWA-0, SWA-1, and SWA-2 using the dedicated VCPs on the rear panel.
4. Interconnected SWA-3, SWA-4, and SWA-5 using the dedicated VCPs on the rear panel.

## Overview and Topology

In this example, two J-EX4500 switches and four J-EX4200 switches are interconnected in a mixed J-EX4200 and J-EX4500 Virtual Chassis configuration. One J-EX4500 switch

(SWA-0) and two J-EX4200 switches (SWA-1 and SWA-2) are located in wiring closet A, and the other J-EX4500 switch (SWA-3) and the other two J-EX4200 switches (SWA-4 and SWA-5) are located in wiring closet B.

For ease of monitoring and manageability, we want to interconnect all six switches as members of a Virtual Chassis configuration.

We have interconnected the switches in wiring closet A and also interconnected the ones in wiring closet B using the dedicated VCPs. The interfaces for the dedicated VCPs are operational by default. They do not need to be configured.

However, the Virtual Chassis cables that interconnect the dedicated VCPs of member switches within a single wiring closet are not long enough to connect member switches across wiring closets. Instead, we will use a 10-Gigabit Ethernet SFP+ connection to interconnect the member switches in wiring closet A to the member switches in wiring closet B. You only need to interconnect one member switch in wiring closet A to one in wiring closet B to form the Virtual Chassis configuration. In this example, this connection will be made by connecting the J-EX4500 switches in each wiring closet together by configuring a 10-Gigabit Ethernet SFP+ connection as a VCP.

We will preprovision the entire Virtual Chassis to set the roles for all member switches. Because we are configuring a mixed J-EX4200 and J-EX4500 Virtual Chassis, we must set the J-EX4500 switches in the master and backup roles. We will first power on SWA-0 and preprovision the Virtual Chassis. We will then cable the Virtual Chassis before powering on the other member switches.

Table 128 on page 772 shows the Virtual Chassis configuration settings for a Virtual Chassis composed of member switches in different wiring closets.

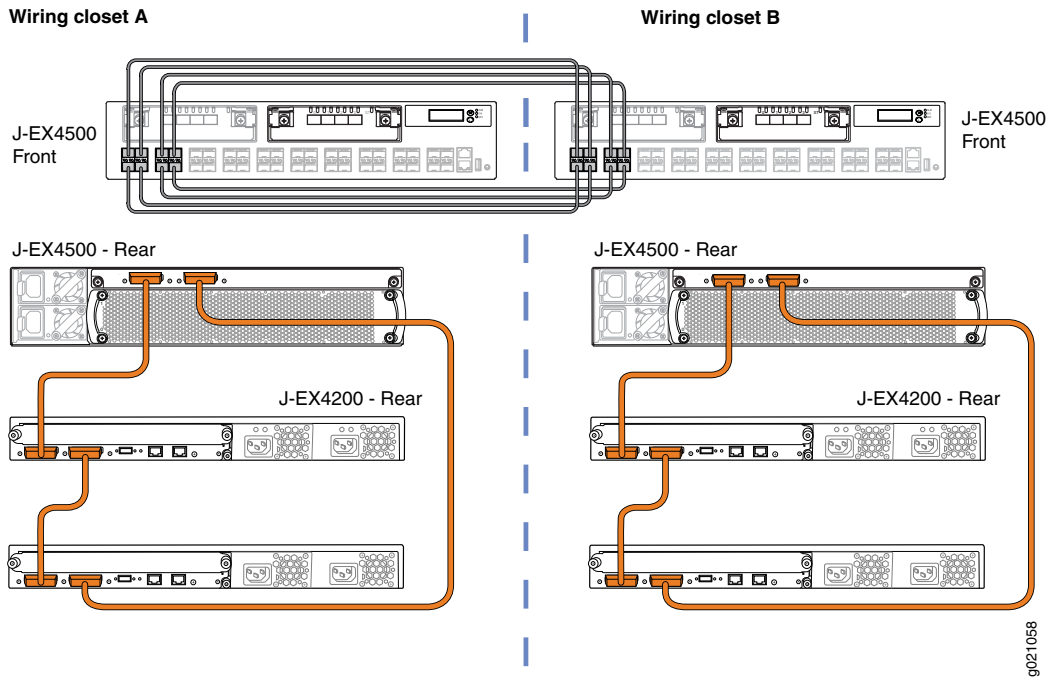
**Table 128: Components of a Virtual Chassis Interconnected Across Multiple Wiring Closets**

Switch	Model	Member ID	Role and Priority	Location
SWA-0	J-EX4500 switch	0	Master	Wiring closet A
SWA-1	J-EX4200 switch	1	Linecard	Wiring closet A
SWA-2	J-EX4200 switch	2	Linecard	Wiring closet A
SWA-3	J-EX4500 switch	3	Backup	Wiring closet B
SWA-4	J-EX4200 switch	4	Linecard	Wiring closet B
SWA-5	J-EX4200 switch	5	Linecard	Wiring closet B

Figure 23 on page 773 shows the different types of interconnections used for this Virtual Chassis configuration. The rear view shows the member switches within each wiring closet interconnected to each other using the dedicated VCPs. The front view shows the uplink VCPs interconnected across the wiring closets.



Figure 23: Mixed J-EX4200 and J-EX4500 Virtual Chassis Interconnected Across Multiple Wiring Closets



## Configuration

To configure the Virtual Chassis across multiple wiring closets, perform this task:

### Step-by-Step Procedure

To configure a Virtual Chassis across multiple wiring closets:

1. Power on SWA-0 (the J-EX4500 switch acting as member 0).
2. Power on SWA-3 (the J-EX4500 switch acting as member 3).
3. Set the PIC mode to the Virtual Chassis mode on both SWA-0 and SWA-3:
 

```
user@switch> request chassis pic-mode virtual-chassis
```
4. Power on the remaining switches.
5. Configure all switches individually as members of the mixed J-EX4200 and J-EX4500 Virtual Chassis:
 

```
user@switch> request virtual-chassis mode mixed
```
6. Reboot all switches:
 

```
user@switch> request system reboot
```
7. Log back onto SWA-0 after the reboot has completed.
8. Run EZSetup on SWA-0 to set the parameters for the entire Virtual Chassis. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185.
9. Preprovision the Virtual Chassis from SWA-0. Specify all members for the Virtual Chassis configuration, listing each switch’s serial number with the desired member

ID and the desired role. You must assign the **routing-engine** role to the J-EX4500 member switches and the **line-card** role to the J-EX4200 member switches.

```
[edit virtual-chassis]
user@SWA-0# set preprovisioned
user@SWA-0# set member 0 serial-number abc123 role routing-engine
user@SWA-0# set member 1 serial-number def456 role line-card
user@SWA-0# set member 2 serial-number ghi789 role line-card
user@SWA-0# set member 3 serial-number jkl012 role routing-engine
user@SWA-0# set member 4 serial-number mno345 role line-card
user@SWA-0# set member 5 serial-number pqr678 role line-card
```

10. Commit the configuration:

```
user@SWA-0> commit synchronize
```

11. Prepare the members in wiring closet A for interconnecting with the member switches in wiring closet B by setting the 10-Gigabit Ethernet SFP+ interfaces on SWA-0 as VCPs:

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 1
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 2
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 3
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 4
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 5
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 6
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 7
```

12. Prepare the members in wiring closet B for interconnecting with the member switches in wiring closet A by setting the 10-Gigabit Ethernet SFP+ interfaces on SWA-3 as VCPs:

```
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 1
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 2
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 3
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 4
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 5
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 6
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 7
```

13. Physically interconnect SWA-0 with SWA-1, then interconnect all switches in wiring closet A.
14. Physically interconnect SWA-0 with SWA-3 across wiring closets using the 10-Gigabit Ethernet SFP+ connections.
15. Physically interconnect all switches in wiring closet B.



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

**Results** Display the results of the configuration on SWA-0:

```
[edit virtual-chassis]
user@SWA-0# show
  member 0 {
    role routing-engine;
    serial-number abc123;
  }
  member 1 {
    role line-card;
    serial-number def456;
  }
  member 2 {
    role line-card;
    serial-number ghi789;
  }
  member 3 {
    role routing-engine;
    serial-number jkl012;
  }
  member 4 {
    role line-card;
    serial-number mno345;
  }
  member 5 {
    role line-card;
    serial-number pqr678;
  }
}
```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 775

### [Verifying the Member IDs and Roles of the Member Switches](#)

**Purpose** Verify that all the interconnected member switches are included within the Virtual Chassis configuration and that their roles are assigned appropriately.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 000.e255.00e0
Virtual Chassis Mode: Mixed
```

Mastership

Neighbor List

Member ID	Status	Serial No	Model	Priority	Role	ID	Interface
0 (FPC 0)	Prsnt	abc123	ex4500-40f	255	Master*	1	vcp-0
						2	vcp-1
						3	vcp-255/1/1
						3	vcp-255/1/2
						3	vcp-255/1/3
						3	vcp-255/1/4
						3	vcp-255/1/5
						3	vcp-255/1/6
						3	vcp-255/1/7
						3	vcp-255/1/8
1 (FPC 1)	Prsnt	def456	ex4200-48t	128	Linecard	0	vcp-0
						2	vcp-1
2 (FPC 2)	Prsnt	ghi789	ex4200-48t	128	Linecard	0	vcp-0
						1	vcp-1
						0	vcp-255/1/0
3 (FPC 3)	Prsnt	jdk1012	ex4500-40f	255	Backup	4	vcp-0
						5	vcp-1
						0	vcp-255/1/1
						0	vcp-255/1/2
						0	vcp-255/1/3
						0	vcp-255/1/4
						0	vcp-255/1/5
						0	vcp-255/1/6
						0	vcp-255/1/7
						0	vcp-255/1/8
4 (FPC 4)	Prsnt	mno345	ex4200-48t	128	Linecard	3	vcp-0
						5	vcp-1
5 (FPC 5)	Prsnt	pqr678	ex4200-48t	128	Linecard	3	vcp-0
						4	vcp-1

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected as a Virtual Chassis configuration with the member IDs that have been assigned by the master and the roles. It also displays the neighbor members with which each member is interconnected.

## Troubleshooting

To troubleshoot a Virtual Chassis configuration that is interconnected across wiring closets, perform these tasks:

### [Troubleshooting Nonoperational VCPs](#)

**Problem** A user-configured VCP shows a status of **down**.

**Solution**

- Check the cable to make sure that it is properly and securely connected to the ports.
- Make sure the VCP that it has been explicitly set as an uplink VCP.
- Make sure that you have specified the options (*pic-slot*, *port*, and *member*) correctly.

- Related Documentation**
- [Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch \(CLI Procedure\)](#) on page 850

## Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch

J-EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. The number of Ethernet links you can combine into a LAG depends on your J-EX Series switch model. See “Understanding Aggregated Ethernet Interfaces and LACP” on page 1003 for more information.

This example describes how to configure uplink LAGs to connect a Virtual Chassis access switch to a Virtual Chassis distribution switch:

- [Requirements](#) on page 777
- [Overview and Topology](#) on page 777
- [Configuration](#) on page 779
- [Verification](#) on page 782
- [Troubleshooting](#) on page 782

### Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX4200-48T switches
- Two J-EX4200-24F switches
- Four uplink modules

Before you configure the LAGs, be sure you have:

- Configured the Virtual Chassis switches. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.
- Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042.

### Overview and Topology

For maximum speed and resiliency, you can combine uplinks between an access switch and a distribution switch into LAGs. Using LAGs can be particularly effective when connecting a multimember Virtual Chassis access switch to a multimember Virtual Chassis distribution switch.

The Virtual Chassis access switch in this example is composed of two member switches. Each member switch has an uplink module with two 10-Gigabit Ethernet ports. These

ports are configured as trunk ports, connecting the access switch with the distribution switch.

Configuring the uplinks as LAGs has the following advantages:

- Link Aggregation Control Protocol (LACP) can optionally be configured for link negotiation.
- It doubles the speed of each uplink from 10 Gbps to 20 Gbps.
- If one physical port is lost for any reason (a cable is unplugged or a switch port fails, or one member switch is unavailable), the logical port transparently continues to function over the remaining physical port.

The topology used in this example consists of one Virtual Chassis access switch and one Virtual Chassis distribution switch. The access switch is composed of two J-EX4200-48T switches (SWA-0 and SWA-1), interconnected to each other with their Virtual Chassis ports (VCPs) as member switches of Host-A. The distribution switch is composed of two J-EX4200-24F switches (SWD-0 and SWD-1), interconnected with their VCPs as member switches of Host-D.

Each member of the access switch has an uplink module installed. Each uplink module has two ports. The uplinks are configured to act as trunk ports, connecting the access switch with the distribution switch. One uplink port from SWA-0 and one uplink port from SWA-1 are combined as LAG `ae0` to SWD-0. This link is used for one VLAN. The remaining uplink ports from SWA-0 and from SWA-1 are combined as a second LAG connection (`ae1`) to SWD-1. LAG `ae1` is used for another VLAN.



**NOTE:** If the remote end of the LAG link is a security device, LACP might not be supported because security devices require a deterministic configuration. In this case, do not configure LACP. All links in the LAG are permanently operational unless the switch detects a link failure within the Ethernet physical layer or data link layers.

---

Figure 24: Topology for LAGs Connecting a J-EX4200 Virtual Chassis Access Switch to a J-EX4200 Virtual Chassis Distribution Switch

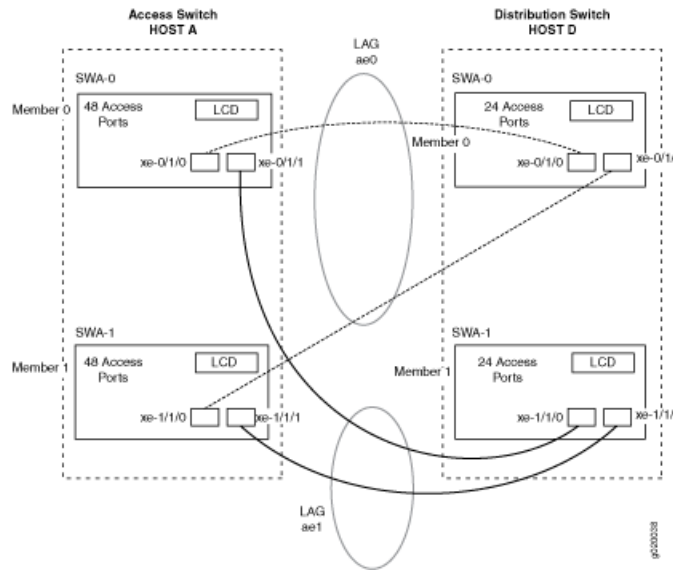


Table 151 on page 1017 details the topology used in this configuration example.

Table 129: Components of the Topology for Connecting Virtual Chassis Access Switches to a Virtual Chassis Distribution Switch

Switch	Hostname and VCID	Base Hardware	Uplink Module	Member ID	Trunk Port
SWA-0	Host-A Access switch VCID 1	J-EX4200-48T switch	One uplink module	0	xe-0/1/0 to SWD-0 xe-0/1/1 to SWD-1
SWA-1	Host-A Access switch VCID 1	J-EX4200-48T switch	One uplink module	1	xe-1/1/0 to SWD-0 xe-1/1/1 to SWD-1
SWD-0	Host-D Distribution switch VCID 4	J-EX4200 L-24F switch	One uplink module	0	xe-0/1/0 to SWA-0 xe-0/1/1 to SWA-1
SWD-1	Host-D Distribution switch VCID 4	J-EX4200 L-24F switch	One uplink module	1	xe-1/1/0 to SWA-0 xe-1/1/1 to SWA-1

## Configuration

To configure two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch:

**CLI Quick Configuration** To quickly configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch, copy the following commands and paste them into the switch terminal window:

```
[edit]
set chassis aggregated-devices ethernet device-count 2
set interfaces ae0 aggregated-ether-options minimum-links 1
set interfaces ae0 aggregated-ether-options link-speed 10g
set interfaces ae1 aggregated-ether-options minimum-links 1
set interfaces ae1 aggregated-ether-options link-speed 10g
set interfaces ae0 unit 0 family inet address 192.0.2.0/25
set interfaces ae1 unit 0 family inet address 192.0.2.128/25
set interfaces xe-0/1/0 ether-options 802.ad ae0
set interfaces xe-1/1/0 ether-options 802.ad ae0
set interfaces xe-0/1/1 ether-options 802.ad ae1
set interfaces xe-1/1/1 ether-options 802.ad ae1
```

**Step-by-Step Procedure** To configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch:

1. Specify the number of LAGs to be created on the chassis:

```
[edit chassis]
user@Host-A# set aggregated-devices ethernet device-count 2
```

2. Specify the number of links that need to be present for the **ae0** LAG interface to be up:

```
[edit interfaces]
user@Host-A# set ae0 aggregated-ether-options minimum-links 1
```

3. Specify the number of links that need to be present for the **ae1** LAG interface to be up:

```
[edit interfaces]
user@Host-A# set ae1 aggregated-ether-options minimum-links 1
```

4. Specify the media speed of the **ae0** link:

```
[edit interfaces]
user@Host-A# set ae0 aggregated-ether-options link-speed 10g
```

5. Specify the media speed of the **ae1** link:

```
[edit interfaces]
user@Host-A# set ae1 aggregated-ether-options link-speed 10g
```

6. Specify the interface ID of the uplinks to be included in LAG **ae0**:

```
[edit interfaces]
user@Host-A# set xe-0/1/0 ether-options 802.ad ae0
user@Host-A# set xe-1/1/0 ether-options 802.ad ae0
```

7. Specify the interface ID of the uplinks to be included in LAG **ae1**:

```
[edit interfaces]
user@Host-A# set xe-0/1/1 ether-options 802.ad ae1
user@Host-A# set xe1/1/1 ether-options 802.ad ae1
```

8. Specify that LAG **ae0** belongs to the subnet for the employee broadcast domain:

```
[edit interfaces]
```



```
user@Host-A# set ae0 unit 0 family inet address 192.0.2.0/25
```

- Specify that LAG **ae1** belongs to the subnet for the guest broadcast domain:

```
[edit interfaces]
```

```
user@Host-A# set ae1 unit 0 family inet address 192.0.2.128/25
```

**Results** Display the results of the configuration:

```
[edit]
chassis {
  aggregated-devices {
    ethernet {
      device-count 2;
    }
  }
}
interfaces {
  ae0 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 2;
    }
    unit 0 {
      family inet {
        address 192.0.2.0/25;
      }
    }
  }
  ae1 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 2;
    }
    unit 0 {
      family inet {
        address 192.0.2.128/25;
      }
    }
  }
  xe-0/1/0 {
    ether-options {
      802.ad ae0;
    }
  }
  xe-1/1/0 {
    ether-options {
      802.ad ae0;
    }
  }
  xe-0/1/1 {
    ether-options {
      802.ad ae1;
    }
  }
  xe-1/1/1 {
    ether-options {
```

```

    802.ad ae1;
  }
}
}

```

## Verification

To verify that switching is operational and two LAGs have been created, perform these tasks:

- Verifying That LAG ae0 Has Been Created on page 782
- Verifying That LAG ae1 Has Been Created on page 782

### Verifying That LAG ae0 Has Been Created

**Purpose** Verify that LAG ae0 has been created on the switch.

**Action** `show interfaces ae0 terse`

Interface	Admin	Link Proto	Local	Remote
ae0	up	up		
ae0.0	up	up inet	192.0.2.0/25	

**Meaning** The output confirms that the ae0 link is up and shows the family and IP address assigned to this link.

### Verifying That LAG ae1 Has Been Created

**Purpose** Verify that LAG ae1 has been created on the switch

**Action** `show interfaces ae1 terse`

Interface	Admin	Link Proto	Local	Remote
ae1	up	down		
ae1.0	up	down inet	192.0.2.128/25	

**Meaning** The output shows that the ae1 link is down.

## Troubleshooting

### Troubleshooting a LAG That Is Down

**Problem** The `show interfaces terse` command shows that the LAG is **down**.

**Solution** Check the following:

- Verify that there is no configuration mismatch.
- Verify that all member ports are up.
- Verify that a LAG is part of family ethernet switching (Layer 2 LAG) or family inet (Layer 3 LAG).
- Verify that the LAG member is connected to the correct LAG at the other end.
- Verify that the LAG members belong to the same switch (or the same Virtual Chassis).

- Related Documentation**
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
  - Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
  - Example: Connecting an Access Switch to a Distribution Switch.
  - Virtual Chassis Cabling Configuration Examples for J-EX4200 Switches
  - For information about and instructions for installing an uplink module, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch

J-EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. J-EX Series switches allow you to further enhance these links by configuring Link Aggregation Control Protocol (LACP).

This example describes how to overlay LACP on the LAG configurations that were created in “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777:

- Requirements on page 783
- Overview and Topology on page 784
- Configuring LACP for the LAGs on the Virtual Chassis Access Switch on page 784
- Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch on page 785
- Verification on page 786
- Troubleshooting on page 787

### Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX4200-48T switches
- Two J-EX4200-24F switches
- Four J-EX Series uplink modules

Before you configure LACP, be sure you have:

- Set up the Virtual Chassis switches. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.
- Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042.
- Configured the LAGs. See “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777.

## Overview and Topology

This example assumes that you are familiar with “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777. The topology in this example is exactly the same as the topology in that other example. This example shows how to use LACP to enhance the LAG functionality.

LACP exchanges are made between *actors* (the transmitting link) and *partners* (the receiving link). The LACP mode can be either active or passive.



**NOTE:** If the actor and partner are both in passive mode, they do not exchange LACP packets, which results in the aggregated Ethernet links not coming up. By default, LACP is in passive mode. To initiate transmission of LACP packets and responses to LACP packets, you must enable LACP in active mode.

By default, the actor and partner send LACP packets every second.

The interval can be fast (every second) or slow (every 30 seconds).

## Configuring LACP for the LAGs on the Virtual Chassis Access Switch

To configure LACP for the access switch LAGs, perform these tasks:

### CLI Quick Configuration

To quickly configure LACP for the access switch LAGs, copy the following commands and paste them into the switch terminal window:

```
[edit]
set interfaces ae0 aggregated-ether-options lacp active periodic fast
set interfaces ae1 aggregated-ether-options lacp active periodic fast
```

### Step-by-Step Procedure

To configure LACP for Host-A LAGs `ae0` and `ae1`:

1. Specify the aggregated Ethernet options for both bundles:

```
[edit interfaces]
user@Host-A#set ae0 aggregated-ether-options lacp active periodic fast
user@Host-A#set ae1 aggregated-ether-options lacp active periodic fast
```

### Results

Display the results of the configuration:

```
[edit interfaces]
user@Host-A# show
ae0 {
```

```

    aggregated-ether-options {
      lacp {
        active;
        periodic fast;
      }
    }
  }
ae1 {
  aggregated-ether-options {
    lacp {
      active;
      periodic fast;
    }
  }
}

```

### Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch

To configure LACP for the two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch, perform these tasks:

#### CLI Quick Configuration

To quickly configure LACP for the distribution switch LAGs, copy the following commands and paste them into the switch terminal window:

```

[edit interfaces]
set ae0 aggregated-ether-options lacp passive periodic fast
set ae1 aggregated-ether-options lacp passive periodic fast

```

#### Step-by-Step Procedure

To configure LACP for Host D LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

```

[edit interfaces]
user@Host-D#set ae0 aggregated-ether-options lacp passive periodic fast
user@Host-D#set ae1 aggregated-ether-options lacp passive periodic fast

```

#### Results

Display the results of the configuration:

```

[edit interfaces]
user@Host-D# show
ae0 {
  aggregated-ether-options {
    lacp {
      passive;
      periodic fast;
    }
  }
}
ae1 {
  aggregated-ether-options {
    lacp {
      passive
      periodic fast;
    }
  }
}

```

## Verification

To verify that LACP packets are being exchanged, perform these tasks:

- Verifying the LACP Settings on page 786
- Verifying That the LACP Packets Are Being Exchanged on page 786

### Verifying the LACP Settings

**Purpose** Verify that LACP has been set up correctly.

**Action** Use the `show lacp interfaces interface-name` command to check that LACP has been enabled as active on one end.

```
user@Host-A> show lacp interfaces xe-0/1/0
```

```
Aggregated interface: ae0
```

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-0/1/0	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-0/1/0	Partner	No	Yes	No	No	No	Yes	Fast	Passive
LACP protocol:	Receive State	Transmit State		Mux State					
xe-0/1/0	Defaulted	Fast periodic		Detached					

**Meaning** The output indicates that LACP has been set up correctly and is active at one end.

### Verifying That the LACP Packets Are Being Exchanged

**Purpose** Verify that LACP packets are being exchanged.

**Action** Use the `show interfaces aex statistics` command to display LACP information.

```
user@Host-A> show interfaces ae0 statistics
```

```
Physical interface: ae0, Enabled, Physical link is Down
Interface index: 153, SNMP ifIndex: 30
Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
Minimum bandwidth needed: 0
Device flags   : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Current address: 02:19:e2:50:45:e0, Hardware address: 02:19:e2:50:45:e0
Last flapped   : Never
Statistics last cleared: Never
  Input packets : 0
  Output packets: 0
Input errors: 0, Output errors: 0

Logical interface ae0.0 (Index 71) (SNMP ifIndex 34)
Flags: Hardware-Down Device-Down SNMP-Traps Encapsulation: ENET2
Statistics      Packets      pps      Bytes      bps
Bundle:
```

```

      Input :          0          0          0          0
      Output:          0          0          0          0
Protocol inet
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
  Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255

```

**Meaning** The output here shows that the link is down and that no protocol data units (PDUs) are being exchanged.

## Troubleshooting

To troubleshoot a nonworking LACP link, perform these tasks:

### Troubleshooting a Nonworking LACP Link

**Problem** The LACP link is not working.

**Solution** Check the following:

- Remove the LACP configuration and verify whether the static LAG is up.
- Verify that LACP is configured at both ends.
- Verify that LACP is not passive at both ends.
- Verify whether LACP protocol data units (PDUs) are being exchanged by running the **monitor traffic-interface lag-member detail** command.

### **Related Documentation**

- Example: Connecting an Access Switch to a Distribution Switch
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- For Virtual Chassis cabling examples and instructions for installing an uplink module, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File

---

You can deterministically control both the role and the member ID assigned to each member switch in a J-EX4200 Virtual Chassis configuration by creating a preprovisioned configuration file.

A preprovisioned configuration file links the serial number of each J-EX4200 switch in the configuration to a specified member ID and role. The serial number must be specified in the configuration file for the member to be recognized as part of the Virtual Chassis configuration.



.....  
**NOTE:** When you use a preprovisioned configuration, you cannot modify the mastership priority or member ID of member switches through the user interfaces.  
.....



.....  
**NOTE:** After you have created a preprovisioned Virtual Chassis configuration, you can use the autoprovisioning feature to add member switches to that configuration. See “Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure)” on page 832.  
.....

This example describes how to configure a Virtual Chassis across multiple wiring closets using a preprovisioned configuration file:

- Requirements on page 788
- Overview and Topology on page 789
- Configuration on page 793
- Verification on page 796
- Troubleshooting on page 799

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Five J-EX4200-48T switches
- Five J-EX4200-24T switches
- Four uplink modules



Before you create the preprovisioned configuration of the Virtual Chassis and interconnect the members across the wiring closets, be sure you have:

1. Made a list of the serial numbers of all the switches to be connected as a Virtual Chassis configuration.
2. Noted the desired role (**routing-engine** or **line-card**) of each switch. If you configure the member with a **routing-engine** role, it is eligible to function as a master or backup. If you configure the member with a **line-card** role, it is not eligible to become a master or backup.
3. Installed an uplink module in each of the member switches that will be interconnected across wiring closets. See *Installing an Uplink Module in a J-EX4200 Switch*.
4. Interconnected the member switches within each wiring closet using the dedicated VCPs on the rear panel of switches. See *Connecting a Virtual Chassis Cable to a J-EX4200 Switch*.
5. Powered on the switch that you plan to use as the master switch (SWA-0).
6. Run the EZSetup program on SWA-0, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.

SWA-0 is going to be configured in the example to function as the master of the Virtual Chassis configuration. Thus, the properties that you specify for SWA-0 will apply to the entire Virtual Chassis configuration, including all the member switches that you specify in the preprovisioned configuration file.

7. Configured SWA-0 with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired.

[edit]

```
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```

## Overview and Topology

You must select two members that you want to make eligible for election as master of the Virtual Chassis configuration. When you list these two members in the preprovisioned configuration file, you designate both members as **routing-engine**. One will function as the master of the Virtual Chassis configuration and the other will function as the backup.

You designate additional members, which are not eligible for election as master, as having the **line-card** role in the preprovisioned configuration file.

In this example, five J-EX4200 switches (SWA-0 through SWA-4) are interconnected with their dedicated VCPs in wiring closet A and five J-EX4200 switches (SWA-5 through SWA-9) are interconnected with their dedicated VCPs in wiring closet B.

SWA-0 (in wiring closet A) is going to be the master of the Virtual Chassis configuration. This example shows how to create a preprovisioned configuration file on SWA-0 for all member switches that will be interconnected in the Virtual Chassis configuration. The preprovisioned configuration file includes member IDs for the members in wiring closet A and for the members in wiring closet B.

SWA-5 (in wiring closet B) is going to be the backup of the Virtual Chassis configuration. Both SWA-0 and SWA-5 are specified in the preprovisioned configuration file with the role of **routing-engine**. All other members are specified with the role of **line-card**.

If all member switches could be interconnected with their dedicated VCPs, you could simply power on the switches after saving and committing the preprovisioned configuration file. The master detects the connection of the members through the dedicated VCPs and applies the parameters specified in the preprovisioned configuration file.

However, the Virtual Chassis cables that interconnect the VCPs of member switches within a single wiring closet are not long enough to connect member switches across wiring closets. Instead, you can configure the uplink module ports or the SFP network ports on J-EX4200-24F switches as VCPs to interconnect the member switches in wiring closet A to the member switch in wiring closet B. For redundancy, this example connects uplink VCPs from two member switches in wiring closet A (SWA-0 and SWA-2) to two member switches (SWA-5 and SWA-7) in wiring closet B.



**NOTE:** You can use interfaces on SFP and SFP+ uplink modules and the SFP network ports on J-EX4200-24F switches as VCPs. When an uplink module port or SFP network port is set as a VCP, it cannot be used for any other purpose. The SFP uplink module has four 1-Gbps ports; the SFP+ uplink module has four 1-Gbps or two 10-Gbps ports. The uplink module ports that are not set as VCPs can be configured as trunk ports to connect to a distribution switch.

Because this particular preprovisioned configuration is for a Virtual Chassis that is interconnected across wiring closets, we will bring up the Virtual Chassis configuration in stages. First, we power on SWA-0 (without powering on any other switches) and create the preprovisioned configuration file. Then we power on the remaining switches in wiring closet A. If we check the status of the Virtual Chassis configuration at this point by using the **show virtual-chassis status** command, it will display only **member 0** through **member 4**. The members that have not yet been interconnected will not be listed.

Next power on SWA-5 without powering on the remaining switches (SWA-6 through SWA-9) in wiring closet B. Bring up SWA-5 as a standalone switch and set one of its uplinks as a VCP prior to interconnecting it with the Virtual Chassis configuration in wiring closet A. Without this setting, SWA-5 cannot be detected as a member switch by the master of the Virtual Chassis configuration.

You can set the uplink VCP of SWA-5 without running the EZSetup program by directly connecting to the console port. If you wish, you can run the EZSetup program and specify identification parameters. When you interconnect SWA-5 with the master of the Virtual Chassis configuration, the master overwrites any conflicting parameters.

After setting the VCP in SWA-5, connect this VCP with the VCP of SWA-0 in wiring closet A. SWA-5 (serial number pqr678) is specified as a **routing-engine** in the preprovisioned configuration file.

This example uses SWA-5 as the backup of the Virtual Chassis configuration. If a problem occurred in wiring closet A, SWA-5 would take control of the Virtual Chassis configuration and maintain the network connections. Specify both SWA-0 and SWA-5 as **routing-engine**. Because SWA-0 is powered on prior to SWA-5, it has additional prioritization properties that cause it to be elected as master of the Virtual Chassis configuration.

After being physically interconnected with SWA-0, SWA-5 reboots and comes up as **member 5** and as the backup of the Virtual Chassis configuration.

Power on the remaining switches (SWA-6 through SWA-9) in wiring closet B. The master can now detect that all members are present. Finally, for redundancy, configure an additional VCP on SWA-7 through the master.

The topology for this example consists of:

- Three J-EX4200-48T switches (SWA-0, SWA-2, and SWA-4) in wiring closet A.
- Two J-EX4200-48T switches (SWA-5 and SWA-9) in wiring closet B.
- Two J-EX4200-24T switches (SWA-1 and SWA-3) in wiring closet A.
- Three J-EX4200-24T switches (SWA-6, SWA-7, and SWA-8) in wiring closet B.
- Four uplink modules. Two are installed in wiring closet A and two are installed in wiring closet B.

Table 130 on page 791 shows the Virtual Chassis configuration settings for a preprovisioned Virtual Chassis composed of member switches in different wiring closets.

**Table 130: Components of a Preprovisioned J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets**

Switch	Serial number	Member ID	Role	Uplink Module Ports	Hardware	Location
SWA-0	abc123	0	routing-engine	xe-0/1/0	J-EX4200-48T and uplink module	Wiring closet A
SWA-1	def456	1	linecard		J-EX4200-24T	Wiring closet A
SWA-2	ghi789	2	linecard	xe-2/1/0	J-EX4200-48T and uplink module	Wiring closet A
SWA-3	jkl012	3	linecard		J-EX4200-24T	Wiring closet A
SWA-4	mno345	4	linecard		J-EX4200-48T	Wiring closet A

Table 130: Components of a Preprovisioned J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets (*continued*)

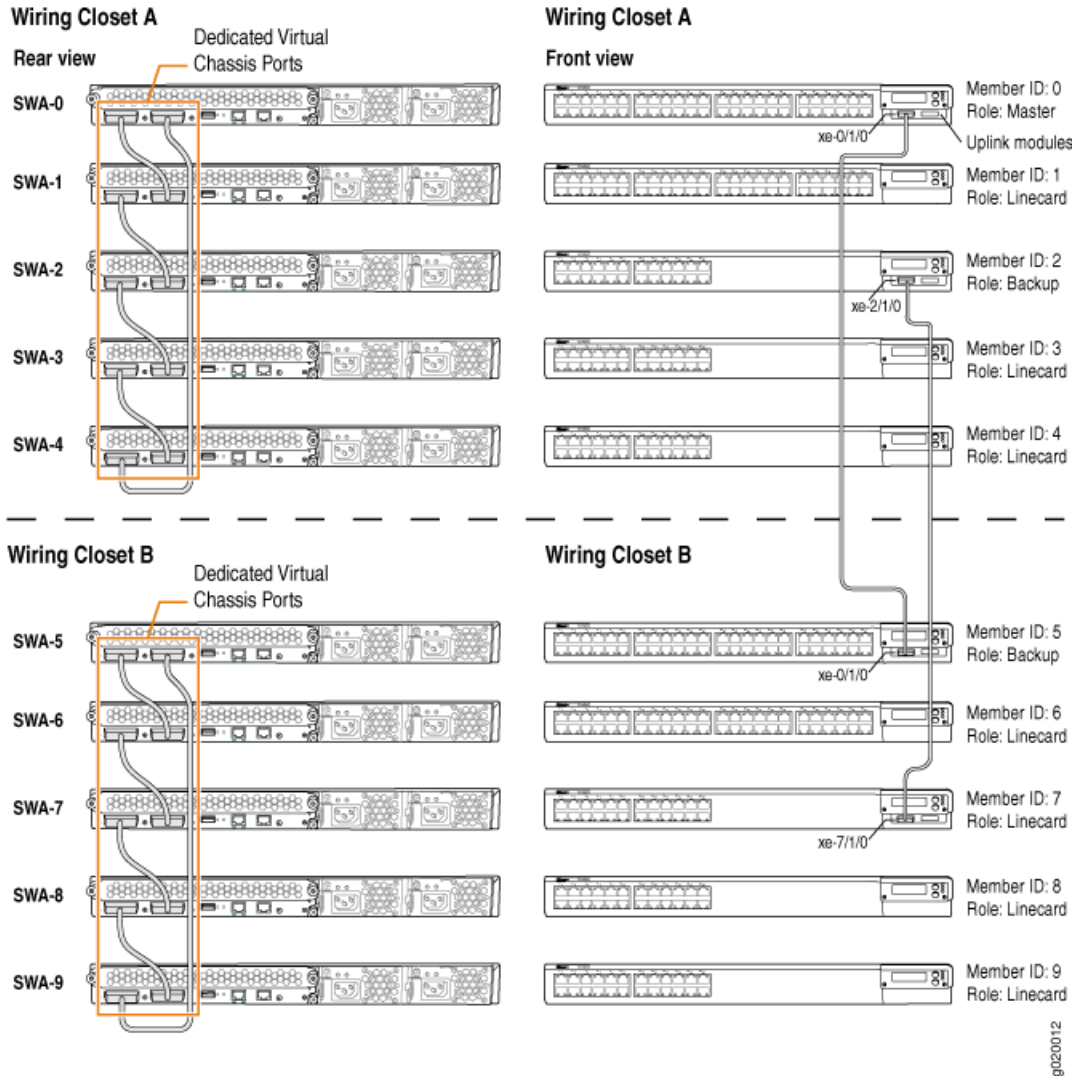
Switch	Serial number	Member ID	Role	Uplink Module Ports	Hardware	Location
SWA-5	pqr678	5	routing-engine	xe-0/1/0  NOTE: The member ID of SWA-5 is 0 at the time that its uplink module port is configured as a VCP.	J-EX4200-48T and uplink module	Wiring closet B
SWA-6	stu901	6	linecard		J-EX4200-24T	Wiring closet B
SWA-7	vwxyz234	7	linecard	xe-7/1/0	J-EX4200-24T and uplink module	Wiring closet B
SWA-8	zya567	8	linecard		J-EX4200-24T	Wiring closet B
SWA-9	bcd890	9	linecard		J-EX4200-48T	Wiring closet B

Figure 25 on page 793 shows the different types of interconnections used for this Virtual Chassis configuration. The rear view shows that the member switches within each wiring closet are interconnected to each other using the dedicated VCPs. The front view shows that the uplink module ports that have been set as VCPs and interconnected across the wiring closets. The uplink module ports that are not set as VCPs can be configured as trunk ports to connect to a distribution switch.



NOTE: The interconnections shown in Figure 25 on page 793 are the same as they would be for a configuration that was not preprovisioned across wiring closets.

Figure 25: Maximum Size J-EX4200 Virtual Chassis Interconnected Across Wiring Closets



## Configuration

To configure the Virtual Chassis across multiple wiring closets using a preprovisioned configuration, perform this task:



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis configuration.

**Step-by-Step Procedure** To create a preprovisioned configuration for the Virtual Chassis:

1. Specify the preprovisioned configuration mode:

```
[edit virtual-chassis]
user@SWA-0# set preprovisioned
```

2. Specify all the members that will be included in the Virtual Chassis configuration, listing each switch's serial number with the desired member ID and the desired role:

```
[edit virtual-chassis]
user@SWA-0# set member 0 serial-number abc123 role routing-engine
user@SWA-0# set member 1 serial-number def456 role line-card
user@SWA-0# set member 2 serial-number ghi789 role line-card
user@SWA-0# set member 3 serial-number jkl012 role line-card
user@SWA-0# set member 4 serial-number mno345 role line-card
user@SWA-0# set member 5 serial-number pqr678 role routing-engine
user@SWA-0# set member 6 serial-number stu901 role line-card
user@SWA-0# set member 7 serial-number vwx234 role line-card
user@SWA-0# set member 8 serial-number yza567 role line-card
user@SWA-0# set member 9 serial-number bcd890 role line-card
```

3. Power on the member switches in wiring closet A.
4. Prepare the members in wiring closet A for interconnecting with the member switches in wiring closet B by setting uplink VCPs for member 0 and member 2:

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-2> request virtual-chassis vc-port set pic-slot 1 port 0 member 2
```



**NOTE:**

- For redundancy, this example sets an uplink VCP in both SWA-0 and SWA-2.
- This example omits the specification of the member 0 in setting the uplink for SWA-0. The command applies by default to the switch where it is executed.

5. Power on SWA-5 and connect to it. This switch comes up as member ID 0 and functions as master of itself. Although SWA-5 is listed in the preprovisioned configuration file, it is not a present member of the Virtual Chassis configuration that has been powered on thus far. In order for the master to detect SWA-5 as a connected member, you must first set an uplink VCP on SWA-5 and interconnect that VCP with the uplink VCP of SWA-0.
6. Set the first uplink of SWA-5 to function as a VCP. Because SWA-5 has been powered on as a separate switch and is still operating independently at this point, its member ID is 0.

```
user@SWA-5> request virtual-chassis vc-port set pic-slot 1 port 0
```



**NOTE:** This example omits the specification of the member 0 in configuring the uplink for SWA-5 (at this point the member ID of SWA-5 is still 0). The command applies by default to the switch where it is executed.

7. Power off SWA-5 and connect the fiber cable from SWA-5 uplink VCP `xe-0/1/0` to the uplink VCP `xe-0/1/0` on SWA-0.
8. Power on SWA-5.
9. Now that SWA-5 has been brought up as **member 5** of the Virtual Chassis configuration, power on the remaining switches (SWA-6 through SWA-9) in wiring closet B. They are interconnected with SWA-5 using the dedicated VCPs on the rear panel and are therefore detected by the master as interconnected members. If you check the status of the Virtual Chassis configuration at this point, all the members that were specified in the preprovisioned configuration file should be displayed as present. Additional configuration for member switches can now be done through the master switch.
10. Set one uplink module port of SWA-7 to function as a VCP:
 

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0
member 7
```

**Results** Display the results of the configuration on SWA-0:

```
[edit]
user@SWA-0# show
virtual-chassis {
  member 0 {
    role routing-engine;
    serial-number abc123;
  }
  member 1 {
    role line-card;
    serial-number def456;
  }
  member 2 {
    role line-card;
    serial-number ghi789;
  }
  member 3 {
    role line-card;
    serial-number jkl012;
  }
  member 4 {
    role line-card;
    serial-number mno345;
  }
  member 5 {
    role routing-engine;
    serial-number pqr678;
  }
}
```

```

member 6 {
  role line-card;
  serial-number stu901;
}
member 7 {
  role line-card;
  serial-number vwx234;
}
member 8 {
  role line-card;
  serial-number yza567;
}
member 9 {
  role line-card;
  serial-number bcd890;
}
preprovisioned;
}

```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 796
- Verifying That the Dedicated VCPs and Uplink VCPs Are Operational on page 797

### Verifying the Member IDs and Roles of the Member Switches

**Purpose** Verify that the member IDs and roles are all set as expected.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
```

```
Preprovisioned Virtual Chassis
```

```
Virtual Chassis ID: 0000.e255.0000
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID	Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	129	Master*	1 4 5	vcp-0 vcp-1 1/0
1 (FPC 1)	Prsnt	def456	ex4200-24t	0	Linecard	2 0	vcp-0 vcp-1
2 (FPC 2)	Prsnt	ghi789	ex4200-48t	0	Linecard	3 1 7	vcp-0 vcp-1 1/0
3 (FPC 3)	Prsnt	jk1012	ex4200-24t	0	Linecard	4 2	vcp-0 vcp-1
4 (FPC 4)	Prsnt	mno345	ex4200-48t	0	Linecard	0 3	vcp-0 vcp-1
5 (FPC 5)	Prsnt	pqr678	ex4200-48t	129	Backup	6 9	vcp-0 vcp-1



							0	1/0
6 (FPC 6)	Prsnt	stu901	ex4200-24t	0	Linecard	7	vcp-0	5 vcp-1
7 (FPC 7)	Prsnt	vwX234	ex4200-24t	0	Linecard	8	vcp-0	6 vcp-1
						2	1/0	
8 (FPC 8)	Prsnt	yza567	ex4200-24t	0	Linecard	9	vcp-0	7 vcp-1
9 (FPC 9)	Prsnt	bc7890	ex4200-48t	0	Linecard	5	vcp-0	8 vcp-1

**Meaning** The output shows that all members listed in the preprovisioned configuration file are connected to the Virtual Chassis configuration. It confirms that SWA-0 (member 0) is functioning as the master of the Virtual Chassis configuration. The other switch configured with the **routing-engine** role (SWA-5) is functioning as the backup. The **Neighbor List** displays the interconnections of the member VCPs.

### Verifying That the Dedicated VCPs and Uplink VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting the member switches within each wiring closet and the uplink module VCPs interconnecting the member switches across wiring closets are operational.

**Action** Display the VCP interfaces:

```
user@SWA-0> show virtual-chassis vc-port all-members
```

```
fpc0:
```

```
-----
Interface      Type      Status   Speed   Neighbor
or             (mbps)   ID      Interface
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up
1/0            Configured Up
```

```
fpc1:
```

```
-----
Interface      Type      Status   Speed   Neighbor
or             (mbps)   ID      Interface
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up
```

```
fpc2:
```

```
-----
Interface      Type      Status   Speed   Neighbor
or             (mbps)   ID      Interface
PIC / Port
vcp-0          Dedicated Up
vcp-1          Dedicated Up
1/0            Configured Up
```

fpc3:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		

fpc4:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		

fpc5:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		
1/0	Configured	Up		

fpc6:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		

fpc7:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		
1/0	Configured	Up		

fpc8:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		

fpc9:

Interface or PIC / Port	Type	Status	Speed (mbps)	Neighbor ID Interface
vcp-0	Dedicated	Up		
vcp-1	Dedicated	Up		

**Meaning** The dedicated VCPs interconnecting the member switches within wiring closets are displayed as **vcp-0** and **vcp-1**. The uplink module VCPs interconnecting member switches (members 0, 2, 5, and 7) across wiring closets are displayed as **1/0** and **1/1** and identified as **Configured**.

## Troubleshooting

To troubleshoot a preprovisioned Virtual Chassis configuration that is interconnected across wiring closets, perform these tasks:

### Troubleshooting Nonoperational VCPs

**Problem** A VCP shows a status of **down**.

**Solution** Check the cable to make sure that it is properly and securely connected to the ports.

**Related Documentation**

- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826

## Example: Configuring a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis

We recommend using a preprovisioned configuration file to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis. Preprovisioning the mixed J-EX4200 and J-EX4500 Virtual Chassis helps ensure the J-EX4500 member switches remain in the master and backup roles and the J-EX4200 member switches remain in the linecard role.

You can deterministically control both the role and the member ID assigned to each member switch in a mixed J-EX4200 and J-EX4500 Virtual Chassis configuration by creating a preprovisioned configuration file.



**NOTE:** When you use a preprovisioned configuration, you cannot modify the mastership priority or member ID of member switches through the user interfaces.

This example describes how to configure a Virtual Chassis using a preprovisioned configuration file:

- Requirements on page 800
- Overview and Topology on page 800
- Configuration on page 801

- Verification on page 803
- Troubleshooting on page 803

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1 or later for J-EX Series switches
- Two J-EX4500 switches, each with a Virtual Chassis module
- Two J-EX4200 switches

Before you create the preprovisioned configuration of the Virtual Chassis and interconnect the members across the wiring closets, be sure you have:

1. Made a list of the serial numbers of all the switches to be connected as a Virtual Chassis configuration.
2. Noted the desired role (**routing-engine** or **line-card**) of each switch. Always configure the J-EX4500 switches in the **routing-engine** role. Always configure the J-EX4200 switches in the **line-card** role.
3. Ensured that the same version of Junos OS is running on all member switches.

## Overview and Topology

A preprovisioned configuration file links the serial number of each switch in the Virtual Chassis configuration to a specified member ID and role. The serial number must be specified in the configuration file for the member to be recognized as part of the Virtual Chassis configuration.

In a J-EX4500 Virtual Chassis or in a mixed J-EX4200 and J-EX4500 Virtual Chassis, you should always configure the J-EX4500 switches in the master and backup roles.

You designate additional members, which are not eligible for election as master, as having the **line-card** role in the preprovisioned configuration file. In a mixed J-EX4200 and J-EX4500 Virtual Chassis with two J-EX4500 switches, always configure the J-EX4200 switches in the **line-card** role.

In this example, two J-EX4500 switches (SWA-0 and SWA-1) and two J-EX4200 switches (SWA-2 and SWA-3) are interconnected with their dedicated VCPs.

SWA-0 is going to be the master of the Virtual Chassis configuration. This example shows how to create a preprovisioned configuration file on SWA-0 for all member switches that will be interconnected in the Virtual Chassis configuration. The preprovisioned configuration file includes member IDs for all member switches.

SWA-1 is going to be the backup of the Virtual Chassis configuration. Both SWA-0 and SWA-1 are specified in the preprovisioned configuration file with the role of **routing-engine**. All other members are specified with the role of **line-card**.

After all member switches are interconnected with their dedicated VCPs, you can simply power on the switches after saving and committing the preprovisioned configuration file.

The master detects the connection of the members through the dedicated VCPs and applies the parameters specified in the preprovisioned configuration file.



**NOTE:** You can use interfaces on SFP and SFP+ uplink modules as VCPs. When an uplink module port or SFP network port is set as a VCP, it cannot be used for any other purpose.

We will bring up the Virtual Chassis configuration in stages. First, we power on SWA-0 (without powering on any other switches) and create the preprovisioned configuration file. Then we power on the remaining switches.

The topology for this example consists of:

- Two J-EX4500 switches (SWA-0 and SWA-1)
- Two J-EX4200 switches (SWA-2 and SWA-3)

Table 131 on page 801 shows the Virtual Chassis configuration settings for a preprovisioned Virtual Chassis.

**Table 131: Components of a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis**

Switch	Serial number	Member ID	Role	Hardware
SWA-0	abc123	0	routing-engine	J-EX4500 switch with a Virtual Chassis module
SWA-1	def456	1	routing-engine	J-EX4500 switch with a Virtual Chassis module
SWA-2	ghi789	2	linecard	J-EX4200 switch
SWA-3	jkl012	3	linecard	J-EX4200 switch

## Configuration

To configure the Virtual Chassis across multiple wiring closets using a preprovisioned configuration, perform this task:



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis configuration.

### Step-by-Step Procedure

To create a preprovisioned configuration for the Virtual Chassis:

1. Power on the J-EX4500 switch in the master role (SWA-0).
2. Set the PIC mode to Virtual Chassis mode on SWA-0:

```
user@swi tch> request chassis pic-mode virtual-chassis
```

3. Set the Virtual Chassis mode to mixed:

```
user@switch> request virtual-chassis mode mixed
```
4. Reboot the switch.
5. After the switch reboots, specify the preprovisioned configuration mode:

```
[edit virtual-chassis]
user@SWA-0# set preprovisioned
```
6. Specify all members to be included in the Virtual Chassis configuration, listing each switch's serial number with the desired member ID and the desired role:

```
[edit virtual-chassis]
user@SWA-0# set member 0 serial-number abc123 role routing-engine
user@SWA-0# set member 1 serial-number def456 role line-card
user@SWA-0# set member 2 serial-number ghi789 role line-card
user@SWA-0# set member 3 serial-number jkl012 role line-card
```
7. Power on the remaining switches.
8. Set the Virtual Chassis mode to mixed on the remaining switches:

```
user@switch> request virtual-chassis mode mixed
```
9. Reboot the switches.
10. When the reboot completes, physically cable the switches together using the dedicated Virtual Chassis ports (VCPs).

**Results** Display the results of the configuration on SWA-0:

```
[edit]
user@SWA-0# show
virtual-chassis {
  member 0 {
    role routing-engine;
    serial-number abc123;
  }
  member 1 {
    role line-card;
    serial-number def456;
  }
  member 2 {
    role line-card;
    serial-number ghi789;
  }
  member 3 {
    role line-card;
    serial-number jkl012;
  }
  preprovisioned;
}
```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 803

### Verifying the Member IDs and Roles of the Member Switches

**Purpose** Verify that the member IDs and roles are all set as expected.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
Preprovisioned Virtual Chassis
Virtual Chassis ID: 0000.e255.0000
```

Member ID	Status	Serial No	Model	Mastership		Neighbor List	
				Priority	Role	ID	Interface
0 (FPC 0)	Prsnt	abc123	ex4500-40f	129	Master*	1 vcp-1 3 vcp-0	
1 (FPC 1)	Prsnt	def456	ex4500-40f	0	Backup	0 vcp-0 2 vcp-1	
2 (FPC 2)	Prsnt	ghi789	ex4200-48t	0	Linecard	1 vcp-0 3 vcp-1	
3 (FPC 3)	Prsnt	jk1012	ex4200-24t	0	Linecard	2 vcp-0 0 vcp-1	

**Meaning** The output shows that all members listed in the preprovisioned configuration file are connected to the Virtual Chassis configuration. It confirms that SWA-0 (member 0) is functioning as the master of the Virtual Chassis configuration. The other switch configured with the **routing-engine** role (SWA-1) is functioning as the backup. The **Neighbor List** displays the interconnections of the member VCPs.

## Troubleshooting

To troubleshoot a preprovisioned Virtual Chassis configuration that is interconnected across wiring closets, perform these tasks:

### Troubleshooting Nonoperational VCPs

**Problem** A VCP shows a status of **down**.

**Solution** Check the cable to make sure that it is properly and securely connected to the ports.

**Related Documentation**

- Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 837
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822

## Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails

---

The Virtual Chassis fast failover feature is a hardware-assisted failover mechanism that automatically reroutes traffic and reduces traffic loss in the event of a link or switch failure. If a link between two members fails, traffic flow between those members must be rerouted quickly so that there is minimal traffic loss.

Fast failover is enabled by default on all dedicated J-EX4200 Virtual Chassis ports (VCPs). Fast failover is not supported in a J-EX4500 Virtual Chassis or in a mixed J-EX4200 and J-EX4500 Virtual Chassis.

This example describes how to configure fast failover on uplink module VCPs in a J-EX4200 Virtual Chassis configuration:

- Requirements on page 804
- Overview and Topology on page 804
- Configuration on page 806
- Verification on page 806

### Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Six J-EX4200-24T switches
- Four SFP uplink modules

Before you begin configuring fast failover, be sure you have:

1. Mounted the switches.
2. Cabled the switches in a multiple-ring topology to create the Virtual Chassis configuration.

For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

### Overview and Topology

In a Virtual Chassis configuration, fast failover automatically reroutes traffic and reduces traffic loss in the event of a link failure or a member switch failure. By default, fast failover is enabled on all dedicated VCPs. If you configure uplink module ports as VCPs, you must manually configure fast failover on these ports.

For fast failover to be effective, the Virtual Chassis members must be configured in a ring topology. The ring topology can be formed by using either dedicated VCPs or user-configured uplink module VCPs. Fast failover is supported only in a ring topology

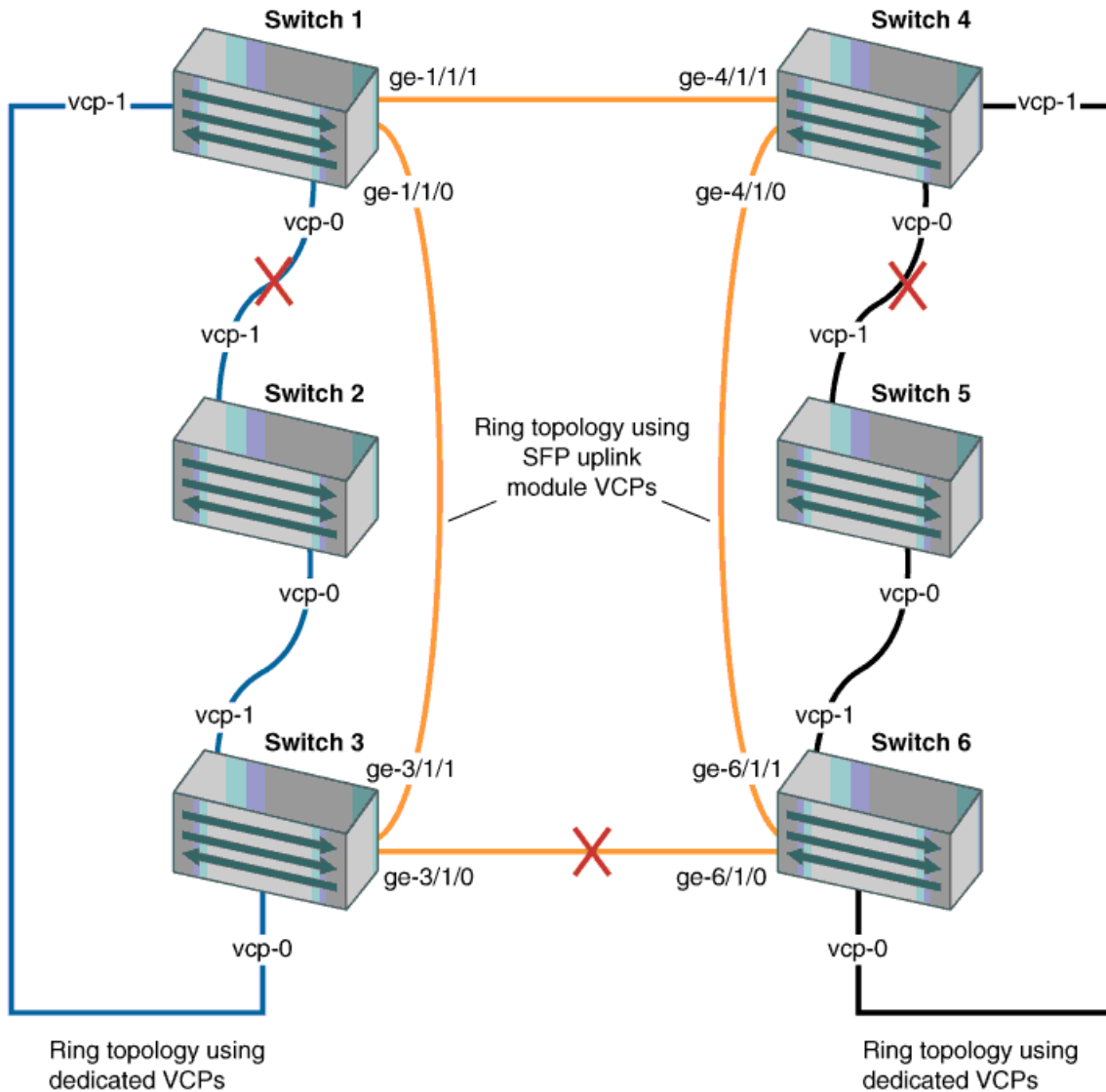


that uses identical port types, for example, either a topology that uses all dedicated VCPs or one that uses all uplink module VCPs. Fast failover is not supported in a ring topology that includes both dedicated VCPs and uplink module VCPs. Fast failover is supported, however, in a Virtual Chassis configuration that consists of multiple rings.

This example shows how to enable fast failover on uplink module VCPs.

Figure 26 on page 805 shows an example of a multiple-ring topology.

**Figure 26: Traffic Redirected by Fast Failover After VCP Link Failures in a Topology with Multiple Rings**



The topology for this example consists of six switches:

g020162

- Six J-EX4200-24T switches, four of which have an SFP uplink module installed (switches 1, 3, 4, and 6)

## Configuration

To configure the fast failover feature on uplink module VCPs:

### CLI Quick Configuration

To configure fast failover on all SFP uplink module VCPs, copy the following command and paste it into the terminal window on switch 1:

```
[edit]
set virtual-chassis fast-failover ge
```

### Step-by-Step Procedure

To configure fast failover on SFP uplink module VCPs:

1. Enable fast failover on all SFP uplink module VCPs in the Virtual Chassis configuration:

```
[edit]
user@switch1# set virtual-chassis fast-failover ge
```



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis.

**Results** Check the results of the configuration:

```
[edit virtual-chassis]
user@switch1# show
fast-failover {
  ge;
}
```

## Verification

To confirm that fast failover is enabled on SFP uplink module VCPs in the Virtual Chassis configuration, perform this task:

- [Verifying That Fast Failover Is Enabled](#) on page 806

### [Verifying That Fast Failover Is Enabled](#)

---

**Purpose** Verify that fast failover has been enabled in a Virtual Chassis configuration.

**Action** Issue the `show virtual-chassis fast-failover` command.

```
user@switch1> show virtual-chassis fast-failover
```

```
Fast failover on dedicated VCP ports: Enabled
Fast failover on XE uplink VCP ports: Disabled
Fast failover on GE uplink VCP ports: Enabled
```

**Meaning** Fast failover is enabled on all dedicated VCPs and SFP uplink module VCPs in the Virtual Chassis configuration.

- Related Documentation**
- Configuring Fast Failover in a J-EX4200 Virtual Chassis on page 853
  - Disabling Fast Failover in a J-EX4200 Virtual Chassis on page 854
  - Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
  - Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826

## Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge

There are two scenarios in which separate Virtual Chassis merge:

- A Virtual Chassis configuration that had split into two is now merging back into a single configuration because the problem that had caused it to split has been resolved.
- You merge two Virtual Chassis that had not previously been configured together.

You can explicitly assign a Virtual Chassis ID (VCID) so that, when two J-EX4200 Virtual Chassis configurations merge, the ID that you assigned takes precedence over the automatically assigned VCIDs and becomes the ID of the newly merged Virtual Chassis configuration.



**NOTE:** This example shows how to assign the VCID on a J-EX4200 Virtual Chassis. This process is identical on a J-EX4500 Virtual Chassis and on a mixed J-EX4200 and J-EX4500 Virtual Chassis.

This example describes how to assign the VCID in a J-EX4200 Virtual Chassis configuration:

- Requirements on page 807
- Overview and Topology on page 808
- Configuration on page 808
- Verification on page 809

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches



**NOTE:** For a J-EX4500 Virtual Chassis or a mixed Virtual Chassis, Junos OS Release 11.1 or later is required.

- Two J-EX4200-48T switches

- Two J-EX4200-24T switches

Before you begin, be sure you have:

1. Installed the switches. .
2. Cabled the switches to create the Virtual Chassis configuration.

For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

## Overview and Topology

Every Virtual Chassis configuration has a unique ID that is automatically assigned when the Virtual Chassis configuration is formed. You can also configure a Virtual Chassis ID using the **set virtual-chassis id** command. When two Virtual Chassis merge, the Virtual Chassis ID that you assigned takes precedence over the automatically assigned Virtual Chassis IDs and becomes the ID for the newly merged Virtual Chassis configuration.

The topology for this example consists of four switches:

- Two J-EX4200-24T switches
- Two J-EX4200-48T switches

The switches are connected as a four-member Virtual Chassis configuration and are identified as switch-A, switch-B, switch-C, and switch-D. The master is switch-A.

## Configuration

To assign the Virtual Chassis ID in a Virtual Chassis configuration:

### CLI Quick Configuration

To assign a Virtual Chassis ID so that when two Virtual Chassis configurations merge, the ID that you assigned takes precedence over the automatically assigned Virtual Chassis IDs and becomes the ID of the newly merged Virtual Chassis configuration, copy the following command and paste it into the terminal window:

```
[edit]  
set virtual-chassis id 9622.6ac8.5345
```

**Step-by-Step Procedure** To assign the Virtual Chassis ID in a Virtual Chassis configuration:

1. Assign the Virtual Chassis ID:

```
[edit]
user@switch-A# set virtual-chassis id 9622.6ac8.5345
```



**NOTE:** We recommend that you use the `commit synchronize` command to save any configuration changes that you make to a multimember Virtual Chassis configuration.

## Verification

To verify that the Virtual Chassis ID has been assigned as you intended, perform these tasks:

- [Verifying That the Virtual Chassis ID Is Assigned on page 809](#)

### [Verifying That the Virtual Chassis ID Is Assigned](#)

**Purpose** Verify that the Virtual Chassis ID has been assigned in a Virtual Chassis configuration.

- Action**
1. Issue the `show configuration virtual-chassis id` command.
  2. Check to see that the Virtual Chassis ID number is listed.

```
user@switch-A> show configuration virtual-chassis id
id 9622.6ac8.5345;
```

**Meaning** The Virtual Chassis ID has been assigned as 9622.6ac8.5345.

- Related Documentation**
- [Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge \(CLI Procedure\) on page 855](#)
  - [Configuring a J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\) on page 822](#)
  - [Configuring a J-EX4200 Virtual Chassis \(J-Web Procedure\) on page 826](#)

## Example: Configuring Link Aggregation Groups Using J-EX4200 Uplink Virtual Chassis Ports

You can form link aggregation groups (LAGs) between J-EX4200 Virtual Chassis member switches in different wiring closets using uplink Virtual Chassis ports (VCPs) and, on J-EX4200-24F switches, network VCPs. LAGs balance traffic across the member links, increase the uplink bandwidth, and provide increased availability. To form LAGs using uplink or network VCPs, you configure the uplink module interfaces or network interfaces on the member switches as VCPs and connect the VCPs using fiber-optic cables. For the LAGs to form, the uplink or network VCPs on each member switch that will form a LAG must operate at the same link speed and you must interconnect at least two uplink or

network VCPs on each of those members. You can connect uplink or network VCPs operating at different link speeds, but they will not form a LAG.



**NOTE:** The LAGs formed by VCPs are different from LAGs formed by Virtual Chassis network interfaces. For more information on LAGs formed by network interfaces, see “Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation” on page 721.

This example shows how to configure uplink module interfaces and network interfaces as VCPs on multiple member switches of a Virtual Chassis configuration and then connect them to form LAGs:

- Requirements on page 810
- Overview and Topology on page 811
- Configuration on page 812
- Verification on page 815
- Troubleshooting on page 818

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Five J-EX4200 switches, one of which is a J-EX4200-24F model
- Four uplink modules

Before you configure the uplink module interfaces and network interfaces on Virtual Chassis member switches as VCPs and interconnect the members to form a LAG, be sure you have:

1. Installed the uplink modules in the SWA-0, SWA-1, SWA-2, and SWA-3 switches. For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
2. Powered on SWA-0, connected it to the network, and run the EZSetup program. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.
3. Configured SWA-0 with the virtual management Ethernet (VME) interface for remote, out-of-band management of the Virtual Chassis configuration, if desired. See “Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 852.
4. Ensured that SWA-1 is not powered on and then interconnected SWA-0 and SWA-1 using the dedicated VCPs on the rear panel.



**NOTE:** The interfaces for the dedicated VCPs are operational by default. They do not need to be configured.

5. Ensured that SWA-2, SWA-3, and SWA-4 are not powered on. They are not connected in any way, so when they are initially powered on they will be standalone switches.

## Overview and Topology

In this example, five J-EX4200 switches will be interconnected to form LAGs for ease of monitoring and manageability. Two of these switches (SWA-0 and SWA-1) are located in wiring closet A and the three others (SWA-2, SWA-3, and SWA-4) are located in wiring closet B. SWA-0 will form one LAG with SWA-2 and another LAG with SWA-4, and SWA-1 will form a LAG with SWA-3.

We will use fiber-optic cables connected to the uplink and network VCPs to interconnect the member switches in wiring closet A to the member switches in wiring closet B.

We will specify the highest mastership priority value (255) for SWA-0 to make it the master before we power on SWA-1. Because SWA-0 and SWA-1 are interconnected with the dedicated VCPs, the master detects that SWA-1 is a member of its Virtual Chassis configuration and assigns it a member ID.

We will use SWA-2 as the backup of the Virtual Chassis configuration. We will configure the same mastership priority value for SWA-2 (255) that we configured for the master. Because we power on SWA-0 before we power on SWA-2, SWA-0 retains mastership of the Virtual Chassis configuration.

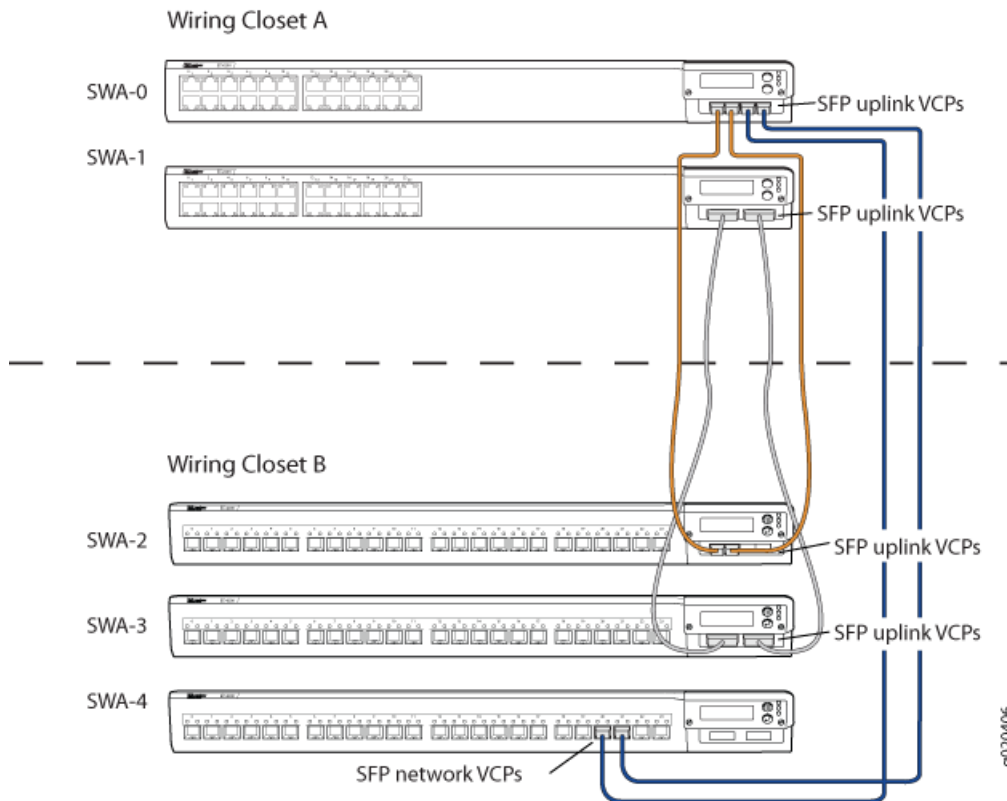


**NOTE:** We recommend setting identical mastership priority values for the master and backup members for high availability and smooth transition of mastership in case the original master becomes unavailable.

We will configure the uplink module interfaces on three of the switches as uplink VCPs. On the J-EX4200-24F switch we will configure two of the network interfaces as VCPs. We will interconnect two of the uplink VCPs on SWA-0 with two of the uplink VCPs on SWA-2. Similarly, we will interconnect the two uplink VCPs on SWA-1 with the two uplink VCPs on SWA-3. Finally, we will connect the two remaining uplink VCPs on SWA-0 with two network VCPs on SWA-4. As a result, three LAGs will be automatically formed.

Figure 27 on page 812 shows the interconnections used to form LAGs using uplink VCPs and the network VCPs after the procedure below has been completed.

**Figure 27: J-EX4200 Virtual Chassis Interconnected Across Wiring Closets to Form LAGs**



## Configuration

To configure the Virtual Chassis uplink module interfaces and network interfaces as uplink VCPs and interconnect them between two wiring closets to form LAGs, perform this task:



**Step-by-Step Procedure** To configure a Virtual Chassis across multiple wiring closets and interconnect them to form LAGs:

1. Configure the mastership priority of SWA-0 (member 0) to be the highest possible value (255), thereby ensuring that it functions as the master of the expanded Virtual Chassis configuration:

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
```

2. Power on SWA-1.
3. Prepare the members in wiring closet A for interconnecting with the member switches in wiring closet B by setting all of the SFP uplink module interfaces on SWA-0 and two of the uplink module interfaces on SWA-1 as uplink VCPs:

```
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 1
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 2
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 3
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 0 member 1
user@SWA-0> request virtual-chassis vc-port set pic-slot 1 port 1 member 1
```



**NOTE:** This example omits the specification of the member *member-id* option in configuring the uplink VCPs for SWA-0 (and, later, for SWA-2). The command applies by default to the switch where it is executed.

4. Power on SWA-2.
5. If SWA-2 was previously configured, revert it to the factory default configuration. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.
6. Prepare SWA-2 in wiring closet B by configuring its mastership priority to be the highest possible value (255). Its member ID is currently 0, because it is not yet interconnected with the other members of the Virtual Chassis configuration. It is operating as a standalone switch. Its member ID will change when it is interconnected.

```
[edit virtual-chassis]
user@SWA-2# set member 0 mastership-priority 255
```



**NOTE:** SWA-2 is configured with the same mastership priority value that we configured for SWA-0. However, the longer uptime of SWA-0 ensures that, once the interconnection is made, SWA-0 functions as the master and SWA-2 functions as the backup.

7. Specify two of the SFP uplink module interfaces in SWA-2 as uplink VCPs. The member IDs are 0, because they are not yet interconnected with the other members of the Virtual Chassis configuration:



**NOTE:** The settings of the uplink VCPs remain intact when SWA-2 reboots and joins the Virtual Chassis configuration as member 2.

```
user@SWA-2> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-2> request virtual-chassis vc-port set pic-slot 1 port 1
```

8. Power off SWA-2.
9. Physically interconnect SWA-0 and SWA-2 across wiring closets using two of the uplink VCPs on each switch.
10. Power on SWA-2. SWA-2 joins the Virtual Chassis configuration and a LAG is automatically formed between SWA-0 and SWA-2. In addition, although SWA-0 and SWA-2 have the same mastership priority value (255), SWA-0 was powered on first and thus has longer uptime. This results in SWA-0 retaining mastership while SWA-2 reboots and joins the now expanded Virtual Chassis configuration as the backup, with member ID 2.
11. Power on SWA-3.
12. If SWA-3 was previously configured, revert it to the factory default configuration.
13. Specify both SFP+ uplink module interfaces in SWA-3 as uplink VCPs:
 

```
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 0
user@SWA-3> request virtual-chassis vc-port set pic-slot 1 port 1
```
14. Power off SWA-3.
15. Physically interconnect SWA-3 with SWA-2 using their dedicated VCPs.
16. Physically interconnect SWA-1 and SWA-3 across wiring closets using their uplink VCPs.
17. Power on SWA-3. It joins the Virtual Chassis configuration as member 3.



**NOTE:** Member ID 3 is assigned to SWA-3 because SWA-3 was powered on after members 0, 1, and 2.

A LAG is automatically formed between SWA-1 and SWA-3. In addition, both SWA-1 and SWA-3 have the default mastership priority value (128) and function in a linecard role.

18. Power on SWA-4.
19. If SWA-4 was previously configured, revert it to the factory default configuration.
20. Configure two of the network interfaces on SWA-4 as uplink VCPs:
 

```
user@SWA-4> request virtual-chassis vc-port set pic-slot 0 port 20
user@SWA-4> request virtual-chassis vc-port set pic-slot 0 port 21
```
21. Power off SWA-4.

22. Physically interconnect SWA-4 and SWA-0 across wiring closets using the network VCPs on SWA-4 and the two remaining SFP uplink VCPs on SWA-0.
23. Power on SWA-4. A LAG is automatically formed between SWA-4 and SWA-0. In addition, SWA-4 joins the Virtual Chassis configuration in the linecard role.

**Results** Display the results of the configuration on SWA-0:

```
user@SWA-0> show configuration virtual-chassis
member 0 {
  mastership-priority 255;
}
member 1 {
  mastership-priority 128;
}
member 2 {
  mastership-priority 255;
}
member 3 {
  mastership-priority 128;
}
member 4 {
  mastership-priority 128;
}
}
```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying the Member IDs and Roles of the Member Switches on page 815
- Verifying That the VCPs Are Operational on page 816

### Verifying the Member IDs and Roles of the Member Switches

**Purpose** Verify that all the interconnected member switches are included within the Virtual Chassis configuration and that their roles are assigned appropriately.

**Action** Display the members of the Virtual Chassis configuration:

```
user@SWA-0> show virtual-chassis status
```

```
Virtual Chassis ID: 0000.e255.00e0
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	255	Master*	1 vcp-0 1 vcp-1 2 vcp-255/1/0 2 vcp-255/1/1 4 vcp-255/0/20 4 vcp-255/0/21
1 (FPC 1)	Prsnt	def456	ex4200-24t	128	Linecard	0 vcp-0 0 vcp-1

							3 vcp-255/1/0
							3 vcp-255/1/1
2 (FPC 2)	Prsnt	ghi789	ex4200-48t	255	Backup	3 vcp-0	3 vcp-1
						0 vcp-255/1/0	0 vcp-255/1/1
3 (FPC 3)	Prsnt	jk1012	ex4200-24t	128	Linecard	2 vcp-0	2 vcp-1
						1 vcp-255/1/0	1 vcp-255/1/1
4 (FPC 4)	Prsnt	mno345	ex4200-24f	128	Linecard	0 vcp-255/1/2	0 vcp-255/1/3

**Meaning** The `show virtual-chassis status` command lists the member switches interconnected in a Virtual Chassis configuration with the member IDs that have been assigned by the master, the mastership priority values, and the roles. It also displays the neighbor members with which each member is interconnected by the dedicated VCPs, by uplink VCPs, and by network VCPs.

### Verifying That the VCPs Are Operational

**Purpose** Verify that the dedicated VCPs interconnecting member switches in wiring closets A and B and the uplink and network VCPs interconnecting the member switches between wiring closets are operational.

**Action** Display the Virtual Chassis interfaces:

```
user@SWA-0> show virtual-chassis vc-port all-members
```

```
fpc0:
```

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	1	vcp-0
vcp-1	Dedicated	2	Up	32000	1	vcp-1
1/0	Configured	3	Up	1000	2	vcp-255/1/0
1/1	Configured	3	Up	1000	2	vcp-255/1/1
1/2	Configured	4	Up	1000	4	vcp-255/0/20
1/3	Configured	4	Up	1000	4	vcp-255/0/21

```
fpc1:
```

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	0	vcp-0
vcp-1	Dedicated	2	Up	32000	0	vcp-1
1/0	Configured	3	Up	10000	3	vcp-255/1/0
1/1	Configured	3	Up	10000	3	vcp-255/1/1

```
fpc2:
```

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	3	vcp-0
vcp-1	Dedicated	2	Up	32000	3	vcp-1
1/0	Configured	3	Up	1000	0	vcp-255/1/0
1/1	Configured	3	Up	1000	0	vcp-255/1/1
1/2		-1	Down	1000		
1/3		-1	Down	1000		

fpc3:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	2	vcp-0
vcp-1	Dedicated	2	Up	32000	2	vcp-1
1/0	Configured	3	Up	10000	1	vcp-255/1/0
1/1	Configured	3	Up	10000	1	vcp-255/1/1

fpc4:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Down	32000		
vcp-1	Dedicated	2	Down	32000		
0/20	Configured	3	Up	1000	0	vcp-255/1/2
0/21	Configured	3	Up	1000	0	vcp-255/1/3

**Meaning** The dedicated VCPs are displayed as **vcp-0** and **vcp-1**. The uplink module interfaces that have been set as uplink VCPs are displayed as **1/0**, **1/1**, **1/2**, and **1/3**. The network interfaces that have been set as VCPs are displayed as **0/20** and **0/21**. The neighbor interface names of uplink and network VCPs are of the form **vcp-255/pic/port**—for example, **vcp-255/1/0**. In that name, **vcp-255** indicates that the interface is a VCP, **1** is the uplink PIC number, and **0** is the port number. The **fpc** number is the same as the member ID. The trunk ID is a positive number ID assigned to the LAG formed by the Virtual Chassis. If no LAG is formed, the value is **-1**.



**NOTE:** Each switch assigns the trunk IDs to its local interfaces. As a result, the pair of interfaces that form one end of a LAG on one switch will have the same trunk ID, and the pair of interfaces that form the other end of the LAG will have the same trunk ID, but the trunk IDs on either end of the LAG might be different. For example, in Figure 27 on page 812, the uplink VCPs **1/2** and **1/3** on **SWA-0** form a LAG with the network VCPs **0/20** and **0/21** on **SWA-4**. Uplink VCPs **1/2** and **1/3** on **SWA-0** both have trunk ID **4**, while network VCPs **0/20** and **0/21** on **SWA-4** both have trunk ID **3**. The trunk IDs are different between the switches because **SWA-0** assigns the trunk IDs for its local uplink VCPs and **SWA-4** assigns the trunk IDs for its local VCPs.

## Troubleshooting

To troubleshoot a Virtual Chassis configuration that is interconnected across wiring closets, perform this task:

### Troubleshooting Nonoperational VCPs

---

<b>Problem</b>	An uplink VCP shows a status of <b>down</b> .
<b>Solution</b>	<ul style="list-style-type: none"><li>• Check the cable to make sure that it is properly and securely connected to the interfaces.</li><li>• If the VCP is an uplink module interface, make sure that it has been explicitly set as an uplink VCP.</li><li>• If the VCP is an uplink module interface, make sure that you have specified the options (<i>pic-slot</i>, <i>port</i>, and <i>member</i>) correctly.</li></ul>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736</li><li>• Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet on page 745</li><li>• Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757</li><li>• Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846</li></ul>

## Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches

---

The automatic software update feature automatically updates the Junos OS version on prospective member switches as they are added to a Virtual Chassis configuration of J-EX4200 switches so the new member switch immediately joins the J-EX4200 Virtual Chassis configuration and is put in the active state. If the software version on the new switch is not the same as the version running on the master, the master keeps the new switch in the inactive state. If you have not enabled the automatic software update feature, you will have to manually install the correct software version on each prospective member switch as it is added to the Virtual Chassis configuration.

This example describes how to configure the Virtual Chassis automatic software update feature:

- Requirements on page 819
- Overview and Topology on page 819
- Configuration on page 819
- Verification on page 820

## Requirements

This example uses the following hardware and software components:

- Three J-EX4200 switches
- Junos OS Release 10.2 or later for J-EX Series switches

Before you begin, be sure you have:

1. Ensured that two member switches are running the same version of Junos OS for J-EX Series switches so that they can form the initial Virtual Chassis configuration.
2. Cabled and powered on those two switches to create the Virtual Chassis configuration. For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.
3. Ensured that you know the name or the URL of the software package to be used by the automatic software update feature.

## Overview and Topology

For a standalone J-EX4200 switch to join an existing Virtual Chassis configuration, it must be running the same version of Junos OS that is running on the Virtual Chassis master. If the software version on the new switch is not the same as the version running on the master, the master keeps the new switch in the inactive state.

The topology for this example consists of three J-EX Series switches. Two of the switches are connected in a Virtual Chassis configuration and are therefore running the same version of Junos OS for J-EX Series switches. The third switch is a standalone switch that is running a different software version than the Virtual Chassis member switches. In this example, we will enable the automatic software update feature on the Virtual Chassis configuration and then add the third switch to the configuration. The master will detect the presence of the new switch, check the software version running on the new switch, and, because it is not the same version currently running on the master, will update the software version on the new switch and reboot the switch so that it can join the Virtual Chassis configuration and immediately be put in the active state.

## Configuration

To configure automatic software update, perform this task:

### Step-by-Step Procedure

To configure automatic software update:

1. Enable automatic software update and configure the path to the software package:
 

```
[edit]
user@switch# set virtual-chassis auto-sw-update package-name
/var/tmp/jinstall-ex-4200-10.2R1.1-domestic-signed.tgz
```
2. Connect the new switch to the existing Virtual Chassis configuration, and power on the switch.

**Results** Check the results of the configuration:

```
[edit virtual-chassis]
user@switch# show
auto-sw-update {
  package-name /var/tmp/jinstall-ex4200-10.2R1.1-domestic-signed.tgz;
}
```

## Verification

To verify that the software version on the new switch has been updated and that the switch has joined the Virtual Chassis configuration, perform this task:

- Verifying That the Software Version Is Updated on page 820

### Verifying That the Software Version Is Updated

**Purpose** Verify that the new switch has joined the Virtual Chassis configuration.



**NOTE:** If the software version on the new switch had not been updated successfully, the master would not allow the switch to join the Virtual Chassis configuration.

**Action** Issue the `show virtual-chassis status` command.

```
user@switch> show virtual-chassis status
Virtual Chassis ID: 0019.e250.47a0
```

Member ID	Status	Serial No	Model	Mastership priority	Role	Neighbor List ID	Interface
0 (FPC 0)	Prsnt	AK0207360276	ex4200-24t	255	Master*	1	vcp-1
1 (FPC 1)	Prsnt	AK0207360281	ex4200-24t	255	Backup	2	vcp-0
2 (FPC 2)	Prsnt	AJ0207391130	ex4200-48t	128	Linecard	0	vcp-1
						1	vcp-0

**Meaning** Because in the initial two-member Virtual Chassis configuration member 0 was the master and member 1 was the backup, the output shows that the new switch has been assigned member ID 2 and has been given the **Linecard** role. The **Status** field shows that member 2 is **Prsnt**, which means that it is in the active state.

**Related Documentation**

- Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure) on page 855
- Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832



# Configuring J-EX4200 and J-EX4500 Virtual Chassis

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828
- Installing Software on a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 831
- Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832
- Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 837
- Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838
- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840
- Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841
- Removing a J-EX4200 or J-EX4500 Switch From a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 843
- Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 844
- Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846
- Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure) on page 850
- Setting a J-EX4200 Uplink Module Port as a Virtual Chassis Port Using the LCD Panel on page 850
- Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852
- Configuring the Timer for the Backup Member to Start Using Its Own MAC Address, as Master of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852

- Configuring Fast Failover in a J-EX4200 Virtual Chassis on page 853
- Disabling Fast Failover in a J-EX4200 Virtual Chassis on page 854
- Disabling Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 854
- Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge (CLI Procedure) on page 855
- Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure) on page 855
- Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856

## Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

This topic only applies to a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis. For information on configuring a mixed J-EX4200 and J-EX4500 Virtual Chassis, see “Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 828.

You can interconnect J-EX4200 switches or J-EX4500 switches using the dedicated Virtual Chassis ports (VCPs) on the switch. You do not have to configure the interfaces for the dedicated VCPs. If you want to interconnect J-EX4200 member switches that are located in different racks or wiring closets, interconnect them using uplinks configured as VCPs. See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.

If you want to interconnect J-EX4500 switches that are located in different racks or wiring closets, interconnect them using 10-Gigabit Ethernet SFP+ ports configured as VCPs. See “Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure)” on page 850.



**NOTE:** A multimember Virtual Chassis configuration has two Routing Engines, one in the master and the other in the backup. Therefore, we recommend that you always use `commit synchronize` rather than simply `commit` to save configuration changes made for a Virtual Chassis. This ensures that the configuration changes are saved in both Routing Engines.

---

A J-EX4200 or J-EX4500 Virtual Chassis can be configured with either:

- A preprovisioned configuration—Allows you to deterministically control the member ID and role assigned to a member switch by tying it to its serial number.

- A nonprovisioned configuration—The master sequentially assigns a member ID to other member switches. The role is determined by the mastership priority value and other factors in the master election algorithm.

This topic includes:

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis with a Preprovisioned Configuration File on page 823
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis with a Nonprovisioned Configuration File on page 824

## Configuring a J-EX4200 or J-EX4500 Virtual Chassis with a Preprovisioned Configuration File

Preprovisioning a Virtual Chassis configuration allows you to assign the member ID and role for each switch in the Virtual Chassis. Preprovisioning is supported for a J-EX4200 Virtual Chassis and a J-EX4500 Virtual Chassis.

To configure a Virtual Chassis using a preprovisioned configuration:

1. Make a list of the serial numbers of all the switches to be connected in a Virtual Chassis configuration.
2. Note the desired role (**routing-engine** or **line-card**) of each switch. If you configure the member with a **routing-engine** role, it is eligible to function as a master or backup. If you configure the member with a **line-card** role, it is not eligible to become a master or backup.
3. Interconnect the member switches using the dedicated VCPs on the rear panel of switches. For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* or the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.



**NOTE:** For management purposes, we recommend arranging the switches in member ID sequence, either from top to bottom or from bottom to top (0–9).

4. Power on only the switch that you plan to use as the master switch. Do not power on the other switches at this time.
5. Run the EZSetup program on the master switch, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.



**NOTE:** The properties that you specify for the master switch apply to the entire Virtual Chassis configuration, including all the members listed in the preprovisioned configuration file.

6. Configure the master switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired.

```
[edit]
user@switch# set interfaces vme unit 0 family inet address /ip-address/mask/
```

- Specify the preprovisioned configuration mode:

```
[edit virtual-chassis]
user@switch# set preprovisioned
```

- Specify all the members that you want to included in the Virtual Chassis configuration, listing each switch's serial number with the desired member ID and the desired role:

```
[edit virtual-chassis]
user@switch# set member 0 serial-number abc123 role routing-engine
user@switch# set member 1 serial-number def456 role line-card
user@switch# set member 2 serial-number ghi789 role line-card
user@switch# set member 3 serial-number jkl012 role line-card
user@switch# set member 4 serial-number mno345 role line-card
user@switch# set member 5 serial-number pqr678 role routing-engine
user@switch# set member 6 serial-number stu901 role line-card
user@switch# set member 7 serial-number vwx234 role line-card
user@switch# set member 8 serial-number yza567 role line-card
user@switch# set member 9 serial-number bcd890 role line-card
```

- Power on the member switches.
- (J-EX4500 switches only) Verify the PIC mode setting:

```
user@switch> show chassis pic-mode
```

If the PIC mode setting is not set to **virtual-chassis**, set the PIC mode to **virtual-chassis**:

```
user@switch> request chassis pic-mode virtual-chassis
```



**NOTE:** You cannot modify the mastership priority when you are using a preprovisioned configuration. The mastership priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file. The two Routing Engines are assigned the same mastership priority value. However, the member that was powered on first has higher prioritization according to the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717.

## Configuring a J-EX4200 or J-EX4500 Virtual Chassis with a Nonprovisioned Configuration File

Nonprovisioned configuration can be used to configure a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis.

To configure the Virtual Chassis using a nonprovisioned configuration:

1. Interconnect the member switches using the dedicated VCPs on the switches. For instructions, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* or the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.



**NOTE:** For management purposes, we recommend arranging the switches in member ID sequence, either from top to bottom or from bottom to top (0–9).

2. Power on only the switch that you plan to use as the master switch (SWA-0). Do not power on the other switches at this time.
3. Run the EZSetup program on SWA-0, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details.



**NOTE:** The properties that you specify for SWA-0 apply to the entire Virtual Chassis configuration, including all the members interconnected through VCPs..

4. Configure SWA-0 with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis configuration, if desired.

```
[edit]
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```

5. Configure mastership priority for the master, backup, and other members, if desired:



**NOTE:** If you are configuring a mixed J-EX4200 and J-EX4500 Virtual Chassis, you must configuring the J-EX4500 switches with the highest priority. The highest values ensure the J-EX4500 switches are configured in the master and backup roles.

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
user@SWA-0# set member 5 mastership-priority 255
```

6. Power on the member switches in sequential order, one by one.
7. (J-EX4500 switches only) Enter the **show chassis pic-mode** operational mode command to verify the current PIC mode setting. If the PIC mode is currently set to **intraconnect**, enter the **request chassis pic-mode virtual-chassis** operational mode command to set the PIC mode to **virtual-chassis**. Reboot the switch to complete the procedure.



**NOTE:** If you do not edit the Virtual Chassis configuration file, a nonprovisioned configuration is generated by default. The mastership priority value for each member switch is 128. The master role is selected by default. You can change the role that is performed by the members by modifying the mastership priority. See “Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 844. We recommend that you specify the same mastership priority value for the desired master and backup members. In this example, the highest possible mastership priority has been assigned to two members. However, the member that was powered on first has higher prioritization according to the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717. The other members use the default mastership priority in this example, which qualifies them to function in the role of linecard.



**NOTE:** If you want to change the member ID that the master has assigned to a member switch, use the `request virtual-chassis renumber` command.

#### Related Documentation

- Example: Configuring a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis on page 799
- Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 844
- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863

## Configuring a J-EX4200 Virtual Chassis (J-Web Procedure)

To take advantage of the scalability features of J-EX4200 switches, you can configure a Virtual Chassis that includes up to ten member switches. You can interconnect the member switches using the dedicated Virtual Chassis ports (VCPs) on the back of the switches. You do not have to configure the interface for the dedicated VCPs. If you want to interconnect member switches that are located in different racks or wiring closets, interconnect them using uplinks configured as VCP interfaces. See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.



**NOTE:** The J-Web interface is currently not supported for a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis.

To configure a J-EX4200 Virtual Chassis using the J-Web interface:

1. Select **Configure > Virtual Chassis**.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

2. The properties you can configure are displayed.

The first section of the Virtual Chassis Configuration page displays the Virtual Chassis member configuration. The display includes a list of member switches, their member IDs, and the mastership priority.

The second section displays the operational status of the Virtual Chassis configuration, member details, and the dedicated and configured Virtual Chassis ports (VCPs).

3. Enter information into the page as described in Table 132 on page 827.
4. Click one:
  - **Add**—To add a member's configuration to the Virtual Chassis configuration, click **Add**.
  - **Edit**—To modify an existing member's configuration, click **Edit**.
  - **Delete**—To delete the configuration of a member, click **Delete**.
5. To configure an uplink as a VCP, select the member in the Virtual Chassis members list and select **Action > Select Uplink Port as VCP**. Select the port from the list.
6. To delete an uplink VCP from a member, select the member in the Virtual Chassis members list and select **Action > Delete Uplink Port as VCP**.

**Table 132: Virtual Chassis Configuration Fields**

Field	Function	Your Action
<b>Member Details</b>		
Member ID	Specifies the identifier for the member switch. The master switch assigns member IDs.	Select an identifier from the list. Select an ID from <b>0</b> through <b>9</b> .
Priority	Specifies the mastership priority to be assigned to the member.	Select a number from <b>1</b> through <b>255</b> , with <b>255</b> being the highest priority ( <b>128</b> is the default).
Disable Management VLAN	If you want to reserve an individual member's management Ethernet port, you can remove that port from being part of the virtual management ethernet (VME) interface.	Click to disable the management VLAN on the port.
Refresh	Refreshes the operational status of Virtual Chassis members.	Click to refresh the operational status.

- Related Documentation**
- [Configuring a J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\) on page 822](#)
  - [Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736](#)
  - [Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762](#)
  - [Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863](#)
  - [Virtual Chassis Cabling Configuration Examples for J-EX4200 Switches](#)
  - [J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709](#)

## [Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis \(CLI Procedure\)](#)

This topic explains how to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis when none of the switches are part of a Virtual Chassis only. It does not explain how to configure a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis or how to add a switch to an existing Virtual Chassis. For information on configuring a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis, see “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.

You can configure a mixed J-EX4200 and J-EX4500 Virtual Chassis that includes up to two J-EX4500 switches and up to eight J-EX4200 member switches. You can interconnect the member switches using the dedicated Virtual Chassis ports (VCPs) on the back of the switch.

For information on adding a switch to an existing Virtual Chassis, see:

- [Adding a New Switch to an Existing J-EX4200 Virtual Chassis \(CLI Procedure\) on page 832](#)
- [Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis \(CLI Procedure\) on page 837](#)
- [Adding a J-EX4500 Switch to a Preprovisioned EX4200 Virtual Chassis \(CLI Procedure\) on page 838](#)
- [Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis \(CLI Procedure\) on page 840](#)

You do not have to configure the interfaces for the dedicated VCPs. If you want to interconnect member switches that are located in different racks or wiring closets, interconnect them using network ports or uplinks configured as VCP interfaces. See:

- [Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port \(CLI Procedure\) on page 846](#)
- [Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch \(CLI Procedure\) on page 850](#)



We recommend using a preprovisioned configuration when configuring a mixed J-EX4200 and J-EX4500 Virtual Chassis when none of the member switches are currently members of a Virtual Chassis. A preprovisioned configuration allows you to deterministically control the member ID and role assigned to a member switch by tying it to its serial number. This procedure only shows how to configure a preprovisioned mixed J-EX4200 and EX4500 Virtual Chassis for this reason.

Nonprovisioned configuration is supported for a mixed J-EX4200 and J-EX4500 Virtual Chassis configuration. In a nonprovisioned configuration, the master sequentially assigns a member ID to other member switches, and the other member switches' roles are determined by the mastership priority value and other factors in the master election algorithm. We recommend nonprovisioned configuration of a mixed J-EX4200 and J-EX4500 Virtual Chassis is only if you are adding a J-EX4200 or J-EX4500 switch to an existing nonprovisioned Virtual Chassis. See “Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure)” on page 840.

To configure a mixed J-EX4200 and J-EX4500 Virtual Chassis:

1. Make a list of the serial numbers of all the switches to be connected in the Virtual Chassis.
2. Power and log onto the J-EX4500 switches only. If a switch has not previously been configured, see “Connecting and Configuring an EX Series Switch (CLI Procedure)” on page 185.
3. Verify the PIC mode setting:  

```
user@swi tch> show chassis pic-mode
```
4. If the PIC mode was not set to Virtual Chassis mode, set the PIC mode to Virtual Chassis mode:  

```
user@swi tch> request chassis pic-mode virtual-chassis
```
5. Set the Virtual Chassis mode to mixed:  

```
user@swi tch> request virtual-chassis mode mixed
```
6. Reboot the J-EX4500 switches:  

```
user@swi tch> request system reboot
```
7. Power and log onto the J-EX4200 switches. If a switch has not previously been configured, see “Connecting and Configuring an EX Series Switch (CLI Procedure)” on page 185.
8. Set the Virtual Chassis mode on the J-EX4200 switches to mixed:  

```
user@swi tch> request virtual-chassis mode mixed
```
9. Reboot the J-EX4200 switches:  

```
user@swi tch> request system reboot
```
10. After you have rebooted the switches, log into the J-EX4500 switch that you powered on first. This switch is the master switch.

11. Run the EZSetup program on the master switch, specifying the identification parameters. See “Connecting and Configuring an EX Series Switch (CLI Procedure)” on page 185 for details.



**NOTE:** The properties that you specify for the master switch apply to the entire mixed J-EX4200 and J-EX4500 Virtual Chassis.

12. On the master switch, configure the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis, if desired.

```
[edit]
user@switch# set interfaces vme unit 0 family inet address /ip-address/mask/
```

13. On the master switch, specify the preprovisioned configuration mode:

```
[edit virtual-chassis]
user@switch# set preprovisioned
```

14. On the master switch, specify all members for the Virtual Chassis configuration, listing each switch’s serial number with the desired member ID and the desired role. Assign the **routing-engine** role to the J-EX4500 member switches and the **line-card** role to the J-EX4200 member switches.

```
[edit virtual-chassis]
user@switch# set member 0 serial-number abc123 role routing-engine
user@switch# set member 1 serial-number def456 role routing-engine
user@switch# set member 2 serial-number ghi789 role line-card
user@switch# set member 3 serial-number jkl012 role line-card
user@switch# set member 4 serial-number mno345 role line-card
user@switch# set member 5 serial-number pqr678 role line-card
user@switch# set member 6 serial-number stu901 role line-card
user@switch# set member 7 serial-number vwx234 role line-card
user@switch# set member 8 serial-umber yza567 role line-card
user@switch# set member 9 serial-number bcd890 role line-card
```

15. Interconnect the member switches by using either the dedicated VCPs on the member switches (see Connecting a Virtual Chassis Cable to a J-EX4200 Switch) or by connecting them through the uplink ports (J-EX4200 member switches) or SFP+ ports (J-EX4500 member switches) that you have configured as VCPs (see “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846 or “Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure)” on page 850).



**NOTE:** You cannot modify the mastership priority when you are using a preprovisioned configuration. The mastership priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file.

#### Related Documentation

- Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 844
- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863

## Installing Software on a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)

You can use this procedure to upgrade or downgrade Junos OS for all member switches in an operational mixed J-EX4200 and J-EX4500 Virtual Chassis.

To upgrade Junos OS for an operational mixed J-EX4200 and J-EX4500 Virtual Chassis:

1. Download the same version of Junos OS Release 11.1 or later software for a J-EX4200 switch and a J-EX4500 switch. See “Downloading Software Packages from Juniper Networks” on page 79.
2. (Optional) Back up the current software configuration to a second storage option. See the *Junos OS Installation and Upgrade Guide* for instructions on performing this task.
3. (Optional) Copy both software packages to the member switch acting in the master role. We recommend that you use FTP to copy the file to the `/var/tmp` directory.

This step is optional because Junos OS can also be upgraded when the software image is stored at a remote location. These instructions describe the software upgrade process for both scenarios.

4. Install both new packages on the Virtual Chassis:

```
user@switch> request system software add set [package package]
```



**NOTE:** You enter the `request system software add set [package package]` command once on the Virtual Chassis to download the software package onto all member switches in the mixed J-EX4200 and J-EX4500 Virtual Chassis.

Replace *package* with one of the following paths:

- For a software package in a local directory on the switch—`/var/tmp/package.tgz`.
- For a software package on a remote server:
  - `ftp://hostname/pathname/package.tgz`
  - `http://hostname/pathname/package.tgz`

where *package.tgz* is, for example, `jinstall-ex-4200-11.1R2.8-domestic-signed.tgz`.



**NOTE:** To abort the installation, do not reboot your Virtual Chassis; instead, finish the installation and then issue the `request system software delete package.tgz` command, where *package.tgz* is, for example, `jinstall-ex-4500-11.1R2.8-domestic-signed.tgz`. This is your last chance to stop the installation.

5. Reboot the Virtual Chassis to start the new software:

```
user@switch> request system reboot
```

6. After the reboot has completed, log in and verify that the new version of the software is properly installed for all member switches in the Virtual Chassis:

```
user@switch> show version
```

- Related Documentation**
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712

## [Adding a New Switch to an Existing J-EX4200 Virtual Chassis \(CLI Procedure\)](#)

---

This topic explains how to add switches to an existing J-EX4200 Virtual Chassis. For information on adding a switch to another type of Virtual Chassis, see “Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 837, “Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure)” on page 838, or “Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure)” on page 840.

To add a J-EX4200 or J-EX4500 switch to an existing Virtual Chassis configuration, use the procedure that matches what you need to accomplish:

- Adding a New Switch to an Existing Virtual Chassis Within the Same Wiring Closet on page 832
- Adding a New Switch from a Different Wiring Closet to an Existing Virtual Chassis on page 833
- Adding a New Switch to an Existing Preprovisioned Virtual Chassis Using Autoprovisioning on page 835

### [Adding a New Switch to an Existing Virtual Chassis Within the Same Wiring Closet](#)

This procedure can be used to add a J-EX4200 switch to a J-EX4200 Virtual Chassis.

Before you begin, be sure you have:

- Mounted the new switch in a rack.
- Confirmed that the new switch is powered off.
- If you are expanding a preprovisioned configuration, made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.
- If you are expanding a preprovisioned configuration, edited the existing Virtual Chassis configuration to include the serial number of the new member switch. You can specify the role of the new member switch when you add its serial number in the Virtual Chassis configuration file. The parameters specified in the master Virtual Chassis configuration file are applied to the new switch after it has been interconnected to an existing member switch.



**NOTE:** After you have created a preprovisioned Virtual Chassis configuration, you can use the autoprovisioning feature to add member switches to that configuration.

To add a new member switch to an existing Virtual Chassis configuration within the same wiring closet:

1. If the new member switch has been previously configured, revert that switch's configuration to the factory defaults. See "Reverting to the Default Factory Configuration for the J-EX Series Switch" on page 353.
2. Interconnect the unpowered new switch to at least one member of the existing Virtual Chassis configuration using the dedicated Virtual Chassis ports (VCPs).
3. Power on the new switch.
4. Confirm that the new member switch is now included within the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a member ID that is higher than 0 (1 through 9), because there is already at least one member of the Virtual Chassis configuration.



**NOTE:** If you are using a preprovisioned configuration, the member ID is automatically assigned to the member's serial number in the configuration file.

## Adding a New Switch from a Different Wiring Closet to an Existing Virtual Chassis

This procedure can be used to add a J-EX4200 switch to a J-EX4200 Virtual Chassis.

To add a new switch from a different wiring closet to an existing Virtual Chassis configuration, you must use a long cable to connect the members switches across wiring closets. You can use a port on an SFP or SFP+ uplink module, or an SFP network port on a J-EX4200 switch, and a fiber-optic cable for this purpose.

Before you begin, be sure you have:

- Installed the uplink modules needed for the Virtual Chassis configuration.
- Mounted the new switch in a rack.
- If the new member switch has been previously configured, reverted its configuration to the factory defaults. See "Reverting to the Default Factory Configuration for the J-EX Series Switch" on page 353.
- Powered on the new member switch as a standalone switch and configured its uplink module ports as VCPs. Otherwise, it cannot be recognized as a member switch by the master.

- If you are expanding a preprovisioned configuration, made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.
- If you are expanding a preprovisioned configuration, edited the existing Virtual Chassis configuration to include the serial number of the new member switch. You can specify the role of the new member switch when you add its serial number in the Virtual Chassis configuration file. The parameters specified in the master Virtual Chassis configuration file are applied to the new switch after it has been interconnected with its uplink VCP to an existing member switch.
- Confirmed that the new, currently standalone switch is powered off.
- Prepared an existing member switch for interconnecting with the new switch through an uplink module port by configuring an uplink module port as a VCP on the existing member switch.



**NOTE:** After you have created a preprovisioned Virtual Chassis configuration, you can use the autoprovisioning feature to add member switches to that configuration.

To add a new member switch that is going to be interconnected with the existing Virtual Chassis configuration across wiring closets:

1. Power on the new switch.
2. Connect a laptop or terminal to the console port of the switch, or use EZSetup on the LCD Panel of the standalone switch to specify temporary identification parameters. (When you interconnect the new member switch with the existing Virtual Chassis configuration, the master will overwrite and disable any specified parameters that conflict with the Virtual Chassis parameters or assigned member configuration.)
3. Use the CLI or the J-Web interface to set the uplink module ports as VCPs.



**NOTE:** If you are using a nonprovisioned configuration, you might configure the new member switch with a mastership priority value that is less than that of the existing member switches. Doing so ensures that the new member switch will function in a linecard role when it is included within the Virtual Chassis configuration.

4. Power off the new switch.
5. Interconnect the new member switch to at least one member of the existing Virtual Chassis configuration using the uplink module ports that have been configured as VCPs on each of the switches.
6. Power on the new member switch.
7. Confirm that the new member switch is now included within the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a

member ID that is higher than 0 (1 through 9), because there is already at least one member of the Virtual Chassis configuration.



**NOTE:** If you are using a preprovisioned configuration, the member ID is automatically assigned to the member's serial number in the configuration file.

## Adding a New Switch to an Existing Preprovisioned Virtual Chassis Using Autoprovisioning

This procedure can be used to add a J-EX4200 switch to an existing J-EX4200 Virtual Chassis.

Before you begin, be sure you have:

- Installed the uplink modules needed for the Virtual Chassis configuration.
- Mounted the new switch in a rack.
- Ensured that the preprovisioned Virtual Chassis configuration has an active master. For more information, see “Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File” on page 788.
- On the master, configured the Link Level Discovery Protocol (LLDP) on the uplink module ports that will be used as VCPs. LLDP is configured by default but might have been disabled. To configure LLDP, see [Configuring LLDP \(CLI Procedure\)](#).
- Ensured that the new member switch has the factory-default configuration. If the new member switch has been previously configured, revert its configuration to the factory defaults. See “Reverting to the Default Factory Configuration for the J-EX Series Switch” on page 353.
- Made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.
- Edited the existing Virtual Chassis preprovisioned configuration to include the serial number of the new member switch. You can specify the role of the new member switch when you add its serial number to the Virtual Chassis configuration file. The parameters specified in the master Virtual Chassis configuration file are applied to the new member switch after it has been interconnected through its uplink VCP to an existing member switch.
- Prepared an existing member switch to interconnect with the new switch through an uplink module port by configuring an uplink module port as a VCP on the existing member switch.
- Ensured that the operational modes of the uplink modules on the existing member switch and the new member switch match.
- Confirmed that the new member switch is powered off.
- Interconnected the existing switch with the new switch using the appropriate cable.

If the preceding conditions are not met, autoprovisioning will not work and you will need to manually configure uplink module ports on the switch to be added to the configuration to be VCPs. For more information, see “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.

To add a switch to an existing preprovisioned Virtual Chassis configuration using the autoprovisioning feature:

1. Power on the new member switch.
2. Confirm that the new member switch is now included in the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a member ID in the range from 0 through 9. The member ID is automatically assigned to the new member switch's serial number in the configuration file.

**Related Documentation**

- Example: Expanding a J-EX4200 Virtual Chassis in a Single Wiring Closet on page 745
- Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818
- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841



## Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)

This topic explains how to add a J-EX4200 switch to an already configured and operational J-EX4500 Virtual Chassis (a Virtual Chassis composed entirely of J-EX4500 switches) or a mixed J-EX4200 and J-EX4500 Virtual Chassis (a Virtual Chassis composed of J-EX4200 and J-EX4500 switches) that was configured using a preprovisioned configuration.

If you want to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis and none of the switches are members of a Virtual Chassis, see “Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 828.

If you want to add a J-EX4200 switch to a nonprovisioned J-EX4500 Virtual Chassis or a nonprovisioned mixed J-EX4200 and J-EX4500 Virtual Chassis, see “Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure)” on page 840.

To add a J-EX4200 switch to a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis that was configured using a preprovisioned configuration:

1. Power on the J-EX4200 switch that will be added to the Virtual Chassis.
2. Set the Virtual Chassis mode to mixed:

```
user@swi tch> request virtual-chassis mode mixed
```

3. Reboot the J-EX4200 switch.

```
user@swi tch> request system reboot
```

4. Log on to the J-EX4500 Virtual Chassis or the mixed J-EX4200 and J-EX4500 Virtual Chassis.
5. (J-EX4500 Virtual Chassis only) Set the Virtual Chassis mode to mixed for all Virtual Chassis member switches:

```
user@swi tch> request virtual-chassis mode mixed all-members
```



**NOTE:** Each member switch will already have been configured in mixed mode in a mixed J-EX4200 and J-EX4500 Virtual Chassis.

6. (J-EX4500 Virtual Chassis only) Reboot all member switches in the J-EX4500 Virtual Chassis.

```
user@swi tch> request system reboot all-members
```

7. Add the J-EX4200 switch to the preprovisioned configuration:

```
[edit virtual-chassis]
user@SWA-0# set member 5 serial-number mno123 role line-card
```



**NOTE:** In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4200 member switches must be in the line-card role.

8. Interconnect the J-EX4200 switch into the Virtual Chassis by using the dedicated VCPs on the rear panel of the switches to connect to a dedicated VCP of a switch that is already part of the Virtual Chassis. See [Connecting a Virtual Chassis Cable to a J-EX4200 Switch](#).

#### Related Documentation

- [Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\)](#) on page 844
- [Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port \(CLI Procedure\)](#) on page 846
- [Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch \(CLI Procedure\)](#) on page 850

## Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure)

This topic explains how to add a J-EX4500 switch to an already configured and operational J-EX4200 Virtual Chassis, a Virtual Chassis composed entirely of J-EX4200 switches.

If you want to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis and none of the switches are members of a Virtual Chassis, see “[Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis \(CLI Procedure\)](#)” on page 828.

If you want to add a J-EX4500 switch to a nonprovisioned J-EX4200 Virtual Chassis, see “[Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis \(CLI Procedure\)](#)” on page 840.

A J-EX4500 switch can be added to a J-EX4200 Virtual Chassis to create a mixed J-EX4200 and J-EX4500 Virtual Chassis.

To add a J-EX4500 switch to a J-EX4200 Virtual Chassis that was configured using a preprovisioned configuration:

1. Power on the J-EX4500 switch with the installed Virtual Chassis module.
2. Verify the PIC mode setting:
 

```
user@swi tch> show chassis pic-mode
```
3. If the PIC mode was not set to Virtual Chassis mode, set the PIC mode to Virtual Chassis mode:
 

```
user@swi tch> request chassis pic-mode virtual-chassis
```
4. Set the Virtual Chassis mode to mixed:
 

```
user@swi tch> request virtual-chassis mode mixed
```

5. Reboot the J-EX4500 switch.

```
user@switch> request system reboot
```

6. Log on to the J-EX4200 Virtual Chassis.

7. Set the Virtual Chassis mode to mixed for all member switches:

```
user@switch> request virtual-chassis mode mixed all-members
```

8. Reboot the Virtual Chassis.

```
user@switch> request system reboot all-members
```

9. Log in to the J-EX4200 Virtual Chassis after the reboot is complete.

10. On the master switch, add the J-EX4500 switch to the preprovisioned configuration:

```
[edit virtual-chassis]
user@switch# set member 5 serial-number mno123 role routing-engine
```



**NOTE:** In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 member switches must be in the **routing-engine** role.

11. On the master switch, change each J-EX4200 switch in the **routing-engine** role to the **line-card** role:

```
[edit virtual-chassis]
user@switch# replace member 0 serial-number abc123 role routing-engine with member
0 serial-number abc123 role line-card
user@switch# replace member 1 serial-number def456 role routing-engine with member
1 serial-number def456 role line-card
```



**NOTE:** The J-EX4200 switches must be in the **line-card** role in a mixed J-EX4200 and J-EX4500 Virtual Chassis.

12. Interconnect the J-EX4500 switch with a switch already in the Virtual Chassis using the dedicated VCPs on the rear panel of the switches. For instructions, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

#### Related Documentation

- Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 844
- Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846
- Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure) on page 850

## Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure)

---

This topic explains how to add a J-EX4500 switch to an already configured and operational J-EX4200 Virtual Chassis, a Virtual Chassis composed entirely of J-EX4200 switches, that was configured using a nonprovisioned configuration.

If you want to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis and none of the switches are members of a Virtual Chassis, see “Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 828.

If you want to add a J-EX4500 switch to a preprovisioned J-EX4200 Virtual Chassis, see “Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)” on page 837.

A J-EX4500 switch can be added to a J-EX4200 Virtual Chassis to create a mixed J-EX4200 and J-EX4500 Virtual Chassis.

To add a J-EX4500 switch to a J-EX4200 Virtual Chassis that was configured using a nonprovisioned configuration:

1. Power on the J-EX4500 switch with the installed Virtual Chassis module.
2. Verify the PIC mode setting:

```
user@swi tch> show chassis pic-mode
```

3. If the PIC mode was not set to Virtual Chassis mode, set the PIC mode to Virtual Chassis mode:

```
user@swi tch> request chassis pic-mode virtual-chassis
```

4. Set the Virtual Chassis mode to mixed:

```
user@swi tch> request virtual-chassis mode mixed
```

5. Reboot the J-EX4500 switch.

```
user@swi tch> request system reboot
```

6. Log into the J-EX4200 Virtual Chassis.

7. Set the Virtual Chassis mode to mixed for all member switches:

```
user@swi tch> request virtual-chassis mode mixed all-members
```

8. Reboot all member switches in the Virtual Chassis.

```
user@swi tch> request system reboot all-members
```

9. After the reboots are complete, interconnect the J-EX4500 switch with another member of the Virtual Chassis by using the dedicated VCPs on the rear panel of the switches. For instructions, see the *Dell PowerConnect J-Series J-EX4500 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

10. Log into the Virtual Chassis.

11. Set the mastership priority of the J-EX4500 switch to 255:

```
[edit virtual-chassis]
user@switch# set member 5 mastership-priority 255
```



**NOTE:** This step ensures the J-EX4500 switch is placed in the master role. In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 member switches must be in the master or backup role.

12. On the master switch, set the mastership priority of each J-EX4200 switch to 0:

```
[edit virtual-chassis]
user@switch# replace member member-id mastership-priority mastership-priority with
member member-id mastership-priority 0
```

Setting the J-EX4200 switches to mastership priority 0 ensures that they stay in the linecard role.

#### Related Documentation

- Example: Adding a J-EX4500 Switch to a Nonprovisioned Virtual Chassis on page 750
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828

## Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure)

You can replace a member switch of a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis without disrupting network service for the other members. You can retain the existing configuration of the member switch and apply it to a new member switch, or you can free up the member ID and make it available for assignment to a new member switch.

To replace a member switch, use the procedure that matches what you need to accomplish:

- Remove, Repair, and Reinstall the Same Switch on page 841
- Remove a Member Switch, Replace It with a Different Switch, and Reapply the Old Configuration on page 842
- Remove a Member Switch and Make Its Member ID Available for Reassignment to a Different Switch on page 842

### Remove, Repair, and Reinstall the Same Switch

If you need to repair a member switch, you can remove it from the Virtual Chassis configuration without disrupting network service for the other members. The master stores the configuration of the member ID so that it can be reapplied when the member switch (with the same base MAC address) is reconnected.

1. Power off and disconnect the member switch to be repaired.

2. Repair, as necessary.
3. Reconnect the switch and power it on.

## Remove a Member Switch, Replace It with a Different Switch, and Reapply the Old Configuration

If you are unable to repair a member switch, you can replace it with a different member switch and retain the old configuration. The master stores the configuration of the member that was removed. When you connect a different member switch, the master assigns a new member ID. But the old configuration is still stored under the previous member ID of the previous member switch.



**NOTE:** If you have used a preprovisioned configuration, you can use the **replace** command to change the serial number in the Virtual Chassis configuration file. Substitute the serial number of the replacement member switch (on the back of the switch) for the serial number of the member switch that was removed.

1. Power off and disconnect the member switch to be replaced.
2. If the replacement member switch has been previously configured, revert that switch's configuration to the factory defaults. See "Reverting to the Default Factory Configuration for the J-EX Series Switch" on page 353.
3. Connect the replacement member switch and power it on.
4. Note the member ID displayed on the front panel.
5. Issue the **request virtual-chassis renumber** command from the Virtual Chassis master to change the member switch's current member ID to the member ID that belonged to the member switch that was removed from the Virtual Chassis configuration.

## Remove a Member Switch and Make Its Member ID Available for Reassignment to a Different Switch

When you remove a member switch from the Virtual Chassis configuration, the master keeps that member switch's member ID on reserve. To make that member switch's member ID available for reassignment, issue the **request virtual-chassis recycle** command from the Virtual Chassis master.



**NOTE:** When you add or delete members in a Virtual Chassis configuration, internal routing changes might cause temporary traffic loss for a few seconds.

### Related Documentation

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832

- Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 837
- Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838
- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840

## Removing a J-EX4200 or J-EX4500 Switch From a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure)

This topic explains how to remove a J-EX4200 or J-EX4500 switch from a mixed J-EX4200 and J-EX4500 Virtual Chassis. It also explains how to reconfigure the Virtual Chassis in cases in which you are removing the switches to convert a mixed J-EX4200 and J-EX4500 Virtual Chassis into a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis.

To remove a J-EX4200 or J-EX4500 switch from a mixed J-EX4200 and J-EX4500 Virtual Chassis:

1. Power off and disconnect the member switch that is being removed from the Virtual Chassis.
2. If the Virtual Chassis configuration was preprovisioned, remove the switch from the preprovisioned configuration. See “Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure)” on page 841. If the Virtual Chassis was nonprovisioned, change the mastership-priority values of each member switch as needed to reconfigure the Virtual Chassis roles. See “Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 844.
3. If the removal of the switch changes the Virtual Chassis from a mixed J-EX4200 and J-EX4500 Virtual Chassis to a J-EX4200 or J-EX4500 Virtual Chassis, disable mixed Virtual Chassis mode for all of the switches in the Virtual Chassis:

```
user@switch> request virtual-chassis mode mixed disable all-members
```

Reboot all member switching the Virtual Chassis to complete this step:

```
user@switch> request system reboot all-members
```

4. If you want to place the removed switch back onto the network as a standalone switch, disable mixed Virtual Chassis mode on the switch:

```
user@switch> request virtual-chassis mode mixed disable
```

5. (J-EX4500 switch only) Set the PIC mode on the removed switch to **intraconnect**:

```
user@switch> request chassis pic-mode intraconnect
```

You only need to perform this step if you want to put the J-EX4500 switch back onto the network as a standalone switch.

6. Reboot the standalone switch so the new settings can take effect.

## Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

You can designate the role (master, backup, or linecard) that a member switch performs within a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis whether or not you are using a preprovisioned configuration.



**NOTE:** A multimember Virtual Chassis configuration has two Routing Engines, one in the master and the other in the backup. Therefore, we recommend that you always use `commit synchronize` rather than simply `commit` to save configuration changes made for a Virtual Chassis. This ensures that the configuration changes are saved in both Routing Engines.

This topic describes:

- Configuring Mastership Using a Preprovisioned Configuration File on page 844
- Configuring Mastership Using a Configuration File That Is Not Preprovisioned on page 845

### Configuring Mastership Using a Preprovisioned Configuration File

To configure mastership using a preprovisioned configuration for a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis:

1. Note the serial numbers of the switches that you want to function in the master role and backup role.
2. Power on only the switch (SWA-0) that you want to function in the master role.
3. Edit the configuration to specify the preprovisioned configuration mode:

```
[edit virtual-chassis]
user@SWA-0# set preprovisioned
```

4. List the serial numbers of the member switches that you want to function as master and backup, specifying their role as **routing-engine**:

```
[edit]
user@SWA-0# set virtual-chassis member 0 serial-number abc123 role routing-engine
user@SWA-0# set virtual-chassis member 2 serial-number def456 role routing-engine
```



**NOTE:** In a mixed J-EX4200 and J-EX4500 Virtual Chassis, you must configure the J-EX4500 switch or switches in the **routing-engine** role to ensure the J-EX4500 switches function in the master or backup roles. The J-EX4200 switches must be configured in the **line-card** role.





**NOTE:** You cannot directly modify the mastership priority value when you are using a preprovisioned configuration. The mastership priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file. The two members assigned the `routing-engine` role are assigned the same mastership priority value (128). However, the member that was powered on first has higher prioritization according to the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717. Only two members can be specified with the `routing-engine` role.

- List the serial numbers of any other member switches that you want to include in the Virtual Chassis configuration. You may also specify their role as `line-card`, if desired.

### Configuring Mastership Using a Configuration File That Is Not Preprovisioned

To configure mastership of the Virtual Chassis through a configuration that is not preprovisioned for a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis:



**NOTE:** The following procedure can be used to configure a mixed J-EX4200 and J-EX4500 Virtual Chassis, but is not the recommended procedure. We recommend preprovisioning a mixed J-EX4200 and J-EX4500 Virtual Chassis to ensure the J-EX4500 switches are in the master and backup roles.

- Power on only the switch that you want to function in the master role (SWA-0).
- Configure the highest possible mastership priority value (255) for the member that you want to function in the master role:

```
[edit virtual-chassis]
user@SWA-0# set member 0 mastership-priority 255
```



**NOTE:** In a mixed J-EX4200 and J-EX4500 Virtual Chassis, we recommend configuring the J-EX4500 switches with the highest mastership priorities to ensure the J-EX4500 switches function in the master and backup roles.

- Configure the same mastership priority value (continue to edit the Virtual Chassis configuration on the master) for the member that you want to be the backup (SWA-1):

```
[edit virtual-chassis]
user@SWA-0# set member 1 mastership-priority 255
```



**NOTE:** We recommend that the master and backup have the same mastership priority value to prevent the master and backup status from switching back and forth between master and backup members in failover conditions.

4. If you are configuring a J-EX4200 or J-EX4500 Virtual Chassis, use the default mastership priority value (**128**) for the remaining member switches or configure the mastership priority to a value that is lower than the value specified for members functioning in the master and backup roles.

If you are configuring a mixed J-EX4200 and J-EX4500 Virtual Chassis, use the mastership priority value of **0** for each J-EX4200 switch. A switch with a mastership priority value of **0** never becomes the master switch.

#### Related Documentation

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832
- Adding a J-EX4200 Switch to a Preprovisioned J-EX4500 Virtual Chassis or a Preprovisioned Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 837
- Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838
- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840

## Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)

The procedure described in this topic can only be used to connect two J-EX4200 switches together within the same Virtual Chassis. To set an SFP+ port on a J-EX4500 switch as a Virtual Chassis port (VCP), see “Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure)” on page 850.

You can interconnect J-EX4200 switches that are beyond the reach of the Virtual Chassis cables as members of a Virtual Chassis configuration by using the SFP network ports—including the SFP uplink module or SFP+ uplink module—and connecting the uplink ports. You can also use the SFP network ports for this purpose. To use the uplink ports or SFP network ports for interconnecting member switches, you must explicitly set the uplink ports as VCPs.



**NOTE:** When an uplink port is set as a VCP interface, it cannot be used for any other purpose. You can set one port as a VCP interface and configure the other port in trunk mode as an uplink to a distribution switch.

Before you set an uplink port as a VCP:

1. Install the uplink module in the member switches that you want to interconnect.
2. Power on and connect to the switch that you plan to designate as the master of the Virtual Chassis configuration.



**NOTE:** Do not power on the other switches at this point.

3. Run EZSetup on the switch that you are configuring to be the master. Follow the prompts to specify the hostname and other identification, time zone, and network properties. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185 for details. The properties that you specify for the master apply to the entire Virtual Chassis configuration, including all the member switches that you later interconnect with the master.
4. If you want to configure and manage the Virtual Chassis configuration remotely, specify the VME global management interface. You can configure the VME global management interface when you are setting up the master or you can do it after completing the other configuration steps for the Virtual Chassis. See “Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 852.
5. Configure mastership of the Virtual Chassis using either the nonprovisioned or preprovisioned configuration. See “Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 844 for details.



**NOTE:** A multimember Virtual Chassis configuration has two Routing Engines, one in the master and the other in the backup. Therefore, we recommend that you always use `commit synchronize` rather than simply `commit` to save configuration changes made for a Virtual Chassis configuration. This ensures that the configuration changes are saved in both Routing Engines.

To interconnect a Virtual Chassis configuration across long distances, such as between wiring closets, you need to:

- Prepare the existing Virtual Chassis configuration for interconnecting with a potential member switch that is beyond the reach of a Virtual Chassis cable by setting at least one uplink VCP on an existing member of the Virtual Chassis configuration.
- Prepare the potential member switch for interconnecting with the existing Virtual Chassis configuration by setting at least one uplink VCP on the standalone switch.



**NOTE:** We recommend that you set two uplink VCPs within each wiring closet for redundancy.

This topic describes:

1. Setting an Uplink VCP Between Two J-EX4200 Member Switches on page 848
2. Setting an Uplink VCP on a Standalone Switch on page 848

## Setting an Uplink VCP Between Two J-EX4200 Member Switches

You can set an uplink port of a J-EX4200 Virtual Chassis member as a VCP.



**NOTE:** If you use the SFP+ uplink module, you must configure all member switches to support either 1-gigabit SFP transceivers or 10-gigabit SFP+ transceivers on J-EX4200 switches. See “Setting the Mode on an SFP+ Uplink Module (CLI Procedure)” on page 1093.

To set the uplink ports for the local member switch (for example, member 0) and for a different member switch (for example, member 1) to function as VCPs:

1. Set one uplink port of member 0 as a VCP interface. You do not need to specify the **member member-id** option, because the command applies by default on the member where it is executed.

```
user@swi tch> request virtual-chassis vc-port set pic-slot 1 port 0
```

2. Set one uplink port of member 1 as a VCP interface.

```
user@swi tch>request virtual-chassis vc-port set pic-slot 1 port 0 member 1
```

This step includes the member *member-id* option, because it is executed on a different member switch than the local member switch.

## Setting an Uplink VCP on a Standalone Switch

You can set an uplink VCP on a standalone switch. You must set an uplink port on the standalone switch as a VCP prior to physically interconnecting the switch with the existing Virtual Chassis configuration. Otherwise, the master cannot detect that the switch is a member of the Virtual Chassis configuration.

To set one uplink VCP on the potential member (SWA-2), which is currently operating as a standalone switch:

1. Power on the standalone switch.
2. Set one uplink port as a VCP interface. You do not need to specify the **member member-id** option, because the command applies by default on the member where it is executed.

```
user@swi tch> request virtual-chassis vc-port set pic-slot 1 port 0
```



**NOTE:** If you do specify the member *member-id* option, use member ID 0. Because the switch is not yet interconnected with the other members of the Virtual Chassis configuration, its current member ID is 0. Its member ID will change when it is interconnected with the Virtual Chassis configuration. It does not impact the functioning of the uplink VCP that its VCP interface is set with 0 as the member ID. The VCP interface has significance only on the local switch.

3. After you have set the uplink VCP on the standalone switch, physically interconnect its uplink port with the VCP uplink ports of the members in the existing Virtual Chassis configuration.
4. The new member switch reboots and joins the now expanded Virtual Chassis configuration with a different member ID.



**NOTE:** The setting for the new member switch's uplink VCP remains intact and is not affected by the change of member ID.

5. If you have additional members in the second wiring closet, set a redundant VCP uplink on another member switch by issuing the **request virtual-chassis vc-port** command.

#### Related Documentation

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762
- Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788
- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863

## Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure)

You can set any 10-Gigabit Ethernet SFP+ port on a J-EX4500 switch as a Virtual Chassis port (VCP). Setting a 10-Gigabit Ethernet SFP+ transceiver as a VCP is useful in cases in which you have to connect Virtual Chassis members together across a distance that is greater than the longest VCP cable can breach.

You can only use the 10-Gigabit Ethernet SFP+ ports to connect J-EX4500 switches together. You must use the native VCPs to connect J-EX4200 switches and J-EX4500 switches together to form a Virtual Chassis. You cannot connect a J-EX4500 switch to a J-EX4200 switch to form a mixed J-EX4200 and J-EX4500 Virtual Chassis using this procedure.

Before you set an uplink port as a VCP on a J-EX4500 switch:

- Cable the J-EX4500 switches together using an 10-Gigabit Ethernet SFP+ connection.

To set an SFP+ connection as a VCP:

1. Set the 10-Gigabit Ethernet SFP+ port as a VCP interface:

```
user@switch> request virtual-chassis vc-port set pic-slot 1 port 0
```

2. Log onto the other J-EX4500 switch, and set the other end of the SFP+ connection as a VCP interface:

```
user@switch> request virtual-chassis vc-port set pic-slot 1 port 0
```

- Related Documentation**
- Example: Connecting J-EX4500 Member Switches in a Virtual Chassis Across Wiring Closets on page 770

## Setting a J-EX4200 Uplink Module Port as a Virtual Chassis Port Using the LCD Panel

You can interconnect J-EX4200 switches that are beyond the reach of the Virtual Chassis cables as members of a Virtual Chassis by using SFP and SFP+ uplink module ports.

You can also use the network ports to interconnect Virtual Chassis member switches. To use the uplink module ports for interconnecting member switches, you must explicitly set the ports as Virtual Chassis Ports (VCPs).

This topic describes how to set or delete the uplink module ports and the network ports as VCPs using the LCD panel.

The following procedure shows how to configure uplink module port **ge-0/1/2** as a VCP.

To set an uplink module port as a VCP using the LCD panel:

1. Press **Menu** until you see **MAINTENANCE MENU**.
2. Press **Menu** until you see **REQUEST VC PORT**.
3. Press **Enter**. You will see **SET VC PORT?**.

4. Press **Enter**. You will see **SET FPC 0?**.
5. Press **Enter**. You will see **SET PIC 0?**.
6. Press **Menu** until you see **SET PIC 1?**.
7. Press **Enter**. You will see **SET PORT 0?**.
8. Press **Menu** until you see **SET PORT 2?**.
9. Press **Enter**. You will see **CONFIGURING ....**
10. Once the configuration has been accepted, press **Enter** to return to the **MAINTENANCE** menu.

You can also use the LCD panel to delete a VCP, thus resetting the port to an uplink module port or a network port.

To reset **vcp-0/1/2** to an uplink module port using the LCD panel:

1. Press **Menu** until you see **MAINTENANCE MENU**.
2. Press **Menu** until you see **REQUEST VC PORT**.
3. Press **Enter**. You will see **SET VC PORT?**.
4. Press **Menu**. You will see **DELETE VC PORT?**.
5. Press **Enter**. You will see **DELETE FPC 0?**.
6. Press **Enter**. You will see **DELETE PIC 0?**.
7. Press **Menu** until you see **DELETE PIC 1?**.
8. Press **Enter**. You will see **DELETE PORT 0?**.
9. Press **Menu** until you see **DELETE PORT 2?**.
10. Press **Enter**. You will see **CONFIGURING ....**
11. Once the configuration has been accepted, press **Enter** to return to the **MAINTENANCE** menu.

**Related Documentation**

- LCD Panel in J-EX4200 Switches
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure) on page 846
- Understanding Interface Naming Conventions on J-EX Series Switches on page 1001

## Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

---

If you want to configure and manage the Virtual Chassis remotely through SSH or Telnet, configure the virtual management Ethernet (VME) interface on the master of the Virtual Chassis. You can configure and manage all members of the Virtual Chassis through this single global interface.

1. Power on the switch that you want to function as the master.
2. Check the front-panel LCD to confirm that the switch has powered on correctly.
3. Run the EZSetup program on the switch, specifying the identification parameters. See “Connecting and Configuring a J-EX Series Switch (CLI Procedure)” on page 185.

To configure the VME interface:

```
[edit]
user@SWA-0# set interfaces vme unit 0 family inet address /ip-address/mask/
```

### Related Documentation

- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis on page 718

## Configuring the Timer for the Backup Member to Start Using Its Own MAC Address, as Master of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

---

When a backup member takes control of the Virtual Chassis configuration because of a reset or other temporary failure, the backup uses the MAC address of the old master. This helps to ensure a smooth transition of mastership with no disruption to network connectivity.

The MAC persistence timer is used in situations in which the master is no longer a member of the Virtual Chassis configuration because it has been physically disconnected or removed. If the old master does not rejoin the Virtual Chassis configuration before the timer elapses, the new master starts using its own MAC address.

The default timer value is 10 minutes. There are no minimum or maximum limits.

Before you begin configuring the timer, ensure that you have at least two member switches in the Virtual Chassis.

To configure or modify the MAC persistence timer:

```
[edit virtual-chassis]
user@switch# set mac-persistence-timer minutes
```

### Related Documentation

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712



## Configuring Fast Failover in a J-EX4200 Virtual Chassis

The Virtual Chassis fast failover feature is a hardware-assisted failover mechanism that automatically reroutes traffic and reduces traffic loss in the event of a link or switch failure. If a link between two members fails, traffic flow between those members must be rerouted quickly so that there is minimal traffic loss.

While fast failover is enabled by default on dedicated Virtual Chassis ports (VCPs) for a J-EX4200 Virtual Chassis, you must manually enable fast failover on uplink module ports that have been configured as VCPs.



**NOTE:** Fast failover is not supported in a mixed J-EX4200 and J-EX4500 Virtual Chassis or in a J-EX4500 Virtual Chassis.

Before you begin configuring fast failover, ensure that the dedicated VCPs or uplink module VCPs are connected in a ring topology.

- To reenabling the fast failover feature on all dedicated VCPs in a ring:

```
[edit]
user@switch# delete virtual-chassis fast-failover vcp disable
```

- To configure the fast failover feature on all SFP+ uplink module VCPs in a ring:

```
[edit]
user@switch# set virtual-chassis fast-failover xe
```

- To configure the fast failover feature on all SFP uplink module VCPs in a ring:

```
[edit]
user@switch# set virtual-chassis fast-failover ge
```

### Related Documentation

- Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804
- Disabling Fast Failover in a J-EX4200 Virtual Chassis on page 854
- Understanding Fast Failover in a J-EX4200 Virtual Chassis on page 725

## Disabling Fast Failover in a J-EX4200 Virtual Chassis

While fast failover is enabled by default on dedicated Virtual Chassis ports (VCPs) on J-EX4200, you can manually disable fast failover on dedicated VCPs.



**NOTE:** Fast failover is not supported in a mixed J-EX4200 and J-EX4500 Virtual Chassis or in a J-EX4500 Virtual Chassis.

- To disable the fast failover feature on all dedicated VCPs in a ring:

```
[edit]
user@switch# set virtual-chassis fast-failover vcp disable
```

- To disable the fast failover feature on all SFP uplink module VCPs in a ring:

```
[edit]
user@switch# delete virtual-chassis fast-failover ge
```

### Related Documentation

- Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804
- Configuring Fast Failover in a J-EX4200 Virtual Chassis on page 853
- Understanding Fast Failover in a J-EX4200 Virtual Chassis on page 725

## Disabling Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

The split and merge feature is enabled by default on J-EX4200 and J-EX4500 switches in a Virtual Chassis. You can disable the split and merge feature. If you disable the split and merge feature and the Virtual Chassis splits, both parts of the split Virtual Chassis configuration remain active.

In a preprovisioned J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis, if both Routing Engines end up in the same Virtual Chassis configuration after a split, the other part of the split Virtual Chassis configuration remains inactive. If the Routing Engines end up in different parts of the split Virtual Chassis configuration and the rest of the member switches are configured as having linecard roles, then a backup Routing Engine might not be selected for either part.

To disable the split and merge feature in a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis:

```
[edit]
user@switch# set virtual-chassis no-split-detection
```

### Related Documentation

- Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807
- Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis on page 731

## Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge (CLI Procedure)

Every J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis has a unique ID that is automatically assigned when the Virtual Chassis configuration is formed. You can also explicitly assign a Virtual Chassis ID using the **set virtual-chassis id** command. When two Virtual Chassis configurations attempt to merge, the Virtual Chassis ID that you assigned takes precedence over the automatically assigned Virtual Chassis IDs and becomes the ID for the newly merged Virtual Chassis configuration.

To configure the Virtual Chassis ID:

```
[edit]
user@switch# set virtual-chassis id id
```

### Related Documentation

- Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807
- Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis on page 731

## Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure)

The automatic software update feature allows you to automatically update the software version on prospective member switches as they are added so that they can join a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis.



**NOTE:** Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later is a special upgrade. Automatic software update and automatic software download are supported for this special upgrade, however, after an automatic installation you must take the extra step of upgrading the loader software. See the release notes for instructions on how to upgrade the loader software.

Before you begin, ensure that you know the name or the URL of the software package to be used by the automatic software update feature.

To configure the automatic software update feature:

```
[edit]
user@switch# set virtual-chassis auto-sw-update package-name package-name
```

If the software package is located on a local directory on the switch, use the following format for **package-name**:

```
/pathname/package-name
```

If the software package is to be downloaded and installed from a remote location, use one of the following formats:

**`ftp://hostname/pathname/package-name`**

**`ftp://username:prompt@ftp.hostname.net/package-name`**

**`http://hostname/pathname/package-name`**

- Related Documentation**
- Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818
  - Understanding Automatic Software Update on J-EX4200 and J-EX4500 Virtual Chassis Member Switches on page 734

## Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)

---

In a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis, one member switch is assigned the master role and has the master Routing Engine. Another member switch is assigned the backup role and has the backup Routing Engine. Graceful Routing Engine switchover (GRES) enables the master and backup Routing Engines in a Virtual Chassis configuration to switch from the master to backup without interruption to packet forwarding. When you configure graceful Routing Engine switchover, the backup Routing Engine automatically synchronizes with the master Routing Engine to preserve kernel state information and the forwarding state.

To set up the Virtual Chassis configuration to use graceful Routing Engine switchover (GRES):

1. Set up a minimum of two switches in a Virtual Chassis configuration with mastership priority of 255:

```
[edit]
user@swi tch# set virtual-chassis member 0 mastership-priority 255
```

```
[edit]
user@swi tch# set virtual-chassis member 1 mastership-priority 255
```

2. Set up graceful Routing Engine switchover:

```
[edit]
user@swi tch# set chassis redundancy graceful-switchover
```

Commit the configuration.

- Related Documentation**
- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
  - High Availability Features for J-EX Series Switches Overview on page 22
  - Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723

# Verifying J-EX4200 and J-EX4500 Virtual Chassis Configuration

- Command Forwarding Usage with a J-EX4200 or J-EX4500 Virtual Chassis on page 857
- Verifying the Member ID, Role, and Neighbor Member Connections of a J-EX4200 or J-EX4500 Virtual Chassis Member on page 860
- Verifying That Virtual Chassis Ports on a J-EX4200 or J-EX4500 Switch Are Operational on page 862
- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Verifying the Setting for the Virtual Chassis Mode on J-EX4200 and J-EX4500 Switches on page 865
- Verifying the Setting for the PIC Mode on a J-EX4500 Switch in a Virtual Chassis on page 865
- Verifying That Graceful Routing Engine Switchover Is Working in the J-EX4200 or J-EX4500 Virtual Chassis on page 865

## Command Forwarding Usage with a J-EX4200 or J-EX4500 Virtual Chassis

---

Some CLI commands can be run either on all members or on a specific member of a Virtual Chassis configuration. This functionality is referred to as command forwarding.

For example, to collect information about your system prior to contacting Dell at <http://www.support.dell.com>, use the command **request support information all-members** to gather data for all the member switches. If you want to gather this data only for a particular member switch, use the command **request support information member *member-id***.

Table 133 on page 858 provides a list of commands that can be run either on all members of the Virtual Chassis configuration or on a specific member switch.

Table 133: Commands That Can be Run on All or Specific Members of the Virtual Chassis Configuration

Commands Available for Command Forwarding	Purpose	all-members	member-member-id
<b>request support information</b>	Use this command when you contact Dell about your component problem. This command is the equivalent of using the following CLI commands: <ul style="list-style-type: none"> <li>• <b>show version</b></li> <li>• <b>show chassis firmware</b></li> <li>• <b>show chassis hardware</b></li> <li>• <b>show chassis environment</b></li> <li>• <b>show interfaces extensive</b> (for each configured interface)</li> <li>• <b>show configuration</b> (excluding any SECRET-DATA)</li> <li>• <b>show system virtual-memory</b></li> </ul>	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>request system partition hard-disk</b>	Set up the hard disk for partitioning. After this command is issued, the hard disk is partitioned the next time the system is rebooted. When the hard disk is partitioned, the contents of <b>/altroot</b> and <b>/altconfig</b> are saved and restored. All other data on the hard disk is at risk of being lost.	Partitions the hard disk on all members of the Virtual Chassis configuration.	Partitions the hard disk on the specified member switch.
<b>request system reboot</b>	Reboot Junos OS for J-EX Series switches after a software upgrade and occasionally to recover from an error condition.	Reboots all members of the Virtual Chassis configuration.	Reboots the specified member switch.
<b>request system snapshot</b>	Back up the currently running and active file system.	Backs up the file systems on all members of the Virtual Chassis configuration.	Backs up the file system on the specified member switch.
<b>request system storage cleanup</b>	Free storage space on the switch by rotating log files and proposing a list of files for deletion. User input is required for file deletion.	Runs cleanup on all members of the Virtual Chassis configuration.	Runs cleanup on the specified member switch.
<b>show log user</b>	Display users who are viewing the system log.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.

Table 133: Commands That Can be Run on All or Specific Members of the Virtual Chassis Configuration (*continued*)

Commands Available for Command Forwarding	Purpose	all-members	member-member-id
<b>show system alarms</b>	Display active system alarms.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system audit</b>	Display the state and checksum values for file systems.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system boot-messages</b>	Display initial messages generated by the system kernel upon startup. These messages are the contents of <code>/var/run/dmesg.boot</code> .	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system core-dumps</b>	Display a core file generated by an internal Junos OS process.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system directory-usage</b>	Display directory usage information.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system reboot</b>	Display pending system reboots or halts.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system snapshot</b>	Display information about the backup software that is located in the <code>/altroot</code> and <code>/altconfig</code> file systems. To back up software, use the <code>request system snapshot</code> command.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system software</b>	Display the Junos OS extensions loaded on your switch.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system statistics</b>	Display systemwide protocol-related statistics.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system storage</b>	Display statistics about the amount of free disk space in the switch's file systems.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.
<b>show system uptime</b>	Display the current time and information about how long the switch, the switch software, and any existing protocols have been running	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.

Table 133: Commands That Can be Run on All or Specific Members of the Virtual Chassis Configuration (*continued*)

Commands Available for Command Forwarding	Purpose	all-members	member-member-id
<code>show system users</code>	Show all users who are currently logged in.	Shows all users who are currently logged in to any members of the Virtual Chassis configuration.	Shows all users who are currently logged in to the specified member switch.
<code>show system virtual-memory</code>	Display the usage of Junos OS kernel memory, listed first by size of allocation and then by type of usage. Use <code>show system virtual-memory</code> for troubleshooting with JTAC.	Displays information for all members of the Virtual Chassis configuration.	Displays information for the specified member switch.

Table 134 on page 860 shows a list of commands that are relevant only to the master switch in a Virtual Chassis configuration. Do not use the options `all-members` or `member-member-id` with these commands.

Table 134: Commands Relevant Only to the Master

Commands Relevant Only to the Master	Purpose
<code>set date</code>	Set the data and time.
<code>show system buffers</code>	Display information about the buffer pool that the Routing Engine uses for local traffic. Local traffic is the routing and management traffic that is exchanged between the Routing Engine and the Packet Forwarding Engine within the switch, as well as the routing and management traffic from IP (that is, from OSPF, BGP, SNMP, ping operations, and so on).
<code>show system connections</code>	Display information about the active IP sockets on the Routing Engine. Use this command to verify which servers are active on a system and which connections are currently in progress.
<code>show system processes</code>	Display information about software processes that are running on the switch and that have controlling terminals.

- Related Documentation**
- [Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863](#)
  - [Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712](#)
  - *Junos OS System Basics and Services Command Reference*

## Verifying the Member ID, Role, and Neighbor Member Connections of a J-EX4200 or J-EX4500 Virtual Chassis Member

- Purpose** You can designate the role that a member performs within a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis configuration, or you can allow the role to be assigned by default. You can designate the member ID that is assigned to a specific switch by creating a permanent association



between the switch's serial number and a member ID, using a preprovisioned configuration. Or you can let the member ID be assigned by the master, based on the sequence in which the member switch is powered on and on which member IDs are currently available.

The role and member ID of the member switch are displayed on the front-panel LCD.

Each member switch can be cabled to one or two other member switches, using either the dedicated Virtual Chassis ports (VCPs) on the rear panel, an uplink module port that has been configured as a VCP, or an SFP network port that has been configured as a VCP. The members that are cabled together are considered neighbor members.

**Action** To display the role and member ID assignments using the CLI:

```
user@switch> show virtual-chassis status
```

```
Virtual Chassis ID: 0000.e255.00e0
```

Member ID	Status	Serial No	Model	Mastership Priority	Role	Neighbor List ID, Interface
0 (FPC 0)	Prsnt	abc123	ex4200-48t	255	Master*	1 vcp-0 2 vcp-1
1 (FPC 1)	Prsnt	def456	ex4200-24t	255	Backup	2 vcp-0 0 vcp-1
2 (FPC 2)	Prsnt	abd231	ex4200-24t	128	Linecard	0 vcp-0 1 vcp-1

**Meaning** This output verifies that three J-EX4200 switches have been interconnected as a Virtual Chassis configuration through their dedicated VCPs to create a J-EX4200 Virtual Chassis. The display shows which of the VCPs is connected to which neighbor. The first port (**vcp-0**) of member **0** is connected to member **1** and the second port of member **0** (**vcp-1**) is connected to member **2**. The FPC slots for the switches are the same as the member IDs.

The **Mastership Priority** values indicate that the master and backup members have been explicitly configured, because they are not using the default value (**128**).



**NOTE:** This example uses output from a J-EX4200 Virtual Chassis. The output, with the exception of the **Model** column, would be identical on a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis.

**Related Documentation**

- Configuring Mastership of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 844
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863

## Verifying That Virtual Chassis Ports on a J-EX4200 or J-EX4500 Switch Are Operational

**Purpose** Display the status of Virtual Chassis ports (VCPs) in a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis.



**NOTE:** The interfaces for VCPs are not displayed when you issue the `show interfaces ge-` command.

**Action** Display the VCPs:

```
user@switch> show virtual-chassis vc-port all-members
```

fpc0:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	1	vcp-0
vcp-1	Dedicated	2	Up	32000	1	vcp-1
1/0	Configured	3	Up	1000	2	vcp-255/1/0
1/1	Configured	3	Up	1000	2	vcp-255/1/1
1/2	Configured	4	Up	1000	4	vcp-255/0/20
1/3	Configured	4	Up	1000	4	vcp-255/0/21

fpc1:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	0	vcp-0
vcp-1	Dedicated	2	Up	32000	0	vcp-1
1/0	Configured	3	Up	10000	3	vcp-255/1/0
1/1	Configured	3	Up	10000	3	vcp-255/1/1

fpc2:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	3	vcp-0
vcp-1	Dedicated	2	Up	32000	3	vcp-1
1/0	Configured	3	Up	1000	0	vcp-255/1/0
1/1	Configured	3	Up	1000	0	vcp-255/1/1
1/2		-1	Down	1000		
1/3		-1	Down	1000		

fpc3:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
vcp-0	Dedicated	1	Up	32000	2	vcp-0
vcp-1	Dedicated	2	Up	32000	2	vcp-1

```

1/0      Configured      3   Up      10000    1   vcp-255/1/0
1/1      Configured      3   Up      10000    1   vcp-255/1/1

```

fpc4:

```

-----
Interface or PIC / Port   Type           Trunk ID   Status   Speed (mbps)   Neighbor ID   Neighbor Interface
vcp-0                     Dedicated      1          Down     32000
vcp-1                     Dedicated      2          Down     32000
0/20                      Configured     3          Up       1000          0   vcp-255/1/2
0/21                      Configured     3          Up       1000          0   vcp-255/1/3

```

**Meaning** The dedicated VCPs are displayed as **vcp-0** and **vcp-1**. The uplink module interfaces that have been set as uplink VCPs are displayed as **1/0**, **1/1**, **1/2**, and **1/3**. The network interfaces that have been set as VCPs are displayed as **0/20** and **0/21**. The neighbor interface names of uplink and network VCPs are of the form **vcp-255/pic/port**—for example, **vcp-255/1/0**. In that name, **vcp-255** indicates that the interface is a VCP, **1** is the uplink PIC number, and **0** is the port number. The **fpc** number is the same as the member ID. The trunk ID is a positive number ID assigned to the link aggregation group (LAG) formed by the Virtual Chassis. If no LAG is formed, the value is **-1**.



**NOTE:** This example uses output from a J-EX4200 Virtual Chassis. The output would be identical on a J-EX4500 Virtual Chassis or a mixed J-EX4200 and J-EX4500 Virtual Chassis.

**Related Documentation**

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828

## Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics

**Purpose** Use the monitoring functionality to view the following information about J-EX4200 or J-EX4500 member switches and ports in a Virtual Chassis:

- Member details and how members are connected with each other
- Traffic statistics for Virtual Chassis ports of the selected members
- Details of the VCP packet counters

**Action** To view Virtual Chassis monitoring details in the J-Web interface for a J-EX4200 Virtual Chassis, select **Monitor > Virtual Chassis**.



**NOTE:** The J-Web interface is currently not supported for the J-EX4500 Virtual Chassis or for the mixed J-EX4200 and J-EX4500 Virtual Chassis.

To view member details for all members in the CLI, enter the following command:

```
user@switch> show virtual-chassis status
```

To view VCP traffic statistics for a specific member in the CLI, enter the following command:

```
user@switch> show virtual-chassis vc-port statistics member member-id
```

To view the path a packet takes when going from a source interface to a destination interface in a Virtual Chassis configuration using the CLI, enter the following command:

```
user@switch> show virtual-chassis vc-path
```

**Meaning** In the J-Web interface the top half of the screen displays details of the Virtual Chassis configuration, such as:

- Member
- Role
- Interface
- Type
- Speed
- Neighboring Member ID
- Link Status
- Error count

Click the **Stop** button to stop fetching values from the switch, and click the **Start** button to start plotting data again from the point where it was stopped.

To view a graph of the statistics for the selected VCP of the member, click **Show Graph**.

**Refresh Interval (sec)**—Displays the time interval you have set for page refresh.

Click **Clear Statistics** to clear the monitoring statistics for the selected member switch. You can specify the interval at which the member details and statistics must be refreshed.

The bottom half of the screen displays a chart of the Virtual Chassis statistics and the port packet counters.

For details about the output from CLI commands, see the **show virtual-chassis status** and **show virtual-chassis vc-port statistics** command summaries.

**Related Documentation**

- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828

- Verifying the Member ID, Role, and Neighbor Member Connections of a J-EX4200 or J-EX4500 Virtual Chassis Member on page 860

## Verifying the Setting for the Virtual Chassis Mode on J-EX4200 and J-EX4500 Switches

<b>Purpose</b>	You must configure J-EX4200 and J-EX4500 switches into mixed Virtual Chassis mode if you want those switches to act as member switches in a mixed J-EX4200 and J-EX4500 Virtual Chassis. You must also configure a J-EX4200 or J-EX4500 switch out of mixed Virtual Chassis mode if you remove the switch from a mixed Virtual Chassis. You must change the Virtual Chassis mode for all member switches in a Virtual Chassis if all J-EX4200 or J-EX4500 switches are removed from a mixed J-EX4200 and J-EX4500 Virtual Chassis and the Virtual Chassis is no longer mixed.
<b>Action</b>	To display the Virtual Chassis mode of any J-EX4200 or J-EX4500 switch:  <pre>user@switch&gt; show virtual-chassis mode fpc0: ----- Mixed Mode: Disabled</pre>
<b>Meaning</b>	The output indicates that the switch is currently not in mixed Virtual Chassis mode.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li> </ul>

## Verifying the Setting for the PIC Mode on a J-EX4500 Switch in a Virtual Chassis

<b>Purpose</b>	Verify the PIC mode setting for a J-EX4500 switch in a Virtual Chassis.
<b>Action</b>	To verify the current PIC mode setting:  <pre>user@switch&gt; show chassis pic-mode fpc0: ----- Pic Mode: Intraconnect</pre>
<b>Meaning</b>	The output shows that the PIC mode is currently set to Intraconnect. You must set the PIC mode to <b>virtual-chassis</b> if you want the switch to be part of a Virtual Chassis.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li> </ul>

## Verifying That Graceful Routing Engine Switchover Is Working in the J-EX4200 or J-EX4500 Virtual Chassis

<b>Purpose</b>	Verify that graceful Routing Engine switchover (GRES) is working in a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis.
<b>Action</b>	On the master switch, verify the member ID of the backup Routing Engine:

```
{master:0}
user@switch> show virtual-chassis status
Virtual Chassis ID: 5efa.4b7a.aae6

Member ID  Status  Serial No  Model  Mastership  Role  Neighbor List
0 (FPC 0)  Prsnt    BM0208105281  ex4200-24t  255  Master*  1 vcp-0
1 (FPC 1)  Prsnt    BP0208192350  ex4200-48t  255  Backup   0 vcp-0

Member ID for next new member: 2 (FPC 2)
```

1. Connect to the backup Routing Engine:

```
{master:0}
user@switch> request session member 1
```

```
{backup:1}
user@switch>
```

2. Verify that the backup Routing Engine is ready for switchover on member ID 1:

```
{backup:1}
user@switch> show system switchover
```

```
Graceful switchover: On
Configuration database: Ready
Kernel database: Ready
Peer state: Steady State
```

3. Switch the current backup Routing Engine to master Routing Engine:



**NOTE:** You must wait a minimum of 2 minutes between Routing Engine failovers for the Routing Engines to synchronize.

```
{backup:1}
user@switch> request chassis routing-engine master acquire
```

4. Verify that the master and backup Routing Engines have switched roles:



**NOTE:** Member ID 1 is now the master and member ID 0 is now the backup.

```
{master:1}
user@switch> show virtual-chassis status

Virtual Chassis ID: 5efa.4b7a.aae6

List
Member ID  Status  Serial No  Model  Mastership  Role  Neighbor List
0 (FPC 0)  Prsnt    BM0208105281  ex4200-24t  255  Backup   1 vcp-0
1 (FPC 1)  Prsnt    BP0208192350  ex4200-48t  255  Master*  0 vcp-0
```

Member ID for next new member: 2 (FPC 2)

**Meaning** With graceful Routing Engine switchover enabled, when you initiated a switchover from the backup Routing Engine, the backup Routing Engine became the master and the master Routing Engine became the backup.

**Related Documentation**

- Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856





# Troubleshooting J-EX4200 and J-EX4500 Virtual Chassis

- Troubleshooting a J-EX4200 or J-EX4500 Virtual Chassis on page 869

## Troubleshooting a J-EX4200 or J-EX4500 Virtual Chassis

---

This topic describes the following troubleshooting issues for a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis:

- A Disconnected Member Switch's ID Is Not Available for Reassignment on page 869
- Load Factory Default Does Not Commit on a Multimember Virtual Chassis on page 869
- The Member ID Persists When a Member Switch Is Disconnected From a Virtual Chassis on page 870

### A Disconnected Member Switch's ID Is Not Available for Reassignment

**Problem** You disconnected a switch from the Virtual Chassis, but the disconnected switch's member ID is still displayed in the status output. You cannot reassign that member ID to another switch.

**Solution** When you disconnect a member of a Virtual Chassis configuration, the master retains the member ID and member configuration in its configuration database. Output from the **show virtual-chassis status** command continues to display the member ID of the disconnected member with a status of **NotPrsnt**.

If want to permanently disconnect the member switch, you can free up the member ID by using the **request virtual-chassis recycle** command. This will also clear the status of that member.

### Load Factory Default Does Not Commit on a Multimember Virtual Chassis

**Problem** The **load factory default** command fails on a multimember Virtual Chassis.

**Solution** The **load factory default** command is not supported on a multimember Virtual Chassis configuration. For information on how to revert the switches in the Virtual Chassis to factory default settings, see "Reverting to the Default Factory Configuration for the J-EX Series Switch" on page 353.

## The Member ID Persists When a Member Switch Is Disconnected From a Virtual Chassis

**Problem** Gigabit Ethernet interfaces retain their previous slot numbers when a member switch is disconnected from the Virtual Chassis.

**Solution** If a switch had been previously connected as a member of a Virtual Chassis configuration, it retains the member ID that it was assigned as a member of that configuration even after it is disconnected and operating as a standalone switch. The interfaces that were configured while the switch was a member of the Virtual Chassis configuration retain the old member ID as the first digit of the interface name.

For example, if the switch was previously member 1, its interfaces are named **ge-1/0/0** and so on.

To change the switch's member ID, so that its member ID is **0**, and to rename the switch's interfaces accordingly:

1. To change the member ID to 0:

```
user@switch> request virtual-chassis renumber member-id 1 new-member-id 0
```

2. To rename the interfaces to match the new member ID:

```
[edit virtual-chassis]
```

```
user@switch# replace pattern ge-1/ with ge-0/
```

**Related Documentation**

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822
- Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826
- For more information about the **replace** command, see the *Junos OS CLI User Guide* at <http://www.juniper.net/techpubs/software/junos/index.html>.

# Configuration Statements for J-EX4200 and J-EX4500 Virtual Chassis

- [\[edit virtual-chassis\] Configuration Statement Hierarchy on page 871](#)

## [\[edit virtual-chassis\] Configuration Statement Hierarchy](#)

---

```

virtual-chassis {
  auto-sw-update {
    package-name package-name;
  }
  fast-failover (ge | vcp disable | xe);
  id id;
  mac-persistence-timer seconds;
  member member-id {
    location location
    mastership-priority number;
    no-management-vlan;
    serial-number;
    role;
  }
  no-split-detection;
  preprovisioned;
  traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable> <match
      regex>;
    flag flag ;
  }
}

```

### Related Documentation

- [Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736](#)
- [Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762](#)
- [Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788](#)
- [Configuring a J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\) on page 822](#)
- [J-EX4200 and J-EX4500 Virtual Chassis Overview on page 709](#)

## auto-sw-update

---

<b>Syntax</b>	auto-sw-update { package-name <i>package-name</i> ; }
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Enable the automatic software update feature for Virtual Chassis configurations.  The remaining statement is explained separately.
<b>Default</b>	The automatic software update feature is disabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818</li><li>• Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure) on page 855</li></ul>

## fast-failover

---

<b>Syntax</b>	fast-failover (ge   vcp disable   xe);
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>(J-EX4200 Virtual Chassis) Enable the fast failover feature on all SFP uplink module Virtual Chassis ports (VCPs), or disable the fast failover feature on all dedicated VCPs in a ring topology.</p> <p>Fast failover is not supported on a mixed J-EX4200 and J-EX4500 Virtual Chassis or a J-EX4500 Virtual Chassis.</p>
<b>Default</b>	Fast failover is enabled on dedicated VCPs; it is not enabled on uplink module VCPs.
<b>Options</b>	<ul style="list-style-type: none"> <li>• <b>ge</b>—Enable fast failover on all Gigabit Ethernet uplink module VCPs in the ring.</li> <li>• <b>vcp disable</b>—Disable fast failover on all dedicated VCPs in the ring.</li> <li>• <b>xe</b>—Enable fast failover on all 10-Gigabit Ethernet uplink module VCPs in the ring.</li> </ul>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804</li> <li>• Configuring Fast Failover in a J-EX4200 Virtual Chassis on page 853</li> <li>• Disabling Fast Failover in a J-EX4200 Virtual Chassis on page 854</li> </ul>

## graceful-switchover

---

<b>Syntax</b>	<code>graceful-switchover;</code>
<b>Hierarchy Level</b>	<code>[edit chassis redundancy]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For switches with more than one Routing Engine, including those in a Virtual Chassis, configure the master Routing Engine to switch over gracefully to a backup Routing Engine without interruption to packet forwarding.
<b>Default</b>	Graceful Routing Engine switchover (GRES) is disabled.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941</li><li>• Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856</li><li>• Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure) on page 948</li></ul>

## id

---

<b>Syntax</b>	<code>id id;</code>
<b>Hierarchy Level</b>	<code>[edit virtual-chassis]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the alphanumeric string that identifies a Virtual Chassis configuration.
<b>Options</b>	<code>id</code> —Virtual Chassis ID (VCID), which uses the ISO family address format—for example, <code>9622.6ac8.5345</code> .
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807</li><li>• Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge (CLI Procedure) on page 855</li></ul>

## location

---

<b>Syntax</b>	<code>location <i>location</i>;</code>
<b>Hierarchy Level</b>	[edit virtual-chassis member <i>member-id</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	<p>Set a description of the location of the Virtual Chassis member switch or external Routing Engine.</p> <p>The <b>Location</b> field is visible to users who enter the <b>show virtual-chassis status detail</b> command.</p> <p>Setting this description has no effect on the operation of the Virtual Chassis member.</p>
<b>Options</b>	<b>location</b> —Location of the current member switch or external Routing Engine. The <b>location</b> can be any single word.
<b>Required Privilege Level</b>	<b>system</b> —To view this statement in the configuration. <b>system-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788</li><li>• Example: Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis in a Single Wiring Closet</li><li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li><li>• Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li></ul>

## mac-persistence-timer

---

<b>Syntax</b>	<code>mac-persistence-timer <i>minutes</i>;</code>
<b>Hierarchy Level</b>	<code>[edit virtual-chassis]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>If the master is physically disconnected or removed from the Virtual Chassis configuration, the MAC persistence timer determines how long the backup (new master) continues to use the address of the old master. When the MAC persistence timer expires, the backup (new master) begins to use its own MAC address.</p> <p>There are no minimum or maximum timer limits.</p>
<b>Default</b>	10 minutes
<b>Options</b>	<i>minutes</i> —Time in minutes that the member switch in the backup role continues to use the address of the old master before using its own MAC address after the switch in the master role is physically disconnected or removed from the Virtual Chassis.
<b>Required Privilege Level</b>	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Timer for the Backup Member to Start Using Its Own MAC Address, as Master of the J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852</li><li>• Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712</li></ul>



## mastership-priority

---

<b>Syntax</b>	<code>mastership-priority <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit virtual-chassis member <i>member-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches. Mastership priority option <b>0</b> introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	<p>(On J-EX4200 and J-EX4500 Virtual Chassis only) The mastership priority value is the most important factor in determining the role of the member switch within the Virtual Chassis configuration. Other factors (see “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717) also affect the election of the master.</p> <p>The mastership priority value takes the highest precedence in the master election algorithm. The member switch with highest mastership priority becomes the master of the Virtual Chassis configuration. Toggling back and forth between master and backup status in failover conditions is undesirable, so we recommend that you assign the same mastership priority value to both the master and the backup. Secondary factors in the master election algorithm determine which of these two members (that is, the two members that are assigned the highest mastership priority value) functions as the master of the Virtual Chassis configuration.</p> <p>A switch with a mastership priority of <b>0</b> never takes the master or backup role.</p>
<b>Default</b>	128
<b>Options</b>	<p><i>number</i>—Mastership priority value.</p> <p><b>Range:</b> 0 through 255</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736</li> <li>• Example: Configuring a J-EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets on page 762</li> <li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li> </ul>

## member

---

<b>Syntax</b>	<pre>member <i>member-id</i> {   location <i>location</i>   mastership-priority <i>number</i>;   no-management-vlan;   serial-number;   role; }</pre>
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a J-EX4200 or J-EX4500 switch as a member of a Virtual Chassis configuration.
<b>Default</b>	When a J-EX4200 or J-EX4500 is powered on as a standalone switch (not interconnected through its Virtual Chassis ports (VCPs) with other switches), its default member ID is 0.
<b>Options</b>	<p><i>member-id</i>—Identifies a specific member switch of a Virtual Chassis configuration.</p> <p><b>Range:</b> 0 through 9</p> <p>In a J-EX4200 or J-EX4500 Virtual Chassis, each switch has a member ID between 0 and 9.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788</li><li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li></ul>

## no-management-vlan

---

<b>Syntax</b>	no-management-vlan;
<b>Hierarchy Level</b>	[edit virtual-chassis member <i>member-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Remove the specified member's out-of-band management port from the Virtual Management Ethernet (VME) global management VLAN of the Virtual Chassis configuration.</p> <p>For a member that is functioning in a linecard role, you can use this configuration to reserve the member's management Ethernet port for local troubleshooting:</p> <pre>virtual-chassis {   member 2 {     no-management-vlan;   } }</pre> <p>You cannot configure the IP address for a local management Ethernet port using the CLI or the J-Web interface. To do this, you need to use the shell <b>ifconfig</b> command.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Example: Setting Up a Multimember J-EX4200 Virtual Chassis Access Switch with a Default Configuration on page 757</li> <li>• Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 852</li> <li>• Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis on page 718</li> </ul>

## no-split-detection

---

<b>Syntax</b>	no-split-detection;
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable the split and merge feature in a Virtual Chassis configuration.
<b>Default</b>	The split and merge feature is enabled.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 Virtual Chassis Merge on page 807</li><li>• Disabling Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 854</li><li>• Assigning the Virtual Chassis ID to Determine Precedence During a J-EX4200 or J-EX4500 Virtual Chassis Merge (CLI Procedure) on page 855</li><li>• Understanding Split and Merge in a J-EX4200 or J-EX4500 Virtual Chassis on page 731</li></ul>

## package-name

---

<b>Syntax</b>	<code>package-name <i>package-name</i>;</code>
<b>Hierarchy Level</b>	[edit virtual-chassis auto-sw-update]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Specify the software package name or location of the software package to be used by the automatic software update feature for Virtual Chassis configurations.
<b>Default</b>	No package name is specified.
<b>Options</b>	<p><i>package-name</i>—Name of the software package or the URL to the software package to be used.</p> <ul style="list-style-type: none"> <li>If the software package is located on a local directory on the switch, use the following format for <i>package-name</i>: <i>/pathname/package-name</i></li> <li>If the software package is to be downloaded and installed from a remote location, use one of the following formats: <i>ftp://hostname/pathname/package-name</i> <i>ftp://username:prompt@ftp.hostname.net/package-name</i> <i>http://hostname/pathname/package-name</i></li> </ul>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Example: Configuring Automatic Software Update on J-EX4200 Virtual Chassis Member Switches on page 818</li> <li>Configuring Automatic Software Update on J-EX4200 or J-EX4500 Virtual Chassis Member Switches (CLI Procedure) on page 855</li> </ul>

## preprovisioned

---

<b>Syntax</b>	preprovisioned;
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Enable the preprovisioned configuration mode for a Virtual Chassis configuration.</p> <p>When the preprovisioned configuration mode is enabled for a J-EX4200 or J-EX4500 Virtual Chassis, you cannot use the CLI or the J-Web interface to change the mastership priority or member ID of member switches.</p> <p>A preprovisioned configuration is highly recommended for a mixed J-EX4200 and J-EX4500 Virtual Chassis.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788</li><li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li><li>• Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832</li><li>• Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841</li></ul>

---

## redundancy (Graceful Switchover)

---

<b>Syntax</b>	<pre>redundancy {     graceful-switchover; }</pre>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>For J-EX4200 and J-EX4500 switches configured as a Virtual Chassis and for J-EX8200 switches with more than one Routing Engine, enable redundant Routing Engines.</p> <p>The remaining statement is explained separately.</p>
<b>Default</b>	Redundancy is enabled for the Routing Engines.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856</li></ul>

## role

---

**Syntax** role (line-card | routing-engine);

**Hierarchy Level** [edit virtual-chassis preprovisioned member *member-id*]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** (J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, and mixed J-EX4200 and J-EX4500 Virtual Chassis) Specify the role to be performed by each member switch. Associate the role permanently with the member's serial number.

When you use a preprovisioned configuration, you cannot modify the mastership priority or member ID of member switches through the user interfaces. The mastership priority value is generated by the software, based on the assigned role:

- A member configured as **routing-engine** is assigned the mastership priority **129**.
- A member configured as **line-card** is assigned the mastership priority **0**.
- A member listed in the preprovisioned configuration without an explicitly specified role is assigned the mastership priority **128**.

The configured role specifications are permanent. If both **routing-engine** members fail, a **line-card** member cannot take over as master of the Virtual Chassis configuration. You must delete the preprovisioned configuration to change the specified roles in a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis.

Explicitly configure two members as **routing-engine** and configure additional switches as members of the preprovisioned Virtual Chassis by specifying only their serial numbers in a J-EX4200 Virtual Chassis. If you do not explicitly configure the role of the additional members, they function in a linecard role by default. In that case, a member that is functioning in a linecard role can take over mastership if the members functioning as master and backup (routing-engine role) both fail.

In a mixed J-EX4200 and J-EX4500 Virtual Chassis, the J-EX4500 switches must be assigned the **routing-engine** role and the J-EX4200 switches must be assigned the **line-card** role.

**Options**

- **line-card**—Enables the member to be eligible to function only in the linecard role. Any member of the Virtual Chassis configuration other than the master or backup functions in the linecard role and runs only a subset of Junos OS for J-EX Series switches. A member functioning in the linecard role does not run the control protocols or the chassis management processes.

A J-EX4200 or J-EX4500 Virtual Chassis configuration must have at least three members in order to include a member that functions in the linecard role.

- **routing-engine**—Enables the member to function as a master or backup of the Virtual Chassis configuration. The master manages all members of the Virtual Chassis configuration and runs the chassis management processes and control protocols. The



backup synchronizes with the master in terms of protocol states, forwarding tables, and so forth, so that it is prepared to preserve routing information and maintain network connectivity without disruption in case the master is unavailable.

(J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, and mixed J-EX4200 and J-EX4500 Virtual Chassis) Specify two and only two members as **routing-engine**. The software determines which of the two members assigned the **routing-engine** role functions as master, based on the master election algorithm. See “Understanding How the Master in a J-EX4200 or J-EX4500 Virtual Chassis Is Elected” on page 717. In a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis, the **routing-engine** role is associated with a switch.


<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788</li><li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li><li>• Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826</li><li>• Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832</li><li>• Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841</li></ul>

## serial-number

---

<b>Syntax</b>	<code>serial-number serial-number;</code>
<b>Hierarchy Level</b>	[edit virtual-chassis preprovisioned member <i>member-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	In a preprovisioned J-EX4200 or J-EX4500 Virtual Chassis, specify the serial number of each member switch to be included in the Virtual Chassis configuration. If you do not include the serial number within the Virtual Chassis configuration, the switch cannot be recognized as a member of a preprovisioned configuration.
<b>Options</b>	<i>serial-number</i> —Permanent serial number for the external Routing Engine or for the member switch.
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring a J-EX4200 Virtual Chassis Using a Preprovisioned Configuration File on page 788</li><li>• Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822</li><li>• Configuring a J-EX4200 Virtual Chassis (J-Web Procedure) on page 826</li><li>• Adding a New Switch to an Existing J-EX4200 Virtual Chassis (CLI Procedure) on page 832</li><li>• Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841</li></ul>

## traceoptions

<b>Syntax</b>	<pre> traceoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;no-stamp&gt; &lt;replace&gt; &lt;size <i>size</i>&gt; &lt;world-readable     no-world-readable&gt;;   flag <i>flag</i> &lt;detail&gt; &lt;disable&gt; &lt;receive&gt; &lt;send&gt;; } </pre>
<b>Hierarchy Level</b>	[edit virtual-chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Define tracing operations for the Virtual Chassis configuration.
<b>Default</b>	Tracing operations are disabled.
<b>Options</b>	<p><b>detail</b>—(Optional) Generate detailed trace information for a flag.</p> <p><b>disable</b>—(Optional) Disable a flag.</p> <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b><i>trace-file</i></b> reaches its maximum size, it is renamed <b><i>trace-file.0</i></b>, then <b><i>trace-file.1</i></b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li><b>all</b>—All tracing operations.</li> </ul> <hr/> <p> <b>TIP:</b> The <b>all</b> flag displays a subset of logs that are useful in debugging most issues. For more detailed information, use <b>all detail</b>.</p> <hr/> <ul style="list-style-type: none"> <li><b>auto-configuration</b>—Trace Virtual Chassis ports (VCPs) that have been automatically configured.</li> <li><b>csn</b>—Trace Virtual Chassis complete sequence number (CSN) packets.</li> <li><b>error</b>—Trace Virtual Chassis errored packets.</li> <li><b>hello</b>—Trace Virtual Chassis hello packets.</li> <li><b>krt</b>—Trace Virtual Chassis KRT events.</li> <li><b>lsp</b>—Trace Virtual Chassis link-state packets.</li> </ul>

- **lsp-generation**—Trace Virtual Chassis link-state packet generation.
- **me**—Trace Virtual Chassis ME events.
- **normal**—Trace normal events.
- **packets**—Trace Virtual Chassis packets.
- **parse**—Trace reading of the configuration.
- **psn**—Trace partial sequence number (PSN) packets.
- **route**—Trace Virtual Chassis routing information.
- **spf**—Trace Virtual Chassis SPF events.
- **state**—Trace Virtual Chassis state transitions.
- **task**—Trace Virtual Chassis task operations.

**no-stamp**—(Optional) Do not place a timestamp on any trace file.

**no-world-readable**—(Optional) Restrict file access to the user who created the file.

**receive**—(Optional) Trace received packets.

**replace**—(Optional) Replace a trace file rather than appending information to it.

**send**—(Optional) Trace transmitted packets.

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches its maximum size, it is renamed **trace-file.0**, then **trace-file.1**, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the **files** option.

**Syntax:** **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

**Range:** 10 KB through 1 GB

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

**Required Privilege Level**

system	—To view this statement in the configuration.
system-control	—To add this statement to the configuration.

**Related Documentation**

- Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863
- Verifying the Member ID, Role, and Neighbor Member Connections of a J-EX4200 or J-EX4500 Virtual Chassis Member on page 860
- Verifying That Virtual Chassis Ports on a J-EX4200 or J-EX4500 Switch Are Operational on page 862
- Troubleshooting a J-EX4200 or J-EX4500 Virtual Chassis on page 869

## virtual-chassis

```

Syntax  virtual-chassis {
            auto-sw-update {
                package-name package-name;
            }
            fast-failover (ge | vcp disable | xe);
            id id;
            mac-persistence-timer seconds;
            member member-id {
                mastership-priority number;
                no-management-vlan;
                serial-number;
                role;
            }
            no-split-detection;
            preprovisioned;
            traceoptions {
                file filename <files number> <size size> <world-readable | no-world-readable> <match
                    regex>;
                flag flag ;
            }
        }
  
```

**Hierarchy Level** [edit]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure Virtual Chassis information.

The remaining statements are explained separately.

**Default** A standalone J-EX4200 or J-EX4500 switch is a Virtual Chassis by default. It has a default member ID of 0, a default mastership priority of 128, and a default role as master.

**Required Privilege Level** system—To view this statement in the configuration.  
system-control—To add this statement to the configuration.

**Related Documentation**

- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 822



CHAPTER 43

# Operational Commands for J-EX4200 and J-EX4500 Virtual Chassis

## clear virtual-chassis vc-port statistics

<b>Syntax</b>	clear virtual-chassis vc-port statistics <all-members> < <i>interface-name</i> > <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Clear—reset to zero (0)—the traffic statistics counters on Virtual Chassis ports (VCPs).
<b>Options</b>	<p>none—Clear traffic statistics for VCPs of all members of a Virtual Chassis configuration.</p> <p>all-members—(Optional) Clear traffic statistics for VCPs of all members of a Virtual Chassis configuration.</p> <p><i>interface-name</i>—(Optional) Clear traffic statistics for the specified VCP.</p> <p>local—(Optional) Clear traffic statistics for VCPs from the switch or external Routing Engine on which this command is entered.</p> <p>member <i>member-id</i>—(Optional) Clear traffic statistics for VCPs from the specified member of a Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show virtual-chassis vc-port statistics on page 917</a></li> <li>• <a href="#">show virtual-chassis vc-port on page 914</a></li> <li>• <a href="#">Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</a></li> </ul>
<b>List of Sample Output</b>	<p><a href="#">clear virtual-chassis vc-port statistics (J-EX4200 Virtual Chassis) on page 892</a></p> <p><a href="#">clear virtual-chassis vc-port statistics member 3 on page 892</a></p>

### Sample Output

```
clear virtual-chassis vc-port statistics (J-EX4200 Virtual Chassis)
user@switch> clear virtual-chassis vc-port statistics
fpc0:
-----
Statistics cleared
```

```
clear virtual-chassis vc-port statistics member 3
user@switch> clear virtual-chassis vc-port statistics member 3
Cleared statistics on member 3
```



## request chassis pic-mode

<b>Syntax</b>	<pre>request chassis pic-mode (intraconnect   virtual-chassis) &lt;all-members&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt;</pre>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	<p>Set the PIC mode on a J-EX4500 switch.</p> <p>The PIC mode must be set to <b>virtual-chassis</b> if the J-EX4500 switch is part of a Virtual Chassis. The PIC mode must be set to <b>intraconnect</b> if the J-EX4500 switch is not part of a Virtual Chassis.</p> <p>The default PIC mode setting is <b>virtual-chassis</b> if the J-EX4500 switch was shipped with a Virtual Chassis module.</p> <p>The PIC mode is not set if the J-EX4500 switch was sent without the Virtual Chassis module. The J-EX4500 switch functions in <b>intraconnect</b> mode when the PIC mode is not set.</p> <p>Use the <b>show chassis pic-mode</b> command to verify the current PIC mode setting.</p> <p>The PIC mode setting is maintained through reboots even though it is set in operational mode.</p>
<b>Options</b>	<p><b>intraconnect</b>—Set the PIC mode to intraconnect.</p> <p><b>virtual-chassis</b>—Set the PIC mode to Virtual Chassis.</p> <p><b>none</b>—Set the PIC mode on the member switch where the command is issued.</p> <p><b>all-members</b>—(Optional) Set the PIC mode for all members of the Virtual Chassis configuration.</p> <p><b>local</b>—(Optional) Set the PIC mode on the member switch where the command is issued.</p> <p><b>member <i>member-id</i></b>—(Optional) Set the PIC mode of the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Verifying the Setting for the PIC Mode on a J-EX4500 Switch in a Virtual Chassis on page 865</li> <li>Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li> <li>Adding a J-EX4500 Switch to a Preprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 838</li> </ul>

- Adding a J-EX4500 Switch to a Nonprovisioned J-EX4200 Virtual Chassis (CLI Procedure) on page 840

**List of Sample Output**    **request chassis pic-mode virtual-chassis on page 894**  
**request chassis pic-mode intraconnect on page 894**

### Sample Output

```
request chassis pic-mode virtual-chassis user@switch> request chassis pic-mode virtual-chassis
pic-mode
virtual-chassis

request chassis pic-mode intraconnect user@switch> request chassis pic-mode intraconnect
pic-mode intraconnect
```

## request session member

---

<b>Syntax</b>	<code>request session member <i>member-id</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Start a session with the specified member of a Virtual Chassis configuration.
<b>Options</b>	<i>member-id</i> —Member ID for the specific member of the Virtual Chassis configuration.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">member on page 878</a></li><li>• <a href="#">Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712</a></li></ul>

## request virtual-chassis mode mixed

<b>Syntax</b>	<pre>request virtual-chassis mode mixed &lt;all-members&gt; &lt;disable&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt;</pre>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	<p>Configure a J-EX4200 or J-EX4500 switch as a member of a mixed J-EX4200 and J-EX4500 Virtual Chassis.</p> <p>Entering this command on each member switch in a mixed J-EX4200 and J-EX4500 Virtual Chassis is a requirement. A switch that is cabled into a mixed J-EX4200 and J-EX4500 Virtual Chassis is not recognized by the Virtual Chassis until this command is entered.</p> <p>To avoid potential traffic disruptions and configuration issues, we recommend entering this command and rebooting the member switch before cabling it into the mixed J-EX4200 and J-EX4500 Virtual Chassis if you are cabling a mixed J-EX4200 and J-EX4500 for the first time. The command can be entered after cabling the switch into the mixed J-EX4200 and J-EX4500 Virtual Chassis, however.</p> <p>The switch or switches must be rebooted for this command to take effect.</p> <p>The Virtual Chassis mode setting is maintained through reboots even though it is set in operational mode.</p>
<b>Options</b>	<p>none—Set the Virtual Chassis mode to mixed on the member switch where the command is issued.</p> <p>all-members—(Optional) Set the Virtual Chassis mode to mixed for all members of the Virtual Chassis configuration.</p> <p>disable—Disable the Virtual Chassis mixed mode setting if it was previously enabled.</p> <p>local—(Optional) Set the Virtual Chassis mode to mixed on the member switch where the command is issued.</p> <p>member <i>member-id</i>—(Optional) Set the Virtual Chassis mode to mixed on the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	system-control
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li> <li>Verifying the Member ID, Role, and Neighbor Member Connections of a J-EX4200 or J-EX4500 Virtual Chassis Member on page 860</li> </ul>

List of Sample Output    request virtual-chassis mode mixed on page 897

### Sample Output

```
request virtual-chassis mode mixed
user@switch> request virtual-chassis mode mixed
```

## request virtual-chassis recycle

---

**Syntax** `request virtual-chassis recycle member-id member-id`

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Make a previously used member ID available for reassignment.

When you remove a member switch from the Virtual Chassis configuration, the master reserves that member ID. To make the member ID available for reassignment, you must use this command.



**NOTE:** You must run this command from the Virtual Chassis member in the master role.

**Options** `member-id member-id`—Specify the member ID that you want to make available for reassignment to a different member.

**Required Privilege Level** system-control

**Related Documentation**


- [request virtual-chassis renumber on page 899](#)
- [Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration \(CLI Procedure\) on page 841](#)

**List of Sample Output** [request virtual-chassis recycle member-id 3 on page 898](#)

### Sample Output

```
request virtual-chassis recycle member-id 3
user@switch> request virtual-chassis recycle member-id 3
```

## request virtual-chassis renumber

<b>Syntax</b>	<code>request virtual-chassis renumber member-id <i>old-member-id</i> new-member-id <i>new-member-id</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Renumber a member of a Virtual Chassis configuration.
	 <b>NOTE:</b> You must run this command from the Virtual Chassis member in the master role.
<b>Options</b>	<p><code>member-id <i>old-member-id</i></code>—Specify the ID of the member that you wish to renumber.</p> <p><code>new-member-id <i>new-member-id</i></code>—Specify an unassigned member ID (from 0 through 9).</p>
<b>Required Privilege Level</b>	system-control
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request virtual-chassis recycle on page 898</a></li> <li>• <a href="#">Replacing a Member Switch of a J-EX4200 or J-EX4500 Virtual Chassis Configuration (CLI Procedure) on page 841</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request virtual-chassis renumber member-id 5 new-member-id 4 on page 899</a>
<b>Sample Output</b>	<pre>user@switch&gt; request virtual-chassis renumber member-id 5 new-member-id 4 5 new-member-id 4</pre>

## request virtual-chassis vc-port

<b>Syntax</b>	<code>request virtual-chassis vc-port set   delete pic-slot <i>pic-slot</i> port <i>port-number</i> &lt;member <i>member-id</i>&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Enable or disable an uplink module port (on an SFP or SFP+ uplink module) or an SFP network port as a Virtual Chassis port (VCP).</p> <p>If you omit <b>member <i>member-id</i></b>, this command defaults to enabling or disabling the uplink VCP or SFP network port configured as a VCP on the switch where the command is issued.</p>
<b>Options</b>	<p><code>pic-slot <i>pic-slot</i></code>—Number of the PIC slot for the uplink module port or SFP network port on the switch.</p> <p><code>port <i>port-number</i></code>—Number of the uplink module port or SFP network port that is to be enabled or disabled as a VCP.</p> <p><code>member <i>member-id</i></code>—(Optional) Enable or disable the specified VCP on the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	system-control
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>request virtual-chassis vc-port on page 901 (dedicated port)</li> <li>show virtual-chassis vc-port on page 914</li> <li>show virtual-chassis vc-port statistics on page 917</li> <li>clear virtual-chassis vc-port statistics on page 892</li> <li>Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712</li> </ul>
<b>List of Sample Output</b>	<p>request virtual-chassis vc-port set pic-slot 1 port 0 on page 900</p> <p>request virtual-chassis vc-port set pic-slot 1 port 1 member 3 on page 900</p> <p>request virtual-chassis vc-port delete pic-slot 1 port 1 member 3 on page 900</p>

### Sample Output

<b>request virtual-chassis vc-port set pic-slot 1 port 0</b>	<pre>user@switch&gt; request virtual-chassis vc-port set pic-slot 1 port 0</pre> <p>To check the results of this command, use the <b>show virtual-chassis vc-port</b> command.</p>
<b>request virtual-chassis vc-port set pic-slot 1 port 1 member 3</b>	<pre>user@switch&gt; request virtual-chassis vc-port set pic-slot 1 port 1 member 3</pre> <p>To check the results of this command, use the <b>show virtual-chassis vc-port</b> command.</p>
<b>request virtual-chassis vc-port delete pic-slot 1 port 1 member 3</b>	<pre>user@switch&gt; request virtual-chassis vc-port delete pic-slot 1 port 1 member 3</pre> <p>To check the results of this command, use the <b>show virtual-chassis vc-port</b> command.</p>



## request virtual-chassis vc-port

<b>Syntax</b>	<code>request virtual-chassis vc-port set interface <i>vcp-interface-name</i> &lt;member <i>member-id</i>&gt; &lt;disable&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Disable or enable a Virtual Chassis port (VCP) on a dedicated VCP on a J-EX4200 or J-EX4500 switch.
<b>Options</b>	<p><code>interface <i>vcp-interface-name</i></code>—Name of the interface to enable or disable.</p> <p>If you omit <b>member <i>member-id</i></b> in a J-EX4200 Virtual Chassis, J-EX4500 Virtual Chassis, or mixed J-EX4200 and J-EX4500 Virtual Chassis, this command defaults to disabling or enabling the dedicated VCP on the switch where the command is issued. The dedicated VCPs are enabled in the factory default configuration.</p> <p><code>member <i>member-id</i></code>—(Optional on J-EX4200 and J-EX4500 switches) Enable or disable the specified VCP on the specified member of the Virtual Chassis configuration.</p> <p><code>disable</code>—(Optional) Disable the specified VCP. If you omit this keyword, the command enables the dedicated VCP.</p>
<b>Required Privilege Level</b>	system-control
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request virtual-chassis vc-port on page 900</a></li> <li>• <a href="#">show virtual-chassis vc-port on page 914</a></li> <li>• <a href="#">show virtual-chassis vc-port statistics on page 917</a></li> <li>• <a href="#">clear virtual-chassis vc-port statistics on page 892</a></li> <li>• <a href="#">Understanding J-EX4200 and J-EX4500 Virtual Chassis Components on page 712</a></li> </ul>
<b>List of Sample Output</b>	<code>request virtual-chassis vc-port set interface vcp-0 disable (J-EX4200 Virtual Chassis) on page 901</code>

### Sample Output

<code>request virtual-chassis vc-port set interface vcp-0 disable (J-EX4200 Virtual Chassis)</code>	<pre>user@switch&gt; request virtual-chassis vc-port set interface vcp-0 disable</pre> <p>To check the results of this command, use the <code>show virtual-chassis vc-port</code> command.</p>
---	--

## show chassis pic-mode

---

<b>Syntax</b>	<code>show chassis pic-mode</code> <code>&lt;all-members&gt;</code> <code>&lt;local&gt;</code> <code>&lt;member <i>member-id</i>&gt;</code>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	<p>Display the PIC mode on a J-EX4500 switch.</p> <p>The PIC mode must be set to <b>virtual-chassis</b> if the J-EX4500 switch is part of a Virtual Chassis. The PIC mode must be set to <b>intraconnect</b> if the J-EX4500 switch is not part of a Virtual Chassis.</p> <p>The default PIC mode setting is <b>virtual-chassis</b> if the J-EX4500 switch was shipped with a Virtual Chassis module.</p> <p>The PIC mode is not set if the J-EX4500 switch was ordered without the Virtual Chassis module. The J-EX4500 switch functions in <b>intraconnect</b> mode when the PIC mode is not set.</p> <p>Use the <b>request chassis pic-mode</b> command to configure the PIC mode setting.</p>
<b>Options</b>	<p><code>none</code>—Display the PIC mode on the member switch where the command is issued.</p> <p><code>all-members</code>—(Optional) Display the PIC mode for all members of the Virtual Chassis configuration.</p> <p><code>local</code>—(Optional) Display the PIC mode on the member switch where the command is issued.</p> <p><code>member <i>member-id</i></code>—(Optional) Display the PIC mode of the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request chassis pic-mode on page 893</a></li> <li>• <a href="#">Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show chassis pic-mode on page 902</a>

### Sample Output

```

show chassis pic-mode  user@switch> show chassis pic-mode
                        fpc0:
                        -----
                        Pic Mode: Intraconnect

```

## show system uptime

<b>Syntax</b>	<code>show system uptime (all-members   member <i>member-id</i>)</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the current time and information about how long the Virtual Chassis, the Junos OS software, and routing protocols have been running.
<b>Options</b>	<p><b>all-members</b>—Display the current time and information about how long the Virtual Chassis, the Junos OS software, and routing protocols have been running for all the member switches of the Virtual Chassis configuration.</p> <p><b>member <i>member-id</i></b>—Display the current time and information about how long the Virtual Chassis, the Junos OS software, and routing protocols have been running for the specific member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">virtual-chassis on page 889</a></li> <li>• <a href="#">Monitoring System Properties on page 578</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show system uptime member 0 on page 904</a>
<b>Output Fields</b>	Table 135 on page 903 lists the output fields for the <code>show system uptime</code> command. Output fields are listed in the approximate order in which they appear.

**Table 135: show system uptime Output Fields**

Field Name	Field Description
<b>Current time</b>	Current system time in UTC.
<b>System booted</b>	Date and time when the switch was last booted and how long it has been running.
<b>Protocols started</b>	Date and time when the routing protocols were last started and how long they have been running.
<b>Last configured</b>	Date and time when a configuration was last committed. Also shows the name of the user who issued the last commit command.
<b>Time and up</b>	Current time, in the local time zone, and how long the switch has been operational.
<b>Users</b>	Number of users logged into the switch.
<b>Load averages</b>	Load averages for the last 1 minute, 5 minutes, and 15 minutes.

## Sample Output

```
show system uptime member 0 user@switch>show system uptime member 0
member 0 fpc0:
-----
Current time: 2008-02-06 05:24:20 UTC
System booted: 2008-01-31 08:26:54 UTC (5d 20:57 ago)
Protocols started: 2008-01-31 08:27:56 UTC (5d 20:56 ago)
Last configured: 2008-02-05 03:26:43 UTC (1d 01:57 ago) by root
5:24AM up 5 days, 20:57, 1 user, load averages: 0.14, 0.06, 0.01
```

## show virtual-chassis active-topology

<b>Syntax</b>	show virtual-chassis active-topology <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the active topology of the Virtual Chassis configuration with next-hop reachability information.
<b>Options</b>	<p>none—Display the active topology of the member switch where the command is issued.</p> <p>all-members—(Optional) Display the active topology of all members of the Virtual Chassis configuration.</p> <p>local—(Optional) Display the active topology of the switch or external Routing Engine on which this command is entered.</p> <p>member <i>member-id</i>—(Optional) Display the active topology of the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</li> <li>Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723</li> </ul>
<b>List of Sample Output</b>	<a href="#">show virtual-chassis active-topology (J-EX4200 Virtual Chassis) on page 905</a>
<b>Output Fields</b>	Table 136 on page 905 lists the output fields for the <b>show virtual-chassis active-topology</b> command. Output fields are listed in the approximate order in which they appear.

**Table 136: show virtual-chassis active-topology Output Fields**

Field Name	Field Description
Destination ID	Specifies the member ID of the destination.
Next-hop	Specifies the member ID and Virtual Chassis port (VCP) of the next hop to which packets for the destination ID are forwarded.

### Sample Output

```

show virtual-chassis active-topology (J-EX4200 Virtual Chassis)
user@switch> show virtual-chassis active-topology
1                               1(vcp-1)
2                               1(vcp-1)

```

3	1(vcp-1)
4	1(vcp-1)
5	8(vcp-0) 1(vcp-1)
6	8(vcp-0)
7	8(vcp-0)
8	8(vcp-0)

## show virtual-chassis fast-failover

**Syntax** `show virtual-chassis fast-failover`

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Display information about the fast failover feature in a Virtual Chassis configuration.

**Required Privilege Level** view

**Related Documentation**

- Example: Configuring Fast Failover on Uplink Module VCPs to Reroute Traffic When a J-EX4200 Virtual Chassis Switch or Intermember Link Fails on page 804
- Configuring Fast Failover in a J-EX4200 Virtual Chassis on page 853
- Disabling Fast Failover in a J-EX4200 Virtual Chassis on page 854

**List of Sample Output** [show virtual-chassis fast-failover on page 907](#)

**Output Fields** Table 137 on page 907 lists the output fields for the `show virtual-chassis fast-failover` command. Output fields are listed in the approximate order in which they appear.

**Table 137: show virtual-chassis fast-failover Output Fields**

Field Name	Field Description
Fast failover on dedicated VCP ports	Indicates fast failover status on dedicated VCPs.
Fast failover on XE uplink VCP ports	Indicates fast failover status on SFP+ uplink module VCPs.
Fast failover on GE uplink VCP ports	Indicates fast failover status on SFP uplink module VCPs.

## Sample Output

```

user@switch1> show virtual-chassis fast-failover
Fast failover on dedicated VCP ports: Enabled
Fast failover on XE uplink VCP ports: Disabled
Fast failover on GE uplink VCP ports: Enabled

```

## show virtual-chassis mode

<b>Syntax</b>	<code>show virtual-chassis mode</code> <code>&lt;all-members&gt;</code> <code>&lt;local&gt;</code> <code>&lt;member <i>member-id</i>&gt;</code>
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Display the Virtual Chassis mixed mode status.  A J-EX4200 or J-EX4500 switch must have mixed mode enabled if it is part of a mixed J-EX4200 and J-EX4500 Virtual Chassis. Mixed mode must be disabled for the switch in all other contexts.
<b>Options</b>	<p><code>none</code>—Display the Virtual Chassis mixed mode status on the switch where the command is entered.</p> <p><code>all-members</code>—(Optional) Display the Virtual Chassis mixed mode status for all member switches in the Virtual Chassis.</p> <p><code>local</code>—(Optional) Display the Virtual Chassis mixed mode status on the switch where the command is entered.</p> <p><code>member <i>member-id</i></code>—(Optional) Display the Virtual Chassis mixed mode status of the specified member of the Virtual Chassis.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>request virtual-chassis mode mixed on page 896</li> <li>Configuring a Mixed J-EX4200 and J-EX4500 Virtual Chassis (CLI Procedure) on page 828</li> </ul>
<b>List of Sample Output</b>	show virtual-chassis mode on page 908
<b>Output Fields</b>	Table 138 on page 908 lists the output fields for the <code>show virtual-chassis mode</code> command.

Table 138: show virtual-chassis mode Output Fields

Field Name	Field Description
Mixed Mode	Specifies the mixed mode status of the member switch. Mixed mode is either <b>Enabled</b> or <b>Disabled</b> for the member switch.

### Sample Output

```

user@switch>show virtual-chassis mode
fpc0:
-----
Mixed Mode: Disabled

```





## show virtual-chassis status

<b>Syntax</b>	<code>show virtual-chassis status</code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches. <b>Location</b> field introduced in Junos OS Release 11.1 for J-EX Series switches.
<b>Description</b>	Display information about all members of the Virtual Chassis configuration.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</li> </ul>
<b>Output Fields</b>	Table 139 on page 910 lists the output fields for the <code>show virtual-chassis status</code> command. Output fields are listed in the approximate order in which they appear.

**Table 139: show virtual-chassis status Output Fields**

Field Name	Field Description
<b>Virtual Chassis ID</b>	Assigned ID that applies to the entire Virtual Chassis configuration.
<b>Member ID</b>	Assigned member ID and FPC slot (from 0 through 9).
<b>Status</b>	<p>For a nonprovisioned configuration:</p> <ul style="list-style-type: none"> <li><b>Prsnt</b> for a member that is currently connected to the Virtual Chassis configuration</li> <li><b>NotPrsnt</b> for a member ID that has been assigned but is not currently connected</li> </ul> <p>For a preprovisioned configuration:</p> <ul style="list-style-type: none"> <li><b>Prsnt</b> for a member that is specified in the preprovisioned configuration file and is currently connected to the Virtual Chassis configuration</li> <li><b>Unprvsnd</b> for a member that is interconnected with the Virtual Chassis configuration, but is not specified in the preprovisioned configuration file</li> </ul>
<b>Serial No</b>	Serial number of the member switch or external Routing Engine
<b>Model</b>	Model number of the member switch
<b>Mastership Priority</b>	Mastership priority value of the member switch
<b>Role</b>	Role of the member switch
<b>Location</b>	<p>Location of the member device</p> <p>If this field is empty, the location field was not configured for the device.</p>
<b>Neighbor List</b>	Member ID of the neighbor member to which this member's VCP is connected.

**show virtual-chassis status (J-EX4200 Virtual Chassis)**

```
user@switch> show virtual-chassis status
```

```
Virtual Chassis ID: 0019.e250.47a0
```

Member ID	Status	Serial No	Model	Mastership priority	Role	Neighbor List ID	Interface
0 (FPC 0)	Prsnt	AK0207360276	ex4200-24t	249	Master*	8	vcp-0
1 (FPC 1)	Prsnt	AK0207360281	ex4200-24t	248	Backup	1	vcp-1
2 (FPC 2)	Prsnt	AJ0207391130	ex4200-48p	247	Linecard	0	vcp-0
3 (FPC 3)	Prsnt	AK0207360280	ex4200-24t	246	Linecard	2	vcp-1
4 (FPC 4)	Prsnt	AJ0207391113	ex4200-48p	245	Linecard	3	vcp-0
5 (FPC 5)	Prsnt	BP0207452204	ex4200-48t	244	Linecard	4	vcp-1
6 (FPC 6)	Prsnt	BP0207452222	ex4200-48t	243	Linecard	5	vcp-0
7 (FPC 7)	Prsnt	BR0207432028	ex4200-24f	242	Linecard	6	vcp-1
8 (FPC 8)	Prsnt	BR0207431996	ex4200-24f	241	Linecard	7	vcp-0
						8	vcp-1
						7	vcp-0
						0	vcp-1

```
Member ID for next new member: 9 (FPC 9)
```

## show virtual-chassis vc-path

<b>Syntax</b>	<code>show virtual-chassis vc-path source-interface <i>interface-name</i> destination-interface <i>interface-name</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Show the path a packet takes when going from a source interface to a destination interface in a Virtual Chassis configuration.
<b>Options</b>	<p>source-interface <i>interface-name</i>—Name of the interface from which the packet originates</p> <p>destination-interface <i>interface-name</i>—Name of the interface to which the packet is delivered</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</li> <li>Understanding J-EX4200 and J-EX4500 Virtual Chassis Configuration on page 723</li> </ul>
<b>List of Sample Output</b>	<code>show virtual-chassis vc-path source-interface destination-interface</code> on page 912
<b>Output Fields</b>	Table 140 on page 912 lists the output fields for the <code>show virtual-chassis vc-path</code> command. Output fields are listed in the approximate order in which they appear.

**Table 140: show virtual-chassis vc-path Output Fields**

Field Name	Field Description
<b>Hop</b>	The number of hops between the source and destination interfaces.
<b>Member</b>	The Virtual Chassis ID of the member switch that contains the Packet Forwarding Engine for each intermediate hop.
<b>PFE-Device</b>	The number of the Packet Forwarding Engine in each Virtual Chassis member through which a packet passes. Each Packet Forwarding Engine is the next hop of the preceding Packet Forwarding Engine.
<b>Interface</b>	The name of the interface through which the Packet Forwarding Engines are connected. The interface for the first hop is always the source interface and the interface for the last hop is always the destination interface. For intermediate hops, the <b>Interface</b> field denotes the Packet Forwarding Engines through which the packet passes on its way to the next hop.

## Sample Output

```

user@switch> show virtual-chassis vc-path source-interface ge-0/0/0 destination-interface
vc-path from ge-0/0/0 to ge-1/0/1
source-interface
destination-interface
Hop      Member  PFE-Device  Interface
0        0        1            ge-0/0/0
1        0        0            internal-1/24

```

2	1	3	vcp-0
3	1	4	ge-1/0/1

## show virtual-chassis vc-port

<b>Syntax</b>	show virtual-chassis vc-port <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the status of the Virtual Chassis ports (VCPs), including both the dedicated VCPs and the uplink module ports configured as VCPs.
<b>Options</b>	<p>none—Display the operational status of all VCPs of the member switch where the command is issued.</p> <p>all-members—(Optional) Display the operational status of all VCPs on all members of the Virtual Chassis configuration.</p> <p>local—(Optional) Display the operational status of the switch or external Routing Engine on which this command is entered.</p> <p>member <i>member-id</i>—(Optional) Display the operational status of all VCPs for the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>show virtual-chassis vc-port statistics on page 917</li> <li>Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</li> </ul>
<b>List of Sample Output</b>	<p>show virtual-chassis vc-port (J-EX4200 Virtual Chassis) on page 915</p> <p>show virtual-chassis vc-port all-members on page 915</p>
<b>Output Fields</b>	Table 141 on page 914 lists the output fields for the <b>show virtual-chassis vc-port</b> command. Output fields are listed in the approximate order in which they appear.

**Table 141: show virtual-chassis vc-port Output Fields**

Field Name	Field Description
<i>fpcnumber</i>	The FPC number is the same as the member ID.
Interface or PIC/Port	<p>VCP name.</p> <ul style="list-style-type: none"> <li>The dedicated VCPs in a J-EX4200 or J-EX4500 Virtual Chassis are <b>vcp-0</b> and <b>vcp-1</b>.</li> <li>The uplink module ports set as VCPs in a J-EX4200 Virtual Chassis are named <b>1/0</b> and <b>1/1</b>, representing the PIC number and the port number.</li> </ul>

Table 141: show virtual-chassis vc-port Output Fields (*continued*)

Field Name	Field Description
Type	<p>Type of VCP:</p> <ul style="list-style-type: none"> <li>• <b>Dedicated</b>—The rear panel VCP on a J-EX4200 or J-EX4500 switch.</li> <li>• <b>Configured</b>—Uplink module port configured as a VCP in a J-EX4200 or J-EX4500 Virtual Chassis.</li> <li>• <b>Auto-Configured</b>—Uplink module port autoconfigured as a VCP in a J-EX4200 or J-EX4500 Virtual Chassis.</li> </ul> <p>See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846 for information about configuring VCPs.</p>
Trunk ID	<p>A positive-number ID assigned to a link aggregation group (LAG) formed by the Virtual Chassis. The trunk ID value is –1 if no trunk is formed. A LAG between uplink VCPs requires that the link speed be the same on connected interfaces and that at least two VCPs on one member be connected to at least two VCPs on the other member in a J-EX4200 or J-EX4500 Virtual Chassis.</p> <p>Dedicated VCP LAGs are assigned trunk IDs 1 and 2. Trunk IDs for LAGs formed with uplink VCPs therefore have values of 3 or greater.</p> <p>The trunk ID value changes if the link-adjacency state between LAG members changes; trunk membership is then allocated or deallocated.</p>
Status	<p>Interface status:</p> <ul style="list-style-type: none"> <li>• <b>absent</b>—Interface is not a VCP link.</li> <li>• <b>down</b>—VCP link is down.</li> <li>• <b>up</b>—VCP link is up.</li> </ul>
Speed (mbps)	Speed of the interface in megabits per second.
Neighbor ID/Interface	The Virtual Chassis member ID and interface of a VCP on a member that is connected to the interface or PIC/Port field in the same row as this interface.

## Sample Output

```

user@switch> show virtual-chassis vc-port
show virtual-chassis vc-port (J-EX4200 Virtual Chassis)
fpc0:
-----
Interface   Type           Trunk  Status   Speed   Neighbor
or          PIC / Port    ID     (mbps)  ID  Interface
vcp-0      Dedicated      1      Up       32000   1    vcp-1
vcp-1      Dedicated      2      Up       32000   0    vcp-0
1/0        Auto-Configured 3      Up       1000    2    vcp-255/1/0
1/0        Auto-Configured 3      Up       1000    2    vcp-255/1/1

```

```

user@switch> show virtual-chassis vc-port all-members
show virtual-chassis vc-port all-members
fpc0:
-----
Interface   Type           Trunk  Status   Speed   Neighbor
or          PIC / Port    ID     (mbps)  ID  Interface

```

PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	1	vcp-1
vcp-1	Dedicated	2	Up	32000	0	vcp-0
1/0	Auto-Configured	3	Up	1000	2	vcp-255/1/0
1/1	Auto-Configured	3	Up	1000	2	vcp-255/1/1

fpc1:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	0	vcp-1
vcp-1	Dedicated	2	Up	32000	0	vcp-0
1/0	Auto-Configured	-1	Up	1000	3	vcp-255/1/0

fpc2:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	3	vcp-1
vcp-1	Dedicated	2	Up	32000	3	vcp-0
1/0	Auto-Configured	3	Up	1000	0	vcp-255/1/0
1/1	Auto-Configured	3	Up	1000	0	vcp-255/1/1

fpc3:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
vcp-0	Dedicated	1	Up	32000	2	vcp-0
vcp-1	Dedicated	2	Up	32000	2	vcp-1
1/0	Auto-Configured	-1	Up	1000	1	vcp-255/1/0



## show virtual-chassis vc-port statistics

<b>Syntax</b>	show virtual-chassis vc-port statistics <all-members> <brief   detail   extensive > <interface-name> <local> <member member-id>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the traffic statistics collected on Virtual Chassis ports (VCPs).
<b>Options</b>	<p>none—Display traffic statistics for VCPs of all members of a Virtual Chassis configuration.</p> <p>brief   detail   extensive—(Optional) Display the specified level of output. Using the <b>brief</b> option is equivalent to entering the command with no options (the default). The <b>detail</b> and <b>extensive</b> options provide identical displays.</p> <p>all-members—(Optional) Display traffic statistics for VCPs of all members of a Virtual Chassis configuration.</p> <p>interface-name—(Optional) Display traffic statistics for the specified VCP.</p> <p>local—(Optional) Display traffic statistics for VCPs on the switch or external Routing Engine on which this command is entered.</p> <p>member member-id—(Optional) Display traffic statistics for VCPs on the specified member of a Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">clear virtual-chassis vc-port statistics on page 892</a></li> <li>• <a href="#">show virtual-chassis vc-port on page 914</a></li> <li>• <a href="#">Monitoring J-EX4200 and J-EX4500 Virtual Chassis Status and Statistics on page 863</a></li> </ul>
<b>List of Sample Output</b>	<p><a href="#">show virtual-chassis vc-port statistics on page 920</a></p> <p><a href="#">show virtual-chassis vc-port statistics brief on page 920</a></p> <p><a href="#">show virtual-chassis vc-port statistics extensive on page 921</a></p> <p><a href="#">show virtual-chassis vc-port statistics member 0 on page 922</a></p>
<b>Output Fields</b>	Table 142 on page 918 lists the output fields for the <b>show virtual-chassis vc-port statistics</b> command. Output fields are listed in the approximate order in which they appear.

Table 142: show virtual-chassis vc-port statistics Output Fields

Field Name	Field Description	Level of Output
<b>fpcnumber</b>	(J-EX4200, J-EX4500, and mixed J-EX4200 and J-EX4500 Virtual Chassis only) ID of the Virtual Chassis member. The FPC number is the same as the member ID.	All levels
<b>Interface</b>	VCP name.	<b>brief</b>
<b>Input Octets/Packets</b>	Number of octets and packets received on the VCP.	<b>brief, member, none</b>
<b>Output Octets/Packets</b>	Number of octets and packets transmitted on the VCP.	<b>brief, member, none</b>
<b>master: number</b>	Member ID of the Virtual Chassis master.	All levels
<b>Port</b>	VCP for which RX (Receive) statistics, TX (Transmit) statistics, or both are reported by the VCP subsystem during a sampling interval—since the statistics counter was last cleared.	<b>detail, extensive</b>
<b>Total octets</b>	Total number of octets received and transmitted on the VCP.	<b>detail, extensive</b>
<b>Total packets</b>	Total number of packets received and transmitted on the VCP.	<b>detail, extensive</b>
<b>Unicast packets</b>	Number of unicast packets received and transmitted on the VCP.	<b>detail, extensive</b>
<b>Broadcast packets</b>	Number of broadcast packets received and transmitted on the VCP.	<b>detail, extensive</b>
<b>Multicast packets</b>	Number of multicast packets received and transmitted on the VCP.	<b>detail, extensive</b>
<b>MAC control frames</b>	Number of media access control (MAC) control frames received and transmitted on the VCP.	<b>detail, extensive</b>
<b>CRC alignment errors</b>	Number of packets received on the VCP that had a length—excluding framing bits, but including frame check sequence (FCS) octets—of between 64 and 1518 octets, inclusive, and had one of the following errors: <ul style="list-style-type: none"> <li>Invalid FCS with an integral number of octets (FCS error)</li> <li>Invalid FCS with a nonintegral number of octets (alignment error)</li> </ul>	<b>detail, extensive</b>
<b>Oversize packets</b>	Number of packets received on the VCP that were longer than 1518 octets (excluding framing bits, but including FCS octets) but were otherwise well formed.	<b>detail, extensive</b>

Table 142: show virtual-chassis vc-port statistics Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Undersize packets</b>	Number of packets received on the VCP that were shorter than 64 octets (excluding framing bits but including FCS octets) and were otherwise well formed..	<b>detail, extensive</b>
<b>Jabber packets</b>	Number of packets received on the VCP that were longer than 1518 octets—excluding framing bits, but including FCS octets—and that had either an FCS error or an alignment error.  <i>NOTE:</i> This definition of <i>jabber</i> is different from the definition in IEEE-802.3 section 8.2.1.5 (10Base5) and section 10.3.1.4 (10Base2). These documents define <i>jabber</i> as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms.	<b>detail, extensive</b>
<b>Fragments received</b>	Number of packets received on the VCP that were shorter than 64 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error.  Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.	<b>detail, extensive</b>
<b>Ifout errors</b>	Number of outbound packets received on the VCP that could not be transmitted because of errors.	<b>detail, extensive</b>
<b>Packet drop events</b>	Number of outbound packets received on the VCP that were dropped, rather than being encapsulated and sent out of the switch as fragments. The packet drop counter is incremented if a temporary shortage of packet memory causes packet fragmentation to fail.	<b>detail, extensive</b>
<b>64 octets frames</b>	Number of packets received on the VCP (including invalid packets) that were 64 octets in length (excluding framing bits, but including FCS octets).	<b>detail, extensive</b>
<b>65–127 octets frames</b>	Number of packets received on the VCP (including invalid packets) that were between 65 and 127 octets in length, inclusive (excluding framing bits, but including FCS octets).	<b>detail, extensive</b>
<b>128–255 octets frames</b>	Number of packets received on the VCP (including invalid packets) that were between 128 and 255 octets in length, inclusive (excluding framing bits, but including FCS octets).	<b>detail, extensive</b>

Table 142: show virtual-chassis vc-port statistics Output Fields (*continued*)

Field Name	Field Description	Level of Output
256–511 octets frames	Number of packets received on the VCP (including invalid packets) that were between 256 and 511 octets in length, inclusive (excluding framing bits, but including FCS octets).	detail, extensive
512–1023 octets frames	Number of packets received on the VCP (including invalid packets) that were between 512 and 1023 octets in length, inclusive (excluding framing bits, but including FCS octets).	detail, extensive
1024–1518 octets frames	Number of packets received on the VCP (including invalid packets) that were between 1024 and 1518 octets in length, inclusive (excluding framing bits, but including FCS octets).	detail, extensive
Rate packets per second	Number of packets per second received and transmitted on the VCP.	detail, extensive
Rate bytes per second	Number of bytes per second received and transmitted on the VCP.	detail, extensive

## Sample Output

```
show virtual-chassis vc-port statistics user@switch> show virtual-chassis vc-port statistics
fpc0:
```

```
-----
Interface          Input Octets/Packets      Output Octets/Packets
internal-0/24      0          / 0            0          / 0
internal-0/25      0          / 0            0          / 0
internal-1/26      0          / 0            0          / 0
internal-1/27      0          / 0            0          / 0
vcp-0              0          / 0            0          / 0
vcp-1              0          / 0            0          / 0
internal-0/26      0          / 0            0          / 0
internal-0/27      0          / 0            0          / 0
internal-1/24      0          / 0            0          / 0
internal-1/25      0          / 0            0          / 0
```

```
{master:0}
```

```
show virtual-chassis vc-port statistics brief user@switch> show virtual-chassis vc-port statistics brief
fpc0:
```

```
-----
Interface          Input Octets/Packets      Output Octets/Packets
internal-0/24      0          / 0            0          / 0
internal-0/25      0          / 0            0          / 0
internal-1/26      0          / 0            0          / 0
internal-1/27      0          / 0            0          / 0
vcp-0              0          / 0            0          / 0
vcp-1              0          / 0            0          / 0
internal-0/26      0          / 0            0          / 0
internal-0/27      0          / 0            0          / 0
internal-1/24      0          / 0            0          / 0
```

```
internal-1/25      0          / 0          0          / 0
{master:0}
```

```
show virtual-chassis user@switch> show virtual-chassis vc-port statistics extensive
vc-port statistics  fpc0:
extensive
```

```
-----
                                RX                                TX
Port: internal-0/24
Total octets:                    0                                0
Total packets:                   0                                0
Unicast packets:                 0                                0
Broadcast packets:              0                                0
Multicast packets:              0                                0
MAC control frames:             0                                0
CRC alignment errors:           0
Oversize packets:               0
Undersize packets:              0
Jabber packets:                 0
Fragments received:             0
Ifout errors:                   0
Packet drop events:             0
64 octets frames:               0
65-127 octets frames:           0
128-255 octets frames:          0
256-511 octets frames:          0
512-1023 octets frames:         0
1024-1518 octets frames:        0
Rate packets per second:         0                                0
Rate bytes per second:           0                                0
...
Port: vcp-0
Total octets:                    0                                0
Total packets:                   0                                0
Unicast packets:                 0                                0
Broadcast packets:              0                                0
Multicast packets:              0                                0
MAC control frames:             0                                0
CRC alignment errors:           0
Oversize packets:               0
Undersize packets:              0
Jabber packets:                 0
Fragments received:             0
Ifout errors:                   0
Packet drop events:             0
64 octets frames:               0
65-127 octets frames:           0
128-255 octets frames:          0
256-511 octets frames:          0
512-1023 octets frames:         0
1024-1518 octets frames:        0
Rate packets per second:         0                                0
Rate bytes per second:           0                                0
Port: vcp-1
Total octets:                    0                                0
Total packets:                   0                                0
```

```

Unicast packets:      0          0
Broadcast packets:   0          0
Multicast packets:   0          0
MAC control frames:  0          0
CRC alignment errors: 0
Oversize packets:    0
Undersize packets:   0
Jabber packets:      0
Fragments received:  0
Ifout errors:        0
Packet drop events:  0
64      octets frames: 0
65-127  octets frames: 0
128-255 octets frames: 0
256-511 octets frames: 0
512-1023 octets frames: 0
1024-1518 octets frames: 0
Rate packets per second: 0          0
Rate bytes per second: 0          0

```

...

{master:0}

```

show virtual-chassis user@switch>show virtual-chassis vc-port statistics member 0
vc-port statistics fpc0:
member 0

```

```

-----
Interface          Input Octets/Packets      Output Octets/Packets
internal-0/24      0          / 0           0          / 0
internal-0/25      0          / 0           0          / 0
internal-1/26      0          / 0           0          / 0
internal-1/27      0          / 0           0          / 0
vcp-0              0          / 0           0          / 0
vcp-1              0          / 0           0          / 0
internal-0/26      0          / 0           0          / 0
internal-0/27      0          / 0           0          / 0
internal-1/24      0          / 0           0          / 0
internal-1/25      0          / 0           0          / 0

```

{master:0}

## PART 11

# High Availability

- High Availability—Overview on page 925
- Examples of High Availability Configuration on page 941
- Configuring High Availability on page 947
- Administering High Availability on page 955
- Configuration Statements for High Availability on page 965
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# High Availability—Overview

- High Availability Features for J-EX Series Switches Overview on page 925
- Understanding VRRP on J-EX Series Switches on page 928
- Understanding Nonstop Active Routing on J-EX Series Switches on page 931
- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932
- Understanding Power Management on J-EX Series Switches on page 935

## High Availability Features for J-EX Series Switches Overview

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*High availability* refers to the hardware and software components that provide redundancy and reliability for packet-based communications. This topic covers the following high availability features of J-EX Series Switches:

- VRRP on page 925
- Graceful Protocol Restart on page 926
- Redundant Routing Engines on page 926
- Virtual Chassis on page 926
- Graceful Routing Engine Switchover on page 927
- Link Aggregation on page 927
- Nonstop Active Routing on page 927
- Nonstop Software Upgrade on page 928

## VRRP

You can configure the Virtual Router Redundancy Protocol (VRRP) or VRRP for IPv6 on Gigabit Ethernet interfaces, 10-Gigabit Ethernet interfaces, and logical interfaces on the switches. When VRRP is configured, the switches act as virtual routing platforms. VRRP enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts. The VRRP routing platforms share the IP address corresponding to the default route configured on the hosts. At any time, one of the VRRP routing platforms is the master (active) and the others are backups. If the master routing platform fails, one of the backup routing platforms becomes the new master, providing a virtual default routing platform and enabling traffic on the LAN to be routed without relying on a single routing platform. Using VRRP, a backup switch can take over a failed default switch within a few seconds.

This is done with minimum loss of VRRP traffic and without any interaction with the hosts.

## Graceful Protocol Restart

With standard implementations of routing protocols, any service interruption requires an affected switch to recalculate adjacencies with neighboring switches, restore routing table entries, and update other protocol-specific information. An unprotected restart of a switch can result in forwarding delays, route flapping, wait times stemming from protocol reconvergence, and even dropped packets. Graceful protocol restart allows a restarting switch and its neighbors to continue forwarding packets without disrupting network performance. Because neighboring switches assist in the restart (these neighbors are called helper switches), the restarting switch can quickly resume full operation without recalculating algorithms from scratch.

On the switches, graceful protocol restart can be applied to aggregate and static routes and for routing protocols (BGP, IS-IS, OSPF, and RIP).

Graceful protocol restart works similarly for the different routing protocols. The main benefits of graceful protocol restart are uninterrupted packet forwarding and temporary suppression of all routing protocol updates. Graceful protocol restart thus allows a switch to pass through intermediate convergence states that are hidden from the rest of the network. Most graceful restart implementations define two types of switches—the restarting switch and the helper switch. The restarting switch requires rapid restoration of forwarding state information so that it can resume the forwarding of network traffic. The helper switch assists the restarting switch in this process. Individual graceful restart configuration statements typically apply to either the restarting switch or the helper switch.

## Redundant Routing Engines

Redundant Routing Engines are two Routing Engines that are installed in a switch. When a switch has two Routing Engines, one functions as the master, while the other stands by as a backup should the master Routing Engine fail. Redundant Routing Engines are supported on Dell PowerConnect J-EX Series J-EX8200 Ethernet Switches.

The master Routing Engine receives and transmits routing information, builds and maintains routing tables, communicates with interfaces and Packet Forwarding Engine components of the switch, and has full control over the control plane of the switch.

The backup Routing Engine stays in sync with the master Routing Engine in terms of protocol states, forwarding tables, and so forth. If the master becomes unavailable, the backup Routing Engine takes over the functions that the master Routing Engine performs.

Network reconvergence takes place more quickly on switches with redundant Routing Engines than on switches with a single Routing Engine.

## Virtual Chassis

A Virtual Chassis is multiple switches connected together that operate as a single network entity. The advantages of connecting multiple switches into a Virtual Chassis include better-managed bandwidth at a network layer, simplified configuration and maintenance

because multiple devices can be managed as a single device, and a simplified Layer 2 network topology that minimizes or eliminates the need for loop prevention protocols such as Spanning Tree Protocol (STP). A Virtual Chassis improves high availability by introducing a variety of failover mechanisms; if a member switch, a line card, or an interface fails on a switch that is a member of a Virtual Chassis, for instance, traffic to that switch, line card, or interface can be rerouted within the Virtual Chassis.

Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches and Dell PowerConnect J-EX Series J-EX4500 Ethernet Switches can form a Virtual Chassis.

## Graceful Routing Engine Switchover

You can configure graceful Routing Engine switchover (GRES) on a switch with redundant Routing Engines or on a Virtual Chassis, allowing control to switch from the master Routing Engine to the backup Routing Engine with minimal interruption to network communications. When you configure graceful Routing Engine switchover, the backup Routing Engine automatically synchronizes with the master Routing Engine to preserve kernel state information and forwarding state. Any updates to the master Routing Engine are replicated to the backup Routing Engine as soon as they occur. If the kernel on the master Routing Engine stops operating, the master Routing Engine experiences a hardware failure, or the administrator initiates a manual switchover, mastership switches to the backup Routing Engine.

When the backup Routing Engine assumes mastership in a redundant failover configuration (that is, when graceful Routing Engine switchover is not enabled), the Packet Forwarding Engines initialize their state to the boot state before they connect to the new master Routing Engine. In contrast, in a graceful switchover configuration, the Packet Forwarding Engines do not reinitialize their state, but resynchronize their state to that of the new master Routing Engine. The interruption to traffic is minimal.

## Link Aggregation

You can combine multiple physical Ethernet ports to form a logical point-to-point link, known as a link aggregation group (LAG) or bundle. A LAG provides more bandwidth than a single Ethernet link can provide. Additionally, link aggregation provides network redundancy by load-balancing traffic across all available links. If one of the links should fail, the system automatically load-balances traffic across all remaining links. In a Virtual Chassis, LAGs can be used to load-balance network traffic between member switches.

The number of Ethernet interfaces you can include in a LAG and the number of LAGs you can configure on a switch depend on the switch model.

## Nonstop Active Routing

Nonstop active routing (NSR) provides high availability in a switch with redundant Routing Engines by enabling transparent switchover of the Routing Engines without requiring restart of supported routing protocols. Both Routing Engines are fully active in processing protocol sessions, and so each can take over for the other. The switchover is transparent to neighbor routing devices, which do not detect that a change has occurred.

To use nonstop active routing, you must also configure graceful Routing Engine switchover.

## Nonstop Software Upgrade

Nonstop software upgrade (NSSU) is available on J-EX8200 switches with redundant Routing Engines. NSSU takes advantage of graceful Routing Engine switchover and nonstop active routing to enable upgrading the Junos OS version running on a switch with no disruption to the control plane. In addition, NSSU upgrades line cards one at a time, permitting traffic to continue to flow through the line cards that are not being upgraded. By configuring LAGs such that the member links reside on different line cards, you can achieve minimal traffic disruption when performing an NSSU.

### Related Documentation

- For more information on high availability features, see the *Junos OS High Availability Configuration Guide*.
- J-EX4200 Virtual Chassis Overview on page 709
- Understanding VRRP on J-EX Series Switches on page 928
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- Understanding Nonstop Active Routing on J-EX Series Switches on page 931
- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932

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## Understanding VRRP on J-EX Series Switches

J-EX Series Switches support the Virtual Router Redundancy Protocol (VRRP) and VRRP for IPv6. This topic covers:

- Overview of VRRP on J-EX Series Switches on page 928
- Examples of VRRP Topologies on page 929

### Overview of VRRP on J-EX Series Switches

You can configure the Virtual Router Redundancy Protocol (VRRP) or VRRP for IPv6 on Gigabit Ethernet interfaces, 10-Gigabit Ethernet interfaces, and logical interfaces on J-EX Series switches. When VRRP is configured, the switches act as virtual routing platforms. VRRP enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts. The VRRP routing platforms share the IP address corresponding to the default route configured on the hosts. At any time, one of the VRRP routing platforms is the master (active) and the others are backups. If the master routing platform fails, one of the backup routing platforms becomes the new master, providing a virtual default routing platform and enabling traffic on the LAN to be routed without relying on a single routing platform. Using VRRP, a backup J-EX Series switch can take over a failed default switch within a few seconds. This is done with minimum loss of VRRP traffic and without any interaction with the hosts.

VRRP for IPv6 provides a much faster switchover to an alternate default routing platform than IPv6 Neighbor Discovery (ND) procedures. VRRP for IPv6 does not support the **authentication-type** or **authentication-key** statements.



**NOTE:** Do not confuse the VRRP master and backup routing platforms with the master and backup member switches of a Virtual Chassis configuration. The master and backup members of a Virtual Chassis configuration compose a single host. In a VRRP topology, one host operates as the master routing platform and another operates as the backup routing platform, as shown in Figure 29 on page 930.

Switches running VRRP dynamically elect master and backup routing platforms. You can also force assignment of master and backup routing platforms using priorities from 1 through 255, with 255 being the highest priority. In VRRP operation, the default master routing platform sends advertisements to backup routing platforms at regular intervals. The default interval is 1 second. If the backup routing platforms do not receive an advertisement for a set period, the backup routing platform with the highest priority takes over as master and begins forwarding packets.



**NOTE:** Priority 255 cannot be set for routed VLAN interfaces (RVIs).

VRRP is defined in RFC 3768, *Virtual Router Redundancy Protocol*.

## Examples of VRRP Topologies

Figure 28 on page 929 illustrates a basic VRRP topology with J-EX Series switches. In this example, Switches A, B, and C are running VRRP and together they make up a virtual routing platform. The IP address of this virtual routing platform is 10.10.0.1 (the same address as the physical interface of Switch A).

Figure 28: Basic VRRP on J-EX Series Switches

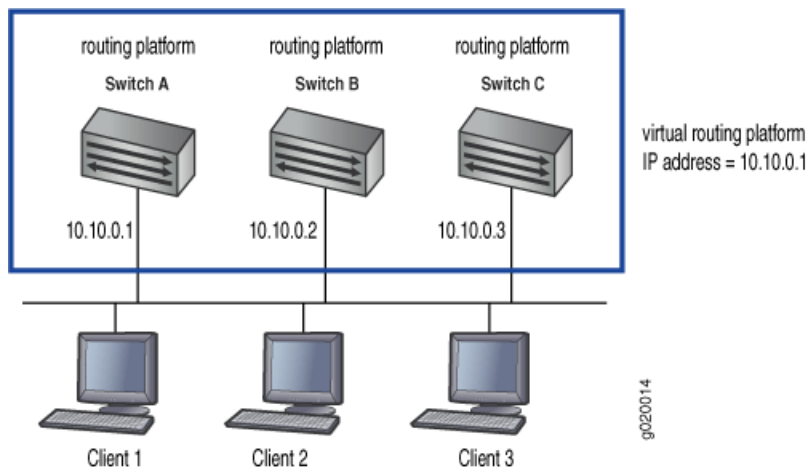
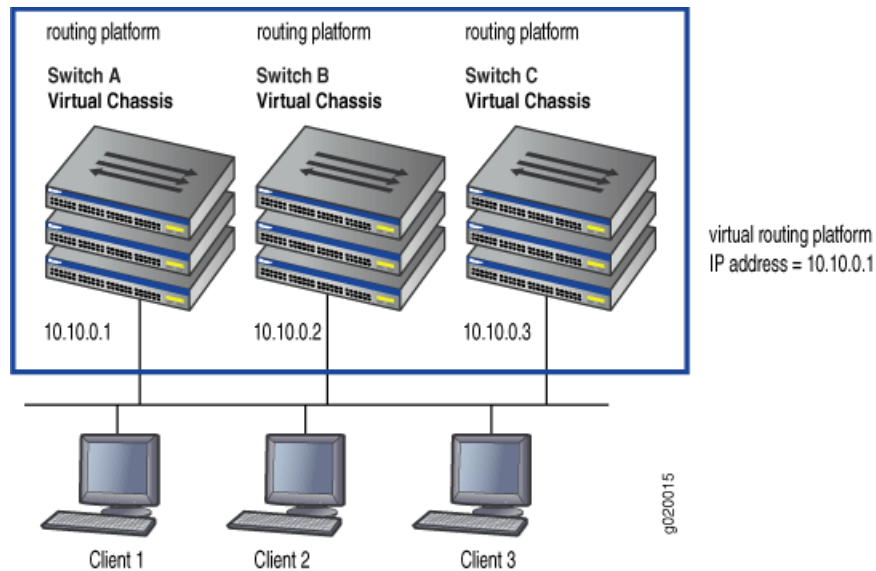


Figure 29 on page 930 illustrates a basic VRRP topology using Virtual Chassis configurations. Switch A, Switch B, and Switch C are each composed of multiple interconnected Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches. Each Virtual Chassis configuration operates as a single switch, which is running VRRP, and together they make

up a virtual routing platform. The IP address of this virtual routing platform is **10.10.0.1** (the same address as the physical interface of Switch A).

Figure 29: VRRP on Virtual Chassis Switches



Because the virtual routing platform uses the IP address of the physical interface of Switch A, Switch A is the master VRRP routing platform, while Switch B and Switch C function as backup VRRP routing platforms. Clients 1 through 3 are configured with the default gateway IP address of **10.10.0.1** as the master router, Switch A, forwards packets sent to its IP address. If the master routing platform fails, the switch configured with the higher priority becomes the master virtual routing platform and provides uninterrupted service for the LAN hosts. When Switch A recovers, it becomes the master virtual routing platform again.

**Related Documentation**

- For more information on VRRP or VRRP for IPv6, see the *Junos OS High Availability Configuration Guide*.
- High Availability Features for J-EX Series Switches Overview on page 22
- Configuring VRRP for IPv6 (CLI Procedure) on page 947

## Understanding Nonstop Active Routing on J-EX Series Switches

You can configure nonstop active routing (NSR) on a J-EX Series switch with redundant Routing Engines to enable the transparent switchover of the Routing Engines in the event that one of the Routing Engines goes down.

Nonstop active routing provides high availability for Routing Engines by enabling transparent switchover of the Routing Engines without requiring restart of supported routing protocols. Both Routing Engines are fully active in processing protocol sessions, and so each can take over for the other. The switchover is transparent to neighbor routing devices, which do not detect that a change has occurred.

Enable nonstop active routing when neighbor routing devices are not configured to support graceful restart of protocols or when you want to ensure graceful restart of protocols for which graceful restart is not supported (such as PIM).

You do not need to start the two Routing Engines simultaneously to synchronize them for nonstop active routing. If both Routing Engines are not present or not up when you issue a **commit synchronize** statement, the candidate configuration is committed in the master Routing Engine and when the backup Routing Engine is inserted or comes online, its configuration is automatically synchronized with that of the master.

Nonstop active routing uses the same infrastructure as graceful Routing Engine switchover (GRES) to preserve interface and kernel information. However, nonstop active routing also saves routing protocol information by running the routing protocol process (**ripd**) on the backup Routing Engine. By saving this additional information, nonstop active routing does not rely on other routing devices to assist in restoring routing protocol information.



**NOTE:** After a graceful Routing Engine switchover, we recommend that you issue the **clear interface statistics (*interface-name* | all)** command to reset the cumulative values for local statistics on the new master Routing Engine.

If you suspect a problem with the synchronization of Routing Engines when nonstop active routing is enabled, you can gather troubleshooting information using trace options. For example, if certain protocols lose connectivity with neighbors after a graceful Routing Engine switchover with NSR enabled, you can use trace options to help isolate the problem. See “Tracing Nonstop Active Routing Synchronization Events” on page 949.



**NOTE:** Graceful restart and nonstop active routing are mutually exclusive. You will receive an error message upon commit if both are configured.

### Related Documentation

- Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure) on page 948
- Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941

## Understanding Nonstop Software Upgrade on J-EX Series Switches

---

Nonstop software upgrade (NSSU) enables you to upgrade the software running on a Dell PowerConnect J-EX Series J-EX8200 Ethernet Switch with redundant Routing Engines using a single command and with minimal disruption to network traffic.

Performing an NSSU provides these benefits:

- No disruption to the control plane—An NSSU takes advantage of graceful Routing Engine switchover (GRES) and nonstop active routing (NSR) to ensure no disruption to the control plane. During the upgrade process, interface, kernel, and routing protocol information is preserved.
- Minimal disruption to traffic—By default, an NSSU upgrades each line card one at a time. Traffic continues to flow through the other line cards while a line card is being restarted as part of the upgrade. You can minimize disruption to traffic by configuring link aggregation groups (LAGs) such that the member links of each LAG reside on different line cards. When one member link of a LAG is down, the remaining links are up, and traffic continues to flow through the LAG.

Because upgrading each line card one at a time can increase the amount of time it takes to perform an upgrade, you can optionally configure line-card upgrade groups. The line cards in an upgrade group are upgraded simultaneously, reducing the amount of time it takes to complete an upgrade.



.....  
**NOTE:** Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later requires that you also upgrade the loader software. See the release notes for instructions on how to upgrade from Release 10.4R2 or earlier to Release 10.4R3 or later.  
.....

This topic covers:

- How an NSSU Works on page 932
- NSSU and Junos OS Release Support on page 935
- Overview of NSSU Configuration and Operation on page 935

### How an NSSU Works

This section describes what happens when you request an NSSU on a:

- Standalone Switch on page 933
- Virtual Chassis on page 934



---

## Standalone Switch

---

When you request an NSSU on a standalone switch:

1. The switch verifies that:
  - Both Routing Engines are online and running the same software version.
  - Both Routing Engines have sufficient storage space for the new software image.
  - Graceful Routing Engine switchover and nonstop active routing are enabled.
2. The switch installs the new software image on the backup Routing Engine and reboots it.
3. The switch resynchronizes the backup Routing Engine to the master Routing Engine.
4. The line cards in the first upgrade group (or the line card in slot 0, if no upgrade groups are defined) download the new image and then restart. Traffic continues to flow through the line cards in the other upgrade groups during this process.
5. When line cards restarted in Step 4 are online again, the line cards in the next upgrade group download the new image and restart. This process continues until all online line cards have restarted with the new software.



**NOTE:** If you have taken a line card offline with the CLI before you start the NSSU, the line card is not restarted and remains offline.

---

6. The switch performs a graceful Routing Engine switchover, so that the upgraded backup Routing Engine becomes the master.
7. The switch installs the new software on the original master Routing Engine.

To complete the upgrade process, the original master Routing Engine must be rebooted. You can do so manually or have the switch perform an automatic reboot by including the **reboot** option when you request the NSSU. After the original master has been rebooted, you can optionally return control to it by requesting a graceful Routing Engine switchover.

## Virtual Chassis

---

When you request an NSSU on a Virtual Chassis:

1. The master external Routing Engine verifies that:
  - It has a backup external Routing Engine that is online.
  - All Virtual Chassis members have redundant Routing Engines and the Routing Engines are online.
  - All Routing Engines are running the same software version.
  - All Routing Engines have sufficient storage space for the new software image.
  - Graceful Routing Engine switchover and nonstop active routing are enabled.
2. The master external Routing Engine installs the new software image on the backup external Routing Engine and reboots it.
3. The backup external Routing Engine resynchronizes with the master external Routing Engine.
4. The master external Routing Engine installs the new software on the backup Routing Engines in the member switches and reboots the backup Routing Engines.
5. When the reboot of the backup Routing Engines complete, the line cards in the first upgrade group download the new image and then restart. (If no upgrade groups are defined, the line card in slot 0 of member 0 downloads the new image and restarts.) Traffic continues to flow through the line cards in the other upgrade groups during this process.
6. When line cards restarted in Step 5 are online again, the line cards in the next upgrade group (or the next sequential line card) download the new image and restart. This process continues until all online line cards have restarted with the new software.



**NOTE:** If you have taken a line card offline with the CLI before you start the NSSU, the line card is not restarted and remains offline.

---

7. The new software image is installed on the master Routing Engines, both external and internal.
8. The member switches perform a graceful Routing Engine switchover, so that the upgraded backup Routing Engines become masters.
9. The master external Routing Engine performs a graceful Routing Engine switchover so that the backup external Routing Engine is now the master.

To complete the upgrade process, the original master Routing Engines, both external and internal, must be rebooted. You can do so manually or have the reboot performed automatically by including the **reboot** option when you request the NSSU. After the original master external Routing Engine has been rebooted, you can optionally return control to it by requesting a graceful Routing Engine switchover.

## NSSU and Junos OS Release Support

A J-EX8200 switch must be running a Junos OS release that supports NSSU before you can perform an NSSU. If a switch is running a software version that does not support NSSU, use the procedure described in “Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)” on page 81 to upgrade the software.

You cannot use an NSSU to downgrade the software—that is, to install an earlier version of the software than is currently running on the switch. To install an earlier software version, use the software installation procedure described in “Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)” on page 81.

Table 143 on page 935 lists the J-EX Series switches and Virtual Chassis that support NSSU and the Junos OS release at which they began supporting it.

**Table 143: Platform and Release Support for NSSU**

Platform	Junos OS Release
J-EX8200 switch	10.4 or later

## Overview of NSSU Configuration and Operation

NSSU requires no configuration. You can optionally configure line-card upgrade groups using the CLI. See “Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches” on page 944.

You perform an NSSU by executing the **request system software nonstop-upgrade** command. Graceful Routing Engine switchover and nonstop active routing must be enabled before you execute the command. For detailed instructions on how to perform an NSSU, see “Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure)” on page 955.

### Related Documentation

- Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure) on page 955
- Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944

## Understanding Power Management on J-EX Series Switches

The power management feature for Dell PowerConnect J-EX Series J-EX8200 Ethernet Switches helps ensure that normal operation of the system is not disrupted because of insufficient power to the switch. It does so by employing a power budget policy.

Power management does the following in its power budget policy:

- Budgets power for each switch component that requires power. The amount that power management budgets for each component is the maximum power that component might consume. For example, for the fan tray, power management budgets the amount of power required to run the fans at their maximum speed setting.

- Reserves a set amount of power for power supply redundancy. In its default configuration, power management manages the switch for N+1 power redundancy, which ensures uninterrupted system operation if one power supply fails. For example, if a switch has four online 3000 W power supplies, power management reserves 3000 W in its power budget policy for redundancy. It allocates the remaining 9000 W to normal operating power.
- Specifies the rules under which components receive power. These rules are designed to ensure the least disruption to switch operation under conditions of insufficient power. For example, power management provides power to core system components, such as the Routing Engine, before it provides power to line cards.

You can configure certain aspects of power management's budget policy, specifically:

- The power priority of individual line cards. By assigning different power priorities to the line cards, you can determine which line cards are more likely to receive power in the event of insufficient power.
- The power redundancy configuration. The default power redundancy configuration is N+1; you can optionally configure N+N. For example, if you have deployed two independent AC power feeds to the switch, configure N+N redundancy. When you configure power management for N+N redundancy, it reserves the appropriate amount of power in its power budget and reports insufficient power conditions accordingly.

These configurable items are discussed further in:

- Power Priority of Line Cards on page 936
- Power Supply Redundancy on page 938

## Power Priority of Line Cards

Power management powers line cards on or off based on the power priority of the slots they occupy:

- When a switch powers on, power management provides power to the line cards in the order of their slot priority, with line cards in high priority slots receiving power first. Thus if available power (including redundant power) is exhausted before all line cards receive power, higher priority cards are powered on while lower priority cards remain powered off.
- If the switch starts receiving insufficient power because of power supply failure or some other problem, power management powers off the line cards in reverse-priority order until power (including redundant power) is sufficient for the remaining cards. Thus higher priority line cards are more likely to retain power in power shortage conditions than are lower priority line cards.
- Power management responds to changes in power availability and line card operating status by powering line cards on or off as appropriate. For example, if you add a power supply, lower priority cards that were powered off due to insufficient power are powered on in priority order.

If you take a line card offline, power management no longer allocates power to it. If power to the switch is insufficient when you take a line card offline, power management

allocates the freed power to a lower priority card that was offline due to lack of power and brings it online. Restarting a line card, however, does not affect the power allocated to it. Thus when power is insufficient, restarting a line card does not change its operating status or the operating status of other line cards.



**NOTE:** Because power management does not allocate power to an offline line card, a line card that has been taken offline in a J-EX8200 switch is not automatically brought online when you commit a configuration. You must explicitly bring the line card online with the `request chassis fpc slot slot-number online` command. This behavior differs from other platforms running Junos operating system (Junos OS), which automatically bring an offline FPC online when you commit a configuration.

The actual power priority of a slot is determined first by the slot's assigned priority and second by the slot's number. If more than one slot has the same assigned priority, power priority is determined by slot number, with the lowest-numbered slots receiving power first.

By default, all slots are assigned the lowest priority. You can assign a priority to a slot using the CLI. If you do not explicitly assign priorities to slots, the slots receive power in ascending order of slot numbers.

Because the purpose of power management is to ensure minimal system disruption when power is insufficient, slot power priority does not always determine which line cards receive power. In some cases, power management might provide power to a lower priority line card rather than a higher priority line card. For example:

- If power is insufficient for a line card in a higher priority slot but is sufficient for a line card in a lower priority slot, the lower priority slot receives the power. For example, if an 8-port SFP+ line card requiring 450 W is in a higher priority slot than a 48-port SFP line card requiring 330 W, the 48-port SFP line card receives the power if there is more than 330 W but less than 450 W available.
- In an operating switch that has insufficient power, power management does not power off operating line cards to provide power to a newly inserted line card or a line card that is brought online after being offline, even if the line card has a higher priority than the currently operating line cards.

However, if you restart the switch, power management reruns the current power budget policy and powers line cards on or off based on their priority. As a result, line cards receive power strictly by priority order and previously operating line cards might no longer receive power.

- If you change the assigned power priority of line cards when there is insufficient power for all the line cards, power management does not power down line cards that had been receiving power because they are now a lower priority.

## Power Supply Redundancy

By default, power management in J-EX8200 switches is configured to manage the power supplies for N+1 redundancy, in which one power supply is held in reserve for backup if one of the other power supplies is removed or fails.

You can configure power management to manage the power supplies for N+N redundancy. In N+N redundancy, power management holds N power supplies in reserve for backup. For example, if your switch has six power supplies and you configure N+N redundancy, power management makes three power supplies available for normal operating power and reserves three power supplies for redundancy (3+3). If you have an odd number of power supplies, power management allocates one more power supply to normal operating power than to redundant power. For example, if you have five power supplies, the N+N configuration is 3+2.

Given the same number of power supplies, an N+N configuration usually provides less normal operating power than an N+1 configuration because the N+N configuration holds more power in reserve for backup. Table 144 on page 938 shows the effect on normal operating power in N+1 and N+N configurations.

**Table 144: Available Operating Power in N+1 and N+N Redundancy Configurations**

Number of Power Supplies at $n$ W Each	Normal Operating Power in N+1 Configuration	Normal Operating Power in N+N Configuration
2	1 x ( $n$ W)	1 x ( $n$ W)
3	2 x ( $n$ W)	2 x ( $n$ W)
4	3 x ( $n$ W)	2 x ( $n$ W)
5	4 x ( $n$ W)	3 x ( $n$ W)
6	5 x ( $n$ W)	3 x ( $n$ W)

To compensate for the reduced normal operating power, power management reserves less power to the chassis in an N+N configuration than in an N+1 configuration. This reduction in reserved chassis power allows a switch in an N+N configuration to power more line cards than it could without the reduction. For the J-EX8208 switch, the power reserved for the chassis is reduced to 1200 W from 1600 W; for the J-EX8216 switch, it is reduced to 1800 W from 2400 W.



**NOTE:** To achieve the reduction in reserved chassis power, power management reduces the maximum fan speed to 60 percent in an N+N configuration from 80 percent in an N+1 configuration. Because the maximum fan speed is reduced, it is possible that a line card that overheats would be shut down sooner in an N+N configuration than in an N+1 configuration.

Power management automatically recalculates the redundant power and normal operating power as power supplies go online or offline. For example, if you have an N+N configuration with three online 2000 W power supplies, power management allocates 2000 W to redundant power. If you bring a fourth 2000 W power supply online, power management then allocates 4000 W to redundant power. If a power supply goes offline again, power management once again allocates 2000 W to redundant power.

When power is insufficient to meet the budgeted power requirements, power management raises alarms as follows:

- If all the line cards are receiving power but insufficient redundant power exists to maintain the configured N+1 or N+N power configuration, power management raises a minor (yellow) alarm. If this condition persists for 5 minutes, the alarm becomes a major (red) alarm.
- If one or more line cards are down because of insufficient power (including redundant power), power management raises a major (red) alarm.

Power management clears all alarms when sufficient power is available to meet normal operating and redundant power requirements.

**Related  
Documentation**

- Understanding Alarm Types and Severity Levels on J-EX Series Switches on page 559
- Configuring the Power Priority of Line Cards (CLI Procedure) on page 953
- Configuring Power Supply Redundancy (CLI Procedure) on page 952
- Verifying Power Configuration and Use on page 962





# Examples of High Availability Configuration

- Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941
- Example: Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944

## Example: Configuring Nonstop Active Routing on J-EX Series Switches

---

Nonstop active routing (NSR) provides high availability for Routing Engines by enabling transparent switchover of the Routing Engines without necessitating restart of supported routing protocols. Both Routing Engines are fully active in processing protocol sessions, and so each can take over for the other. The switchover is transparent to neighbors.

This example describes how to configure nonstop active routing on switches with multiple Routing Engines:

- Requirements on page 941
- Overview and Topology on page 941
- Configuration on page 942
- Verification on page 943
- Troubleshooting on page 943

### Requirements

This example uses the following hardware and software components:

- A J-EX Series switch with multiple Routing Engines
- Junos OS Release 10.4 or later for J-EX Series switches

### Overview and Topology

Configure nonstop active routing on any J-EX Series switch with multiple Routing Engines or J-EX Series switch in a Virtual Chassis configuration. Nonstop active routing is advantageous in networks where neighbor routing devices do not support graceful restart protocol extensions.

The topology used in this example consists of a J-EX8200 switch with redundant Routing Engines connected to neighbor routing devices that are not configured to support graceful restart of protocols.

## Configuration

**CLI Quick Configuration** To quickly configure nonstop active routing, copy the following commands and paste them into the switch terminal window:

```
[edit]
set chassis redundancy graceful-switchover
set routing-options nonstop-routing
set system commit synchronize
```

**Step-by-Step Procedure** To configure nonstop active routing on a switch:

1. Enable graceful Routing Engine switchover (GRES):  

```
[edit chassis redundancy]
user@switch# set graceful-switchover
```
2. Enable nonstop active routing (by default, nonstop active routing is disabled):  

```
[edit routing-options]
user@switch# set nonstop-routing
```
3. Synchronize configuration changes between the Routing Engines:  

```
[edit system]
user@switch# set commit synchronize
```

If you try to commit the nonstop active routing configuration without including the **commit synchronize** statement, the commit fails.



**NOTE:** If the backup Routing Engine is down when you issue the commit, a warning is displayed and the candidate configuration is committed in the master Routing Engine. When the backup Routing Engine comes up, its configuration is automatically synchronized with that of the master. If you subsequently insert or bring up a backup Routing Engine, it automatically synchronizes its configuration with the master Routing Engine configuration.

---

**Results** Check the results of the configuration:

```
[edit]
user@switch# show
chassis {
  redundancy {
    graceful-switchover;
  }
}
routing-options {
  nonstop-routing;
}
system {
  commit synchronize;
```

```
}

```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That Nonstop Active Routing Is Working Correctly on the Switch on page 943](#)

### [Verifying That Nonstop Active Routing Is Working Correctly on the Switch](#)

**Purpose** Verify that nonstop active routing is enabled.

**Action** Issue the `show task replication` command:

```
user@switch# show task replication
Stateful Replication: Enabled
RE mode: Master
```

Protocol	Synchronization Status
OSPF	Complete
RIP	Complete
PIM	Complete
RSVP	Complete

**Meaning** This output shows that nonstop active routing (Stateful Replication) is enabled on master routing engine. If nonstop routing is not enabled, instead of the output shown above:

- On the backup routing engine the following error message is displayed: **“error: the routing subsystem is not running.”**
- On the master routing engine, the following output is displayed if nonstop routing is not enabled:

```
Stateful Replication: Disabled
RE mode: Master
```

## Troubleshooting

To troubleshoot nonstop active routing, perform these tasks:

### [Investigating Problems with Synchronization of Routing Engines When NSR Is Enabled](#)

**Problem** A protocol loses connectivity with neighbors after a graceful Routing Engine switchover (GRES) occurs with nonstop active routing (NSR) enabled.

**Solution** Use trace options to help isolate the problem and gather troubleshooting information. Using the information gathered from trace options, you can confirm or eliminate the synchronization of the Routing Engines as the cause of the loss of connectivity for the protocol. See “Tracing Nonstop Active Routing Synchronization Events” on page 949.

**Related Documentation**

- [Configuring Nonstop Active Routing on J-EX Series Switches \(CLI Procedure\) on page 948](#)
- [Tracing Nonstop Active Routing Synchronization Events on page 949](#)

- Understanding Nonstop Active Routing on J-EX Series Switches on page 931

## Example: Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches

---

Nonstop software upgrade (NSSU) enables you to upgrade the software running on a J-EX8200 switch with redundant Routing Engines using a single command and with minimal disruption to network traffic. By default, NSSU upgrades the software running on the line cards one line card at a time. To reduce the time an NSSU takes, you can configure line-card upgrade groups.

This example shows how to configure NSSU to use line-card upgrade groups:

- Requirements on page 944
- Overview and Topology on page 944
- Configuration on page 945

### Requirements

This example uses the following hardware and software components:

- A J-EX8200 switch with redundant Routing Engines
- Junos OS Release 10.4 or later for J-EX Series switches

Before you begin to configure line-card upgrade groups, ensure that you have configured the link aggregation groups (LAGs) as described in “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 1081. See “Overview and Topology” on page 944 for details about the LAG configurations for this example.

### Overview and Topology

In its default configuration, NSSU upgrades each line card in a switch or Virtual Chassis one at a time. Traffic continues to flow through the other line cards while a line card is being restarted as part of the upgrade. This behavior allows you minimize disruption to traffic by configuring link aggregation groups (LAGs) such that the member links of each LAG reside on different line cards. When one member link of a LAG is down, the remaining links are up, and traffic continues to flow through the LAG.

Because the default configuration upgrades each line card one at a time, the upgrade can take some time to complete. You can reduce the time it takes to perform an NSSU by configuring line-card upgrade groups. Instead of being upgraded sequentially, the line cards in an upgrade group are upgraded simultaneously. To achieve minimal traffic disruption, you must define the line-card upgrade groups such that the member links of the LAGs reside on line cards that are in different upgrade groups.

This example uses a J-EX8200 switch that has five line cards installed in slots 0 through 4. Two LAGs have been configured:

- **ae0**—Has two member links, one on the line card in slot 0 and one on the line card in slot 1.

- **ae1**—Has two member links, one on the line card in slot 2 and one on the line card in slot 3.

The interfaces on the line card in slot 4 are not part of either LAG.

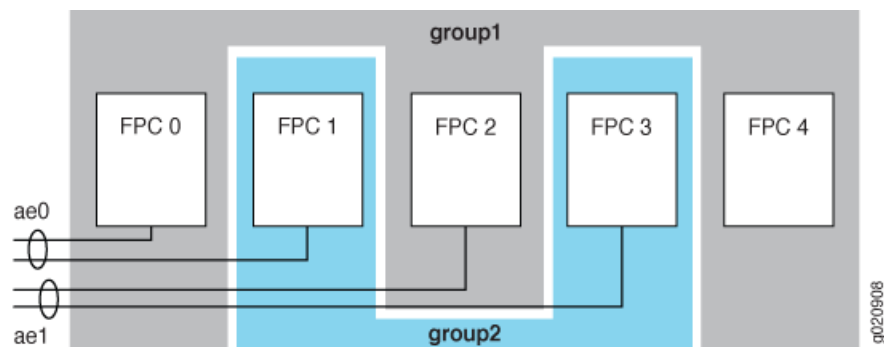
To minimize the time an upgrade takes and to ensure that the member links of each LAG are in different upgrade groups, this example configures the following two line-card upgrade groups:

- **group1**—Contains the line cards in slots 0, 2, and 4.
- **group2**—Contains the line cards in slots 1 and 3.

The line card in slot 4 could be put in either group. It could also be left out of an upgrade group entirely, and it would be upgraded separately after the line cards in the upgrade groups have been upgraded. However, it is more efficient to include it in an upgrade group.

Figure 30 on page 945 illustrates the topology.

**Figure 30: Example Line-Card Upgrade Group Topology**



## Configuration

To create line-card upgrade groups, perform these tasks:

### CLI Quick Configuration

To quickly create the line-card upgrade groups, copy the following commands and paste them into the switch terminal window:

```
[edit]
set chassis nssu upgrade-group group1 fpcs [0 2 4]
set chassis nssu upgrade-group group2 fpcs [1 3]
```

### Step-by-Step Procedure

To create the line-card upgrade groups for an NSSU:

1. Create the first line-card upgrade group:
 

```
[edit chassis]
user@swi tch# set nssu upgrade-group group1 fpcs [0 2 4]
```
2. Create the second line-card upgrade group:
 

```
[edit chassis]
user@swi tch# set nssu upgrade-group group2 fpcs [1 3]
```

**Results** Display the results of the configuration:

```
[edit chassis]
user@switch# show
nssu {
  upgrade-group group1 {
    fpcs [ 0 2 4 ];
  }
  upgrade-group group2 {
    fpcs [ 1 3 ];
  }
}
```

**Related  
Documentation**

- [Configuring Line-card Upgrade Groups for Nonstop Software Upgrade \(CLI Procedure\) on page 951](#)
- [Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\) on page 955](#)

# Configuring High Availability

- Configuring VRRP for IPv6 (CLI Procedure) on page 947
- Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure) on page 948
- Tracing Nonstop Active Routing Synchronization Events on page 949
- Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951
- Configuring Power Supply Redundancy (CLI Procedure) on page 952
- Configuring the Power Priority of Line Cards (CLI Procedure) on page 953

## Configuring VRRP for IPv6 (CLI Procedure)

---

By configuring the Virtual Router Redundancy Protocol (VRRP) on J-EX Series switches, you can enable hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts. You can configure VRRP for IPv6 on Gigabit Ethernet, 10-Gigabit Ethernet, and logical interfaces.

To configure VRRP for IPv6:

1. Configure VRRP group support on interfaces:

```
[edit interfaces interface-name unit logical-unit-number family inet6
address address]
user@switch# set vrrp-inet6-group group-id priority number virtual-inet6-address
address virtual-link-local-address ipv6-address
```

You must explicitly define a virtual link local address for each VRRP for IPv6 group. Otherwise, when you attempt to commit the configuration, the commit request fails. The virtual link local address must be on the same subnet as the physical interface address.

2. If you want to configure the priority order in which this switch functioning as a backup router becomes the master router if the master router becomes nonoperational, configure a priority for this switch:

```
[edit interfaces interface-name unit logical-unit-number family inet6
address address vrrp-inet6-group group-id]
user@switch# set priority number
```

3. Specify the interval in milliseconds in which the master router sends advertisement packets to the members of the VRRP group:

```
[edit interfaces interface-name unit logical-unit-number family inet6
address address vrrp-inet6-group group-id]
user@switch# set inet6-advertise-interval milliseconds
```

4. By default, a higher-priority backup router preempts a lower-priority master router.
  - To explicitly enable the master router to be preempted:

```
[edit interfaces interface-name unit logical-unit-number family inet6
address address vrrp-inet6-group group-id]
user@switch# set preempt
```

- To prohibit a higher-priority backup router from preempting a lower priority master router:

```
[edit interfaces interface-name unit logical-unit-number family inet6
address address vrrp-inet6-group group-id]
user@switch# set no-preempt
```

- Related Documentation**
- [show vrrp on page 988](#)
  - [Understanding VRRP on J-EX Series Switches on page 928](#)

---

## Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure)

---

Nonstop active routing (NSR) provides a mechanism for transparent switchover of the Routing Engines without necessitating restart of supported routing protocols. Both Routing Engines are fully active in processing protocol sessions, and so each can take over for the other. The switchover is transparent to neighbors.

You can configure nonstop active routing on a J-EX Series switch with redundant Routing Engines to enable the transparent switchover of the Routing Engines in the event that the Routing Engines switch over. You can also disable nonstop active routing after you have enabled it.

To configure nonstop active routing:

1. Enable graceful Routing Engine switchover (GRES):

```
[edit chassis redundancy]
user@switch# set graceful-switchover
```

2. Enable nonstop active routing (by default, nonstop active routing is disabled):

```
[edit routing-options]
user@switch# set nonstop-routing
```

3. Synchronize configuration changes between the Routing Engines:

```
[edit system]
user@switch# set commit synchronize
```



If you try to commit the nonstop active routing configuration without including the `commit synchronize` statement, the commit fails.



**NOTE:** There is no requirement to start the two Routing Engines simultaneously. If the backup Routing Engine is not up when you `commit synchronize`, the candidate configuration is committed in the master Routing Engine and when the backup Routing Engine is inserted or comes online, its configuration is automatically synchronized with that of the master.



**BEST PRACTICE:** After a graceful Routing Engine switchover, we recommend that you issue the `clear interface statistics (interface-name | all)` command to reset the cumulative values for local statistics on the new master Routing Engine.

To disable nonstop active routing:

```
[edit routing-options]
user@switch# delete nonstop-routing
```

#### Related Documentation

- Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941
- Tracing Nonstop Active Routing Synchronization Events on page 949
- Understanding Nonstop Active Routing on J-EX Series Switches on page 931

## Tracing Nonstop Active Routing Synchronization Events

To track the progress of nonstop active routing synchronization between Routing Engines, you can configure nonstop active routing trace options flags for each supported protocol and for BFD sessions and record these operations to a log file.

To configure nonstop active routing trace options for supported routing protocols, include the `nsr-synchronization` statement at the `[edit protocols protocol-name traceoptions flag]` hierarchy level and optionally specify one or more of the `detail`, `disable`, `receive`, and `send` options:

```
[edit protocols]
  bgp {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
  isis {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
  ldp {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
```

```

    }
  }
  mpls {
    traceoptions {
      flag nsr-synchronization;
      flag nsr-synchronization-detail;
    }
  }
  (ospf | ospf3) {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
  (rip | ripng) {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
  pim {
    traceoptions {
      flag nsr-synchronization <detail> <disable> <receive> <send>;
    }
  }
}

```

To configure nonstop active routing trace options for BFD sessions, include the **nsr-synchronization** and **nsr-packet** statements at the **[edit protocols bfd traceoptions flag]** hierarchy level.

```

[edit protocols]
bfd {
  traceoptions {
    flag nsr-synchronization;
    flag nsr-packet;
  }
}

```

To trace the Layer 2 VPN signaling state replicated from routes advertised by BGP, include the **nsr-synchronization** statement at the **[edit routing-options traceoptions flag]** hierarchy level. This flag also traces the label and logical interface association that VPLS receives from the kernel replication state.

```

[edit routing-options]
traceoptions {
  flag nsr-synchronization;
}

```

#### Related Documentation

- [Configuring Nonstop Active Routing](#)
- [Configuring Nonstop Active Routing on J-EX Series Switches \(CLI Procedure\) on page 948](#)
- [traceoptions on page 974](#)
- [Example: Configuring Nonstop Active Routing](#)
- [Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941](#)

## Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure)

Nonstop software upgrade (NSSU) enables you to upgrade the software running on a J-EX8200 switch with redundant Routing Engines using a single command and with minimal disruption to network traffic.

In its default configuration, NSSU upgrades each line card in a switch or Virtual Chassis one at a time. Traffic continues to flow through the other line cards while a line card is being restarted as part of the upgrade. This behavior allows you to minimize disruption to traffic by configuring link aggregation groups (LAGs) such that the member links of each LAG reside on different line cards. When one member link of a LAG is down, the remaining links are up, and traffic continues to flow through the LAG.

You can reduce the time it takes to perform an NSSU by configuring NSSU to use line-card upgrade groups. When you define an upgrade group, NSSU upgrades the line cards in the upgrade group at the same time instead of sequentially. To achieve minimal traffic disruption, you must define the line-card upgrade groups such that the member links of the LAGs reside on line cards that are in different upgrade groups. For information on how to configure LAGs, see “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 1081.

To configure line-card upgrade groups on a standalone J-EX8200 switch:

- To create an upgrade group and add a line card to it:

```
[edit chassis]
user@switch# set nssu upgrade-group group-name fpcs slot-number
```

For example, to create an upgrade group called **group3** and add the line card in slot 5 to it:

```
[edit chassis]
user@switch# set nssu upgrade-group group3 fpcs 5
```

If **group3** already exists, this command adds line card 5 to **group3**.

- To create an upgrade group and add multiple line cards to it:

```
[edit chassis]
user@switch# set nssu upgrade-group group-name fpcs [list-of-slot-numbers]
```

For example, to create an upgrade group called **primary** and add line cards in slots 1, 4, and 7 to it:

```
[edit chassis]
user@switch# set nssu upgrade-group primary fpcs [1 4 7]
```

If **primary** already exists, this command adds line cards in slots 1, 4, and 7 to **primary**.

### Related Documentation

- Example: Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944
- Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure) on page 955

- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932

## Configuring Power Supply Redundancy (CLI Procedure)

---

By default, the power management feature in J-EX8200 switches is configured to manage the power supplies for N+1 redundancy, in which one power supply is held in reserve for backup if any one of the other power supplies is removed or fails.

You can configure power management to manage the power supplies for N+N redundancy. For example, to set up your AC power supplies for dual power feed, N+N redundancy is required. In N+N redundancy, power management allocates half of the online power supplies to normal operating power and half to redundant power. If you have an odd number of online power supplies, power management allocates one more power supply to normal operating power than to redundant power.

This topic describes how to configure power management for N+N redundancy and how to revert back to N+1 redundancy if your deployment needs change.

Before you configure power management for N+N redundancy, ensure that you have sufficient power supplies to meet the power requirements of this configuration. Use the **show chassis power-budget-statistics** command to display your current power budget.



**NOTE:** To allow more power to be available to line cards, power management compensates for the reduced normal operating power in an N+N configuration by reserving less power to the chassis than it does in an N+1 configuration. For the J-EX8208 switch, the power reserved for the chassis is reduced to 1200 W from 1600 W. For the J-EX8216 switch, it is reduced to 1800 W from 2400 W. In determining whether you have enough power for an N+N configuration, take this reduction of reserved chassis power into account.

The reduction in reserved chassis power is achieved by reducing the maximum fan speed to 60 percent in an N+N configuration from 80 percent in an N+1 configuration. Because the maximum fan speed is reduced, it is possible that a line card that overheats would be shut down sooner in an N+N configuration than in an N+1 configuration.

To configure N+N redundancy:

```
[edit chassis]
user@switch# set psu redundancy n-plus-n
```

To revert back to N+1 redundancy:

```
[edit chassis]
user@switch# delete chassis psu redundancy n-plus-n
```

### Related Documentation

- Configuring the Power Priority of Line Cards (CLI Procedure) on page 953
- Verifying Power Configuration and Use on page 962

- Understanding Power Management on J-EX Series Switches on page 935

## Configuring the Power Priority of Line Cards (CLI Procedure)

---

The power management facility on J-EX8200 switches allows you to assign power priorities to the slots occupied by line cards. Power management provides power to the slots in priority order, which means that line cards in higher priority slots are more likely to receive power than line cards in lower priority slots if power to the switch is insufficient to power all the line cards.

When assigning power priority to slots, keep these points in mind:

- 0 is the highest priority. For a J-EX8208 switch, you can assign a priority of 0 through 7 to a slot. For a J-EX8216 switch, you can assign a priority of 0 through 15 to a slot.
- All slots are assigned the lowest priority by default.
- If a group of slots shares the same assigned priority, each slot's power priority within the group is based on its slot number, with the lowest-numbered slots receiving power first.

To assign or change the power priority for a slot:

```
[edit chassis]
user@switch# set fpc slot power-budget-priority priority
```

For example, to set slot 6 to priority 0, enter:

```
[edit chassis]
user@switch# set fpc 6 power-budget-priority 0
```

### Related Documentation

- Configuring Power Supply Redundancy (CLI Procedure) on page 952
- Verifying Power Configuration and Use on page 962
- Understanding Power Management on J-EX Series Switches on page 935



# Administering High Availability

- [Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\)](#) on page 955
- [Verifying Power Configuration and Use](#) on page 962

## [Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\)](#)

---

You can use nonstop software upgrade (NSSU) to upgrade the software on standalone J-EX8200 switches with redundant Routing Engines. NSSU upgrades the software running on the Routing Engines and line cards with minimal traffic disruption during the upgrade. NSSU is supported on switches running Junos OS Release 10.4 or later.

With NSSU, you can upgrade both Routing Engines at the same time with a single command. You also have the option of upgrading just one Routing Engine, the backup Routing Engine, which becomes the master Routing Engine after the upgrade is done. You then use the standard software installation process to upgrade the original master Routing Engine.

This topic covers:

- [Preparing the Switch for Software Installation](#) on page 955
- [Upgrading Both Routing Engines Using NSSU](#) on page 957
- [Upgrading One Routing Engine Using NSSU](#) on page 959
- [Upgrading the Original Master Routing Engine](#) on page 961

### [Preparing the Switch for Software Installation](#)

Before you begin software installation using NSSU:

- (Optional) Configure line-card upgrade groups as described in “[Configuring Line-card Upgrade Groups for Nonstop Software Upgrade \(CLI Procedure\)](#)” on page 951. By default, an NSSU upgrades line cards one at a time to allow aggregated Ethernet links that have members on different line cards to remain up through the upgrade process. Configuring line-card upgrade groups reduces the time an upgrade takes because the line cards in each upgrade group are upgraded at the same time rather than sequentially.
- Verify that the Routing Engines are running the same version of the software. Enter the following command:

```
{master}
user@switch> show version invoke-on all-routing-engines
re0:
```

```
-----
Hostname: switch
Model: ex8208
JUNOS Base OS boot [10.4-20100712.0]
JUNOS Base OS Software Suite [10.4-20100712.0]
JUNOS Kernel Software Suite [10.4-20100712.0]
JUNOS Crypto Software Suite [10.4-20100712.0]
JUNOS Online Documentation [10.4-20100712.0]
JUNOS Enterprise Software Suite [10.4-20100712.0]
LC JUNOS Installation Software [10.4-20100712.0]
JUNOS Routing Software Suite [10.4-20100712.0]
JUNOS Web Management [10.4-20100712.0]
```

```
re1:
```

```
-----
Hostname: switch
Model: ex8208
JUNOS Base OS boot [10.4-20100712.0]
JUNOS Base OS Software Suite [10.4-20100712.0]
JUNOS Kernel Software Suite [10.4-20100712.0]
JUNOS Crypto Software Suite [10.4-20100712.0]
JUNOS Online Documentation [10.4-20100712.0]
JUNOS Enterprise Software Suite [10.4-20100712.0]
LC JUNOS Installation Software [10.4-20100712.0]
JUNOS Routing Software Suite [10.4-20100712.0]
JUNOS Web Management [10.4-20100712.0]
```

If the Routing Engines are not running the same version of the software, use the **request system software add** command to upgrade the Routing Engine that is running the earlier software version. For instructions on upgrading a single Routing Engine, see “Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure)” on page 81.

- Ensure that nonstop active routing (NSR) and graceful Routing Engine switchover (GRES) are enabled. To verify that they are enabled, you need to check only the state of nonstop active routing—if nonstop active routing is enabled, then graceful Routing Engine switchover is enabled.

To verify that nonstop active routing is enabled, execute the following command:

```
{master}
user@switch> show task replication
Stateful Replication: Enabled
RE mode: Master

Protocol                Synchronization Status
OSPF                    Complete
RIP                     Complete
PIM                     Complete
RSVP                    Complete
```



If nonstop active routing is not enabled (**Stateful Replication is Disabled**), see “Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure)” on page 948 for information on how to enable it.

- (Optional) Back up the system software on each Routing Engine to a second storage device with the **request system snapshot** command.

## Upgrading Both Routing Engines Using NSSU

This procedure describes how to upgrade both Routing Engines using NSSU. When the upgrade completes, both Routing Engines are running the new version of the software, and the backup Routing Engine is the new master Routing Engine.

To upgrade both Routing Engines using NSSU:

1. Download the software package by following the procedure in “Downloading Software Packages” on page 79.
2. Copy the software package to the switch. We recommend that you use FTP to copy the file to the `/var/tmp` directory.
3. Log in to the master Routing Engine using the console connection. You can perform an NSSU from the management interface, but a console connection allows you to monitor the progress of the master Routing Engine reboot.
4. Install the new software package:

```
{master}
user@switch> request system software nonstop-upgrade reboot
/var/tmp/package-name-m.nZx-distribution.tgz
```

where *package-name-m.nZx-distribution.tgz* is, for example, *jinstall-ex-8200-10.4R1.5-domestic-signed.tgz*.

The switch displays the following status messages as the upgrade executes:

```
Chassis ISSU Check Done
ISSU: Validating Image
ISSU: Preparing Backup RE
Pushing bundle to re1
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
Backup upgrade done
Rebooting Backup RE

Rebooting re1
ISSU: Backup RE Prepare Done
Waiting for Backup RE reboot
GRES operational
Initiating Chassis In-Service-Upgrade
Chassis ISSU Started
ISSU: Preparing Daemons
ISSU: Daemons Ready for ISSU
ISSU: Starting Upgrade for FRUs
ISSU: Preparing for Switchover
ISSU: Ready for Switchover
Checking In-Service-Upgrade status
  Item          Status          Reason
  FPC 0         Online
```

```

FPC 1      Online
FPC 2      Online
FPC 3      Offline          Offlined by CLI command
FPC 4      Online
FPC 5      Online
FPC 6      Online
FPC 7      Online
Resolving mastership...
Complete. The other routing engine becomes the master.
ISSU: RE switchover Done
ISSU: Upgrading Old Master RE
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
ISSU: Old Master Upgrade Done
ISSU: IDLE
Shutdown NOW!
[pid 2635]

```

```

*** FINAL System shutdown message from user@switch ***
System going down IMMEDIATELY

```



**NOTE:** If you omit the reboot option in this step, you must manually reboot the original master Routing Engine with the `request system reboot` command for the upgrade to complete.

5. Log in after the reboot completes. To verify that both Routing Engines have been upgraded, enter the following command:

```

{backup}
user@switch> show version invoke-on all-routing-engines
re0:
-----
Hostname: switch
Model: ex8208
JUNOS Base OS boot [10.4-20100826.0]
JUNOS Base OS Software Suite [10.4-20100826.0]
JUNOS Kernel Software Suite [10.4-20100826.0]
JUNOS Crypto Software Suite [10.4-20100826.0]
JUNOS Online Documentation [10.4-20100826.0]
JUNOS Enterprise Software Suite [10.4-20100826.0]
LC JUNOS Installation Software [10.4-20100826.0]
JUNOS Routing Software Suite [10.4-20100826.0]
JUNOS Web Management [10.4-20100826.0]

re1:
-----
Hostname: switch
Model: ex8208 JUNOS Base OS boot [10.4-20100826.0]
JUNOS Base OS Software Suite [10.4-20100826.0]
JUNOS Kernel Software Suite [10.4-20100826.0]
JUNOS Crypto Software Suite [10.4-20100826.0]
JUNOS Online Documentation [10.4-20100826.0]
JUNOS Enterprise Software Suite [10.4-20100826.0]
LC JUNOS Installation Software [10.4-20100826.0]
JUNOS Routing Software Suite [10.4-20100826.0]
JUNOS Web Management [10.4-20100826.0]

```

6. To verify that the line cards that were online before the upgrade are online after the upgrade, log in to the master Routing Engine and enter the **show chassis nonstop-upgrade** command:

```
{backup}
user@switch> request routing-engine login master

{master}
user@switch> show chassis nonstop-upgrade
Item           Status           Reason
FPC 0          Online
FPC 1          Online
FPC 2          Online
FPC 3          Offline          Offlined by CLI command
FPC 4          Online
FPC 5          Online
FPC 6          Online
FPC 7          Online
```

7. If you want to make **re0** the master Routing Engine again, enter the following command:

```
{master}
user@switch> request chassis routing-engine master switch
Toggle mastership between routing engines ? [yes,no] (no) yes
```

You can verify that **re0** is the master Routing Engine by executing the **show chassis routing-engine** command.

8. Back up the system software on each Routing Engine to a second storage device with the **request system snapshot** command.

## Upgrading One Routing Engine Using NSSU

This procedure describes how to upgrade one of the Routing Engines using NSSU. When the upgrade completes, the backup Routing Engine is running the new software version and is the new master. The original master Routing Engine, now the backup Routing Engine, continues to run the previous software version.

To upgrade one Routing Engine using NSSU:

1. Download the software package by following the procedure in “Downloading Software Packages from Juniper Networks” on page 79.
2. Copy the software package to the switch. We recommend that you use FTP to copy the file to the **/var/tmp** directory.
3. Log in to the master Routing Engine.
4. Request an NSSU and specify the **no-old-master-upgrade** option:

```
{master}
user@switch> request system software nonstop-upgrade
no-old-master-upgrade /var/tmp/package-name-m.nZx-distribution.tgz
```

where *package-name-m.nZx-distribution.tgz* is, for example, *jinstall-ex-8200-10.4R2.5-domestic-signed.tgz*.

The switch displays the following status messages as the upgrade executes:

```
Chassis ISSU Check Done
ISSU: Validating Image
ISSU: Preparing Backup RE
Pushing bundle to re1
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
Backup upgrade done
Rebooting Backup RE

Rebooting re1
ISSU: Backup RE Prepare Done
Waiting for Backup RE reboot
GRES operational
Initiating Chassis In-Service-Upgrade
Chassis ISSU Started
ISSU: Preparing Daemons
ISSU: Daemons Ready for ISSU
ISSU: Starting Upgrade for FRUs
ISSU: Preparing for Switchover
ISSU: Ready for Switchover
Checking In-Service-Upgrade status
  Item          Status          Reason
  FPC 0         Online
  FPC 1         Online
  FPC 2         Online
  FPC 3         Offline         Offlined by CLI command
  FPC 4         Online
  FPC 5         Online
  FPC 6         Online
  FPC 7         Online
Resolving mastership...
Complete. The other routing engine becomes the master.
ISSU: RE switchover Done
Skipping Old Master Upgrade
ISSU: IDLE
```

When the upgrade is complete, the original master Routing Engine (**re0**) becomes the backup Routing Engine.

5. To verify that the original backup Routing Engine (**re1**) has been upgraded, enter the following command:

```
{backup}
user@switch> show version invoke-on all-routing-engines
re0:
-----
Hostname: switch
Model: ex8208
JUNOS Base OS boot [10.4-20100712.0]
JUNOS Base OS Software Suite [10.4-20100712.0]
JUNOS Kernel Software Suite [10.4-20100712.0]
JUNOS Crypto Software Suite [10.4-20100712.0]
JUNOS Online Documentation [10.4-20100712.0]
JUNOS Enterprise Software Suite [10.4-20100712.0]
LC JUNOS Installation Software [10.4-20100712.0]
JUNOS Routing Software Suite [10.4-20100712.0]
```

```
JUNOS Web Management [10.4-20100712.0]
```

```
re1:
```

```
-----
Hostname: switch
Model: ex8208
JUNOS Base OS boot [10.4-20100828.0]
JUNOS Base OS Software Suite [10.4-20100828.0]
JUNOS Kernel Software Suite [10.4-20100828.0]
JUNOS Crypto Software Suite [10.4-20100828.0]
JUNOS Online Documentation [10.4-20100828.0]
JUNOS Enterprise Software Suite [10.4-20100828.0]
LC JUNOS Installation Software [10.4-20100828.0]
JUNOS Routing Software Suite [10.4-20100828.0]
JUNOS Web Management [10.4-20100828.0]
```

- To verify that the line cards that were online before the upgrade are online after the upgrade, log in to the new master Routing Engine and enter the **show chassis nonstop-upgrade** command:

```
{backup}
user@switch> request routing-engine login master

--- JUNOS 10.4-20100828.0 built 2010-08-28 05:19:44 UTC
{master}
user@switch> show chassis nonstop-upgrade
  Item      Status      Reason
  FPC 0     Online
  FPC 1     Online
  FPC 2     Online
  FPC 3     Offline    Offlined by CLI command
  FPC 4     Online
  FPC 5     Online
  FPC 6     Online
  FPC 7     Online
```

## Upgrading the Original Master Routing Engine

This procedure describes how to upgrade the original master Routing Engine after you have upgraded the original backup Routing Engine as described in “Upgrading One Routing Engine Using NSSU” on page 959.

- Log in to the current master Routing Engine (**re1**):
- Enter configuration mode and disable nonstop active routing:

```
{master}[edit]
user@switch# delete routing-options nonstop-routing
```

- Deactivate graceful Routing Engine switchover and commit the configuration:

```
{master}[edit]
user@switch# deactivate chassis redundancy graceful-switchover
```

```
{master}[edit]
user@switch# commit
```

- Log in to the current backup Routing Engine (**re0**) using a console connection.
- Request a software installation:

```
user@switch> request system software add reboot
/var/tmp/package-name-m.nZx-distribution.tgz
```



**NOTE:** When you use NSSU to upgrade only one Routing Engine, the installation package is not automatically deleted from `/var/tmp`, leaving the package available to be used to upgrade the original master Routing Engine.

6. After the upgrade completes, log in to the current master Routing Engine (**re1**) and enter CLI configuration mode.

7. Re-enable nonstop active routing and graceful Routing Engine switchover:

```
[edit]
user@switch# activate chassis redundancy graceful-switchover
```

```
[edit]
user@switch# set routing-options nonstop-routing
```

```
[edit]
user@switch# commit
```

8. (Optional) To return control to the original master Routing Engine (**re0**), exit CLI configuration mode and enter the following command:

```
{master}
user@switch> request chassis routing-engine master switch
Toggle mastership between routing engines ? [yes,no] (no) yes
```

You can verify that **re0** is the master Routing Engine by executing the **show chassis routing-engine** command.

9. (Optional) Back up the system software on each Routing Engine to a second storage device with the **request system snapshot** command.

#### Related Documentation

- Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944
- Troubleshooting Software Installation on page 107
- Junos OS Package Names on page 72
- Understanding Nonstop Software Upgrade on J-EX Series Switches on page 932
- Understanding Software Installation on J-EX Series Switches on page 69

## Verifying Power Configuration and Use

**Purpose** Verify on a J-EX8200 switch:

- What the power redundancy and line card priority settings are
- Whether the N+1 or N+N power requirements are being met

- Whether the switch has sufficient power for a new line card or an N+N configuration

**Action** Enter the following command:

```
user@switch> show chassis power-budget-statistics
PSU 1      (EX8200-AC2K)      : 1200 W
PSU 2      (EX8200-AC2K)      : 1200 W
PSU 3      (EX8200-AC2K)      : 1200 W
PSU 4      (EX8200-AC2K)      : 1200 W
Total Power supplied by all Online PSUs : 4800 W
Power Redundancy Configuration          : N+N
Power Reserved for the Chassis          : 1200 W
FPC 5      (EX8200-48F )       : 330 W   Priority: 7
FPC 6      (EX8200-8XS )       : 450 W   Priority: 0
Actual Power Used                        : 1980 W
Power Available (Redundant case)         : 420 W
Total Power Available                    : 2820 W
```

**Meaning** The switch is configured for N+N redundancy. As shown by the **Power Available (Redundant case)** field, the switch has sufficient power to meet the N+N power requirements and has an additional 420 W available. The switch has insufficient power for an additional 8-port SFP+ line card while maintaining N+N redundancy, because the line card requires 450 W. However, it does have enough power for an additional 48-port SFP line card, which requires only 330 W. The 8-port SFP+ line card in slot 6 has a higher power priority than the 48-port SFP line card line card in slot 5.



**NOTE:** The amount of power shown in the **Actual Power Used** field reflects the total power allocated in the power budget for the installed components rather than the actual power being used by the components. Because the power budget allocation is based on maximum power use, actual power consumption is likely to be much less.

**Related Documentation**

- Configuring Power Supply Redundancy (CLI Procedure) on page 952
- Configuring the Power Priority of Line Cards (CLI Procedure) on page 953





# Configuration Statements for High Availability

## commit synchronize

---

<b>Syntax</b>	commit synchronize;
<b>Hierarchy Level</b>	[edit system]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>For devices with multiple Routing Engines only. Configure a <b>commit</b> command to automatically result in a <b>commit synchronize</b> command. The Routing Engine on which you execute the <b>commit</b> command (the requesting Routing Engine) copies and loads its candidate configuration to the other (the responding) Routing Engines. All Routing Engines then perform a syntax check on the candidate configuration file being committed. If no errors are found, the configuration is activated and becomes the current operational configuration on all Routing Engines.</p> <p>Accounting of events and operations on a backup Routing Engine is not supported on accounting servers such as TACACS+ or RADIUS. Logging of accounting events is supported only for events and operations on a master Routing Engine.</p>
<b>Required Privilege Level</b>	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically</li></ul>

## fpc

<b>Syntax</b>	<pre>fpc slot {   pic <i>pic-number</i> {     sfpplus {       pic-mode <i>mode</i>;     }   }   power-budget-priority <i>priority</i>; }</pre>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>On a J-EX4200 switch, specify the port of the SFP+ uplink module for which you want to configure the operating mode.</p> <p>On a J-EX8200 switch, specify the line card slot for which you want to assign a power priority.</p>
<b>Options</b>	<p><b>slot</b>—Number of the slot:</p> <ul style="list-style-type: none"> <li>• 0—Standalone J-EX4200 switches. The FPC refers to the switch itself.</li> <li>• 0–9—J-EX4200 switch in a Virtual Chassis configuration. The value corresponds to the switch's member ID.</li> <li>• 0–7—J-EX8200 switch. The slot is a line card slot.</li> <li>• 0–15—J-EX8216 switch. The slot is a line card slot.</li> </ul> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 1093</li> <li>• Configuring the Power Priority of Line Cards (CLI Procedure) on page 953</li> </ul>

## fpcs

---

<b>Syntax</b>	<code>fpcs (slot-number   [<i>list-of-slot-numbers</i>]);</code>
<b>Hierarchy Level</b>	[edit chassis nssu upgrade-group <i>group-name</i> ], [edit chassis nssu upgrade-group <i>group-name</i> member <i>member-id</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Assign one or more line cards to a line-card upgrade group by specifying their slot numbers.
<b>Options</b>	<p><i>list-of-slot-numbers</i>—A list of slot numbers of multiple line cards to be included in the upgrade group. Separate the slot numbers with spaces and enclose the list in square brackets—for example: [3 4 7].</p> <p><i>slot-number</i>—The slot number of a single line card to be included in the upgrade group.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944</li> <li>• Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951</li> </ul>

## graceful-switchover

---

<b>Syntax</b>	<code>graceful-switchover;</code>
<b>Hierarchy Level</b>	[edit chassis redundancy]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For switches with more than one Routing Engine, configure the master Routing Engine to switch over gracefully to a backup Routing Engine without interruption to packet forwarding.
<b>Default</b>	Graceful Routing Engine switchover (GRES) is disabled.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring Nonstop Active Routing on J-EX Series Switches on page 941</li><li>• Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856</li><li>• Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure) on page 948</li><li>• Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure) on page 81</li></ul>

## inet6-advertise-interval

---

<b>Syntax</b>	<code>inet6-advertise-interval <i>milliseconds</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>group-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the interval between Virtual Router Redundancy Protocol (VRRP) IPv6 advertisement packets.
<b>Options</b>	<i>milliseconds</i> —Interval, in milliseconds, between advertisement packets. <b>Range:</b> 100 to 40,000 ms <b>Default:</b> 1 second
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring VRRP for IPv6 (CLI Procedure) on page 947</li></ul>

## n-plus-n

---

<b>Syntax</b>	n-plus-n;
<b>Hierarchy Level</b>	[edit chassis psu redundancy]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure N+N power supply redundancy for power management on a J-EX8200 switch.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Power Supply Redundancy (CLI Procedure) on page 952</li> </ul>

## nonstop-routing

---

<b>Syntax</b>	nonstop-routing;
<b>Hierarchy Level</b>	[edit routing-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	For routing platforms with two Routing Engines, configure a master Routing Engine to switch over gracefully to a backup Routing Engine and preserve routing protocol information.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Nonstop Active Routing</li> <li>Configuring Nonstop Active Routing on J-EX Series Switches (CLI Procedure) on page 948</li> </ul>

## nssu

---

<b>Syntax</b>	<pre>nssu {   upgrade-group <i>group-name</i> {     fpcs (<i>slot-number</i>   [<i>list-of-slot-numbers</i>]);     member <i>member-id</i> {       fpcs (<i>slot-number</i>   [<i>list-of-slot-numbers</i>]);     }   } }</pre>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	<p>(J-EX8200 switches only) Define a line-card upgrade group for nonstop software upgrade (NSSU). All line cards in an upgrade group are upgraded to the new software version at the same time.</p> <p>The remaining statements are explained separately.</p>
<b>Default</b>	If no line-card upgrade groups are defined, NSSU upgrades line cards one at a time in ascending order by slot number.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944</li><li>• Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951</li></ul>

## power-budget-priority

---


<b>Syntax</b>	<code>power-budget-priority <i>priority</i>;</code>
<b>Hierarchy Level</b>	[edit chassis fpc slot]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for EX Series switches.
<b>Description</b>	Assign a power priority to the specified line card slot on a J-EX8200 switch.
<b>Default</b>	All line card slots are initially assigned the lowest priority.
<b>Options</b>	<p><b>priority</b>—Assigned power priority for the slot, with 0 being the highest priority.</p> <p><b>Range:</b> 0 through 7 for a J-EX8208 switch; 0 through 15 for a J-EX8216 switch</p> <p><b>Range:</b> 0 through 15 for a J-EX8216 switch</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Power Priority of Line Cards (CLI Procedure) on page 953</li> </ul>

## preempt

---

<b>Syntax</b>	<pre>(preempt   no-preempt) {   hold-time <i>seconds</i>; }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>group-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	<p>Configure whether a backup router can preempt a master router:</p> <ul style="list-style-type: none"> <li><b>preempt</b>—Allow the master router to be preempted.</li> <li><b>no-preempt</b>—Prohibit the preemption of the master router.</li> </ul> <p>The remaining statement is explained separately.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li> </ul>

## priority

<b>Syntax</b>	<code>priority <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> vrrp-group <i>group-id</i> ], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>group-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a switch's priority for becoming the master default routing platform. The routing platform with the highest priority within the group becomes the master.
<b>Options</b>	<b><i>number</i></b> —Routing platform's priority for being elected to be the master router in the VRRP group. A larger value indicates a higher priority for being elected. <b>Range:</b> 1 through 255 <b>Default:</b> 100 (for backup routers)
	 <b>NOTE:</b> Priority 255 cannot be assigned to routed VLAN interfaces (RVIs).
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li> </ul>

## psu

<b>Syntax</b>	<code>psu {   redundancy {     n-plus-n;   } }</code>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure N+N power supply redundancy for power management on a J-EX8200 switch.  The remaining statements are explained separately.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Power Supply Redundancy (CLI Procedure) on page 952</li> </ul>



## redundancy (Graceful Switchover)

---

<b>Syntax</b>	<code>redundancy {     graceful-switchover; }</code>
<b>Hierarchy Level</b>	[edit chassis]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	For J-EX4200 and J-EX4500 switches configured as a Virtual Chassis and for J-EX8200 switches with more than one Routing Engine, enable redundant Routing Engines.  The remaining statement is explained separately.
<b>Default</b>	Redundancy is enabled for the Routing Engines.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856</li> <li>Installing Software on a J-EX8200 Switch with Redundant Routing Engines (CLI Procedure) on page 81</li> </ul>

## redundancy (Power Management)

---

<b>Syntax</b>	<code>redundancy {     n-plus-n; }</code>
<b>Hierarchy Level</b>	[edit chassis psu]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure N+N power supply redundancy for power management on a J-EX8200 switch.  The remaining statement is explained separately.
<b>Default</b>	N+1 power supply redundancy is configured by default.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Power Supply Redundancy (CLI Procedure) on page 952</li> </ul>

## traceoptions

<b>Syntax</b>	<pre>traceoptions {     file <i>name</i> &lt;size <i>size</i>&gt; &lt;files <i>number</i>&gt; &gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;; }</pre>
<b>Hierarchy Level</b>	<pre>[edit protocols bfd], [edit protocols bgp], [edit protocols isis], [edit protocols ldp], [edit protocols mpls], [edit protocols ospf], [edit protocols ospf3], [edit protocols pim], [edit protocols rip], [edit protocols ripng], [edit routing-options]</pre>
<b>Release Information</b>	Statement introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	<p>Define tracing operations that track nonstop active routing (NSR) functionality in the router.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p>
<b>Default</b>	If you do not include this statement, no global tracing operations are performed.
<b>Options</b>	<p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>name</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>. We recommend that you place global routing protocol tracing output in the file <code>routing-log</code>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <i>trace-file</i> reaches its maximum size, it is renamed <i>trace-file.0</i>, then <i>trace-file.1</i>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p><b>Range:</b> 2 through 1000 files</p> <p><b>Default:</b> 2 files</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The nonstop active routing tracing options are:</p> <ul style="list-style-type: none"> <li>• <b>nsr-packet</b>—Detailed trace information for BFD nonstop active routing only</li> <li>• <b>nsr-synchronization</b>—Tracing operations for nonstop active routing</li> </ul>

- **nsr-synchronization-detail**—(MPLS only) Tracing operations for nonstop active routing in detail

**flag-modifier**—(Optional) Modifier for the tracing flag. Except for BFD sessions, you can specify one or more of these modifiers:

- **detail**—Detailed trace information
- **receive**—Packets being received
- **send**—Packets being transmitted

**no-world-readable**—Restrict users from reading the log file.

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named *trace-file* reaches this size, it is renamed *trace-file.0*. When the **trace-file** again reaches its maximum size, *trace-file.0* is renamed *trace-file.1* and *trace-file* is renamed *trace-file.0*. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through the maximum file size supported on your system

**Default:** 128 KB

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**world-readable**—Allow users to read the log file.


<b>Required Privilege Level</b>	routing and trace—To view this statement in the configuration. routing-control and trace-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Tracing Nonstop Active Routing Synchronization Events on page 949</li> </ul>

## upgrade-group

---

<b>Syntax</b>	<pre>upgrade-group <i>group-name</i> {     fpcs (<i>slot-number</i>   [<i>list-of-slot-numbers</i>]);     member <i>member-id</i> {         fpcs (<i>slot-number</i>   [<i>list-of-slot-numbers</i>]);     } }</pre>
<b>Hierarchy Level</b>	[edit chassis nssu]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Assign a name to the line-card upgrade group being created for nonstop software upgrade (NSSU).
<b>Options</b>	<p><i>group-name</i>—Name of the upgrade group.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Example: Configuring Line-card Upgrade Groups for Nonstop Software Upgrade on J-EX Series Switches on page 944</li><li>• Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951</li></ul>

## virtual-inet6-address

<b>Syntax</b>	<code>virtual-inet6-address [addresses];</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>group-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure the addresses of the virtual routers in a Virtual Router Redundancy Protocol (VRRP) IPv6 group. You can configure up to eight addresses.
	 <b>NOTE:</b> The address of an aggregated Ethernet interface (a LAG) or a routed VLAN interface (RVI) cannot be assigned as the virtual router address in a VRRP IPv6 group.
<b>Options</b>	<b>addresses</b> —Addresses of one or more virtual routers. Do not include a prefix length. If the address is the same as the interface's physical address, the interface becomes the master virtual router for the group.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li> </ul>

## virtual-link-local-address

<b>Syntax</b>	<code>virtual-link-local-address ipv6-address;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>group-id</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a virtual link local address for a Virtual Router Redundancy Protocol (VRRP) IPv6 group. You must explicitly define a virtual link local address for each VRRP IPv6 group. The virtual link local address must be in the same subnet as the physical interface address.
<b>Options</b>	<b>ipv6-address</b> —Virtual link local IPv6 address for VRRP for an IPv6 group.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li> </ul>

## vrrp-inet6-group

---

<b>Syntax</b>	<pre>vrrp-inet6-group <i>group-id</i> {   inet6-advertise-interval <i>milliseconds</i>;   preempt{     hold-time <i>seconds</i>;   }   priority <i>number</i>;   virtual-inet6-address;   virtual-link-local-address }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 address <i>address</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Configure a Virtual Router Redundancy Protocol (VRRP) IPv6 group.
<b>Options</b>	<p><b>group-id</b>—VRRP group identifier. If you enable MAC source address filtering on the interface, you must include the virtual MAC address in the list of source MAC addresses that you specify in the <b>source-address-filter</b> statement. MAC addresses ranging from <b>00:00:5e:00:01:00</b> through <b>00:00:5e:00:01:ff</b> are reserved for VRRP, as defined in RFC 3768. The VRRP group number must be the decimal equivalent of the last hexadecimal byte of the virtual MAC address.</p> <p><b>Range:</b> 0 through 255</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li></ul>

CHAPTER 49

# Operational Commands for High Availability

## request system software nonstop-upgrade

---

**Syntax** request system software nonstop-upgrade *package-name*  
<no-copy>  
<no-old-master-upgrade>  
<reboot >  
<unlink>

**Release Information** Command introduced in Junos OS Release 10.4 for J-EX Series switches.

**Description** (J-EX8200 switches only) Perform a nonstop software upgrade (NSSU) on a J-EX8200 switch with redundant Routing Engines. When you execute this command on a standalone switch, both the backup and master Routing Engines are upgraded, with the previous backup Routing Engine becoming the new master at the end of the upgrade. The previous backup Routing Engines become the new master Routing Engines.

This command has the following requirements:

- The Routing Engines must be running the same Junos OS release.
- Graceful Routing Engine switchover (GRES) must be enabled.
- Nonstop active routing (NSR) must be enabled.
- The command must be executed from the master Routing Engine on a standalone switch.
- For minimal traffic disruption, you must define link aggregation groups (LAGs) such that the member links reside on different line cards.

**Options** *package-name*—Location from which the software package or bundle is to be installed.

For example:

- */var/tmp/package-name*—For a software package or bundle that is being installed from a local directory on the switch.
- *protocol://hostname/pathname/package-name*—For a software package or bundle that is to be downloaded and installed from a remote location. Replace *protocol* with one of the following:
  - **ftp**—File Transfer Protocol.  
Use **ftp://hostname/pathname/package-name**. To specify authentication credentials, use **ftp://<username>:<password>@hostname/pathname/package-name**. To have the system prompt you for the password, specify **prompt** in place of the password. If a password is required, and you do not specify the password or **prompt**, an error message is displayed.
  - **http**—Hypertext Transfer Protocol.  
Use **http://hostname/pathname/package-name**. To specify authentication credentials, use **http://<username>:<password>@hostname/pathname/package-name**. If a password is required and you omit it, you are prompted for it.



- **scp**—Secure copy (available only for Canada and U.S. version). Use `scp://hostname/pathname/package-name`. To specify authentication credentials, use `scp://<username>:<password>@hostname/pathname/package-name`.



**NOTE:** The *pathname* in the protocol is the relative path to the user home directory on the remote system and not the root directory.

**no-copy**—(Optional) Install a software package or bundle, but do not save copies of package or bundle files.

**no-old-master-upgrade**—(Optional) (Standalone J-EX8200 switches only) Upgrade the backup Routing Engine only. After the upgrade completes, the original master Routing Engine becomes the backup Routing Engine and continues running the previous software version.

**reboot**—(Optional) When the **reboot** option is included, the original master (new backup) Routing Engines are automatically rebooted after being upgraded to the new software. When the **reboot** option is not included, you must manually reboot the original master (new backup) Routing Engines using the **request system reboot** command.

**unlink**—(Optional) Remove the software package after a successful upgrade is completed.

**Required Privilege Level** maintenance

**Related Documentation**

- [show chassis nonstop-upgrade on page 985](#)
- [Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\) on page 955](#)

**List of Sample Output**

**request system software nonstop-upgrade reboot (Standalone Switch) on page 981**  
**request system software nonstop-upgrade no-old-master-upgrade (Standalone Switch) on page 982**  
**request system software nonstop-upgrade reboot (Virtual Chassis) on page 983**

**Output Fields**

When you enter this command, you are provided feedback on the status of your request.

## Sample Output

```
request system software nonstop-upgrade reboot (Standalone Switch)
{master}
user@switch> request system software nonstop-upgrade reboot
/var/tmp/jinstall-ex-8200-10.4R1.5-domestic-signed.tgz
Chassis ISSU Check Done
ISSU: Validating Image
ISSU: Preparing Backup RE
Pushing bundle to re1
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
```

Backup upgrade done  
Rebooting Backup RE

Rebooting re1  
ISSU: Backup RE Prepare Done  
Waiting for Backup RE reboot  
GRES operational  
Initiating Chassis In-Service-Upgrade  
Chassis ISSU Started  
ISSU: Preparing Daemons  
ISSU: Daemons Ready for ISSU  
ISSU: Starting Upgrade for FRUs  
ISSU: Preparing for Switchover  
ISSU: Ready for Switchover  
Checking In-Service-Upgrade status

Item	Status	Reason
FPC 0	Online	
FPC 2	Offline	Offlined by CLI command
FPC 3	Online	

Resolving mastership...  
Complete. The other routing engine becomes the master.  
ISSU: RE switchover Done  
ISSU: Upgrading Old Master RE  
WARNING: A reboot is required to install the software  
WARNING: Use the 'request system reboot' command immediately  
ISSU: Old Master Upgrade Done  
ISSU: IDLE  
Shutdown NOW!  
[pid 2635]

\*\*\* FINAL System shutdown message from user@switch \*\*\*  
System going down IMMEDIATELY

**request system** {master}  
**software** user@switch> request system software nonstop-upgrade no-old-master-upgrade  
**nonstop-upgrade** /var/tmp/jinstall-ex-8200-10.4R1.5-domestic-signed.tgz  
**no-old-master-upgrade** Chassis ISSU Check Done  
**(Standalone Switch)** ISSU: Validating Image  
ISSU: Preparing Backup RE

Pushing bundle to re1  
WARNING: A reboot is required to install the software  
WARNING: Use the 'request system reboot' command immediately  
Backup upgrade done  
Rebooting Backup RE

Rebooting re1  
ISSU: Backup RE Prepare Done  
Waiting for Backup RE reboot  
GRES operational  
Initiating Chassis In-Service-Upgrade  
Chassis ISSU Started  
ISSU: Preparing Daemons  
ISSU: Daemons Ready for ISSU  
ISSU: Starting Upgrade for FRUs  
ISSU: Preparing for Switchover  
ISSU: Ready for Switchover  
Checking In-Service-Upgrade status

Item	Status	Reason
FPC 0	Online	
FPC 1	Online	

```

FPC 2      Online
FPC 3      Offline          Offlined by CLI command
FPC 4      Online
FPC 5      Online
FPC 6      Online
FPC 7      Online
Resolving mastership...
Complete. The other routing engine becomes the master.
ISSU: RE switchover Done
Skipping Old Master Upgrade
ISSU: IDLE

request system {master:9}
software       user@external-routing-engine> request system software nonstop-upgrade reboot
nonstop-upgrade /var/tmp/jinstall-ex-xre200-11.1-20101130.0-domestic-signed.tgz
reboot (Virtual Chassis) Chassis ISSU Check Done
ISSU: Validating Image
ISSU: Preparing LCC Backup REs
ISSU: Preparing Backup RE
Pushing bundle /var/tmp/jinstall-ex-xre200-11.1-20101130.0-domestic-signed.tgz
to member8
-----
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
VC Backup upgrade done
Rebooting VC Backup RE

Rebooting member8
ISSU: Backup RE Prepare Done
Waiting for VC Backup RE reboot
Pushing bundle to member0-backup
Pushing bundle to member1-backup
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately
WARNING: A reboot is required to install the software
WARNING: Use the 'request system reboot' command immediately

Rebooting member0-backup
Rebooting LCC [member0-backup]

Rebooting member1-backup
Rebooting LCC [member1-backup]
ISSU: LCC Backup REs Prepare Done
GRES operational
Initiating Chassis Nonstop-Software-Upgrade
Chassis ISSU Started
ISSU: Preparing Daemons
ISSU: Daemons Ready for ISSU
ISSU: Starting Upgrade for FRUs
ISSU: Preparing for Switchover
ISSU: Ready for Switchover
Checking Nonstop-Upgrade status
member0:
-----
Item      Status      Reason
FPC 0     Online
FPC 1     Online
FPC 2     Online
FPC 5     Online

member1:

```

```
-----
```

Item	Status	Reason
FPC 0	Online	
FPC 1	Offline	Offlined due to config
FPC 2	Online	
FPC 3	Online	
FPC 4	Online	
FPC 5	Online	
FPC 7	Online	

member0:

```
-----
```

Item	Status	Reason
FPC 0	Online	
FPC 1	Online	
FPC 2	Online	
FPC 5	Online	

member1:

```
-----
```

Item	Status	Reason
FPC 0	Online	
FPC 1	Offline	Offlined due to config
FPC 2	Online	
FPC 3	Online	
FPC 4	Online	
FPC 5	Online	
FPC 7	Online	

ISSU: Upgrading Old Master RE  
 Pushing bundle /var/tmp/incoming-package-8200.tgz to member0-master  
 Pushing bundle /var/tmp/incoming-package-8200.tgz to member1-master

ISSU: RE switchover Done  
 WARNING: A reboot is required to install the software  
 WARNING: Use the 'request system reboot' command immediately  
 Rebooting ...  
 shutdown: [pid 2188]  
 Shutdown NOW!  
 ISSU: Old Master Upgrade Done  
 ISSU: IDLE  
 Shutdown NOW!

\*\*\* FINAL System shutdown message from root@ \*\*\*  
 System going down IMMEDIATELY

## show chassis nonstop-upgrade

<b>Syntax</b>	<code>show chassis nonstop-upgrade</code>
<b>Release Information</b>	Command introduced in Junos OS Release 10.4 for J-EX Series switches.
<b>Description</b>	(J-EX8200 switches only) Display the status of the line cards after the most recent nonstop software upgrade (NSSU). This command must be issued on the master Routing Engine.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request system software nonstop-upgrade on page 980</a></li> <li>• <a href="#">Upgrading Software on a J-EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure) on page 955</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show chassis nonstop-upgrade (Standalone Switch) on page 985</a>
<b>Output Fields</b>	Table 145 on page 985 lists the output fields for the <code>show chassis nonstop-upgrade</code> command. Output fields are listed in the approximate order in which they appear.

**Table 145: show chassis nonstop-upgrade Output Fields**

Field Name	Field Description
<b>Item</b>	Line card slot number.
<b>Status</b>	State of line card: <ul style="list-style-type: none"> <li>• <b>Error</b>—Line card is in an error state.</li> <li>• <b>Online</b>—Line card is online and running.</li> <li>• <b>Offline</b>—Line card is powered down.</li> </ul>
<b>Reason</b>	Reason for the state (if the line card is offline).

### Sample Output

```

show chassis nonstop-upgrade (Standalone Switch)
user@switch> show chassis nonstop-upgrade
  Item      Status      Reason
  FPC 0     Online
  FPC 1     Online
  FPC 2     Online
  FPC 3     Offline    Offlined by CLI command
  FPC 4     Online
  FPC 5     Online
  FPC 6     Online
  FPC 7     Online

```

## show chassis power-budget-statistics

<b>Syntax</b>	<code>show chassis power-budget-statistics</code>
<b>Release Information</b>	Command introduced in Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display the power budget of a J-EX8200 switch.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Verifying Power Configuration and Use on page 962</li> <li>Configuring the Power Priority of Line Cards (CLI Procedure) on page 953</li> <li>Configuring Power Supply Redundancy (CLI Procedure) on page 952</li> </ul>
<b>List of Sample Output</b>	<a href="#">show chassis power-budget-statistics on page 987</a>
<b>Output Fields</b>	Table 146 on page 986 lists the output fields for the <code>show chassis power-budget-statistics</code> command. Output fields are listed in the approximate order in which they appear.

**Table 146: show chassis power-budget-statistics Output Fields**

Field Name	Field Description
<code>PSU n (supply type)</code>	Number of watts supplied by the power supply. All installed power supplies, whether currently operating or not, are listed.
<code>Power supplied by all Online PSUs</code>	Total number of watts supplied by all currently operating power supplies.
<code>Power Redundancy Configuration</code>	Configured power redundancy setting, either N+1 or N+N.
<code>Power Reserved for the Chassis</code>	<p>Power reserved for the chassis:</p> <ul style="list-style-type: none"> <li>For a J-EX8208 switch: 1600 W in an N+1 configuration; 1200 W in an N+N configuration</li> <li>For a J-EX8216 switch: 2400 W in an N+1 configuration; 1800 W in an N+N configuration</li> </ul> <p>The power reserved for the chassis includes the maximum power requirements for the fan tray and Switch Fabric and Routing Engine (SRE), Routing Engine (RE), and Switch Fabric (SF) modules in both base and redundant configurations.</p>
<code>FPC n (card type)</code>	Number of watts required by the line card in slot <i>n</i> and the power priority assigned to the slot.
<code>Actual Power Used</code>	Power budgeted for all the components in the switch. This equal to the power reserved for the chassis plus the power requirements of all online line cards. Because the amount budgeted is based on maximum power requirements, the real power consumption of the switch is likely to be less than this figure.

Table 146: show chassis power-budget-statistics Output Fields (*continued*)

Field Name	Field Description
Power Available (Redundant case)	Unused power available to the switch in the power budget, excluding redundant power. If power is insufficient to meet the N+1 or N+N redundancy requirements, this value is 0.
Total Power Available	Unused power available to the switch in the power budget, including redundant power.

### Sample Output

```

show chassis power-budget-statistics user@switch> show chassis power-budget-statistics
PSU 0 (EX8200-AC2K) : 2000 W
PSU 1 (EX8200-AC2K) : 2000 W
PSU 2 (EX8200-AC2K) : 2000 W
Total Power supplied by all Online PSUs : 6000 W
Power Redundancy Configuration : N+N
Power Reserved for the Chassis : 1600 W
FPC 6 (EX8200-8XS ) : 450 W Priority: 7
Actual Power Used : 2050 W
Power Available (Redundant case) : 1950 W
Total Power Available : 3950 W

```

## show vrrp

<b>Syntax</b>	show vrrp <brief   detail   extensive   summary> <interface <i>interface-name</i> > <track interfaces>
<b>Release Information</b>	Command introduced before Junos OS Release 10.2 for J-EX Series switches.
<b>Description</b>	Display information and status about VRRP groups.
<b>Options</b>	<p>none—(Same as brief) Display brief status information about all VRRP interfaces.</p> <p>brief   detail   extensive   summary—(Optional) Display the specified level of output.</p> <p>interface <i>interface-name</i> —(Optional) Display information and status about the specified VRRP interface.</p> <p>track interfaces—(Optional) Display information and status about VRRP track interfaces.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring VRRP for IPv6 (CLI Procedure) on page 947</li> </ul>
<b>List of Sample Output</b>	<p>show vrrp on page 993</p> <p>show vrrp brief on page 993</p> <p>show vrrp detail (IPv6) on page 993</p> <p>show vrrp detail (Route Track) on page 993</p> <p>show vrrp extensive on page 994</p> <p>show vrrp interface on page 995</p> <p>show vrrp summary on page 996</p> <p>show vrrp track detail on page 996</p> <p>show vrrp track summary on page 996</p>
<b>Output Fields</b>	Table 147 on page 988 lists the output fields for the <b>show vrrp</b> command. Output fields are listed in the approximate order in which they appear.

**Table 147: show vrrp Output Fields**

Field Name	Field Description	Level of Output
Interface	Name of the logical interface.	none, brief, extensive, summary
Interface index	Physical interface index number, which reflects its initialization sequence.	extensive
Groups	Total number of VRRP groups configured on the interface.	extensive
Active	Total number of VRRP groups that are active (that is, whose interface state is either up or down).	extensive



Table 147: show vrrp Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Interface VRRP PDU statistics</b>	<p>Nonerrored statistics for the logical interface:</p> <ul style="list-style-type: none"> <li>• <b>Advertisement sent</b>—Number of VRRP advertisement protocol data units (PDUs) that the interface has transmitted.</li> <li>• <b>Advertisement received</b>—Number of VRRP advertisement PDUs received by the interface.</li> <li>• <b>Packets received</b>—Number of VRRP packets received for VRRP groups on the interface.</li> <li>• <b>No group match received</b>—Number of VRRP packets received for VRRP groups that do not exist on the interface.</li> </ul>	<b>extensive</b>
<b>Interface VRRP PDU error statistics</b>	<p>Errored statistics for the logical interface:</p> <ul style="list-style-type: none"> <li>• <b>Invalid IPAH next type received</b>—Number of packets received that use the IP Authentication Header protocol (IPAH) and that do not encapsulate VRRP packets.</li> <li>• <b>Invalid VRRP ttl value received</b>—Number of packets received whose IP time-to-live (TTL) value is not 255.</li> <li>• <b>Invalid VRRP version received</b>—Number of packets received whose VRRP version is not 2.</li> <li>• <b>Invalid VRRP pdu type received</b>—Number of packets received whose VRRP PDU type is not 1.</li> <li>• <b>Invalid VRRP authentication type received</b>—Number of packets received whose VRRP authentication is not none, simple, or md5.</li> <li>• <b>Invalid VRRP IP count received</b>—Number of packets received whose VRRP IP count exceeds 8.</li> <li>• <b>Invalid VRRP checksum received</b>—Number of packets received whose VRRP checksum does not match the calculated value.</li> </ul>	<b>extensive</b>
<b>Physical interface</b>	Name of the physical interface.	<b>detail, extensive</b>
<b>Unit</b>	Logical unit number.	All levels
<b>Address</b>	Address of the physical interface.	<b>none, brief, detail, extensive</b>
<b>Index</b>	Physical interface index number, which reflects its initialization sequence.	<b>detail, extensive</b>
<b>SNMP ifIndex</b>	SNMP index number for the physical interface.	<b>detail, extensive</b>
<b>VRRP-Traps</b>	Status of VRRP traps: <b>Enabled</b> or <b>Disabled</b> .	<b>detail, extensive</b>
<b>Type and Address</b>	<p>Identifier for the address and the address itself:</p> <ul style="list-style-type: none"> <li>• <b>lcl</b>—Configured local interface address.</li> <li>• <b>mas</b>—Address of the master virtual router. This address is displayed only when the local interface is acting as a backup router.</li> <li>• <b>vip</b>—Configured virtual IP addresses.</li> </ul>	<b>none, brief, summary</b>

Table 147: show vrrp Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Interface state or Int state</b>	State of the physical interface: <ul style="list-style-type: none"> <li>• <b>down</b>—The device is present and the link is unavailable.</li> <li>• <b>not present</b>—The interface is configured, but no physical device is present.</li> <li>• <b>unknown</b>—The VRRP process has not had time to query the kernel about the state of the interface.</li> <li>• <b>up</b>—The device is present and the link is established.</li> </ul>	<b>none, brief, extensive, summary</b>
<b>Group</b>	VRRP group number.	<b>none, brief, extensive, summary</b>
<b>State</b>	VRRP state: <ul style="list-style-type: none"> <li>• <b>backup</b>—The interface is acting as the backup router interface.</li> <li>• <b>bringup</b>—VRRP is just starting, and the physical device is not yet present.</li> <li>• <b>idle</b>—VRRP is configured on the interface and is disabled. This can occur when VRRP is first enabled on an interface whose link is established.</li> <li>• <b>initializing</b>—VRRP is initializing.</li> <li>• <b>master</b>—The interface is acting as the master router interface.</li> <li>• <b>transition</b>—The interface is changing between being the backup and being the master router.</li> </ul>	<b>extensive</b>
<b>Priority</b>	Configured VRRP priority for the interface.	<b>detail, extensive</b>
<b>Advertisement interval</b>	Configured VRRP advertisement interval.	<b>detail, extensive</b>
<b>Authentication type</b>	Configured VRRP authentication type: <b>none</b> , <b>simple</b> , or <b>md5</b> .	<b>detail, extensive</b>
<b>Preempt</b>	Whether preemption is allowed on the interface: <b>yes</b> or <b>no</b> .	<b>detail, extensive</b>
<b>Accept-data mode</b>	Whether the interface is configured to accept packets destined for the virtual IP address: <b>yes</b> or <b>no</b> .	<b>detail, extensive</b>
<b>VIP count</b>	Number of virtual IP addresses that have been configured on the interface.	<b>detail, extensive</b>
<b>VIP</b>	List of virtual IP addresses configured on the interface.	<b>detail, extensive</b>
<b>Advertisement timer</b>	Time until the advertisement timer expires.	<b>detail, extensive</b>
<b>Master router</b>	IP address of the interface that is acting as the master. If the VRRP interface is down, the output is <b>N/A</b> .	<b>detail, extensive</b>
<b>Virtual router uptime</b>	Time that the virtual router has been up.	<b>detail, extensive</b>
<b>Master router uptime</b>	Time that the master router has been up.	<b>detail, extensive</b>

Table 147: show vrrp Output Fields (*continued*)

Field Name	Field Description	Level of Output
Virtual MAC	MAC address associated with the virtual IP address.	detail, extensive
Tracking	Whether tracking is <b>enabled</b> or <b>disabled</b> .	detail, extensive
Current priority	Current operational priority for being the VRRP master.	detail, extensive
Configured priority	Configured base priority for being the VRRP master.	detail, extensive
Priority hold-time	Minimum time interval, in seconds, between successive changes to the current priority. <b>Disabled</b> indicates no minimum interval.	detail, extensive
Remaining-time	( <b>track</b> option only) Displays the time remaining in the priority hold-time interval.	detail
Interface tracking	Whether interface tracking is enabled or disabled. When enabled, the output also displays the number of tracked interfaces.	detail extensive
Interface/Tracked interface	Name of the tracked interface.	detail extensive
Int state/Interface state	Current operational state of the tracked interface: <b>up</b> or <b>down</b> .	detail, extensive
Int speed/Speed	Current operational speed, in bits per second, of the tracked interface.	detail, extensive
Incurred priority cost	Operational priority cost incurred due to the state and speed of this tracked interface. This cost is applied to the configured priority to obtain the current priority.	detail, extensive
Threshold	Speed below which the corresponding priority cost is incurred. In other words, when the speed of the interface drops below the threshold speed, the corresponding priority cost is incurred.  An entry of <b>down</b> means that the corresponding priority cost is incurred when the interface is down.	detail, extensive
Route tracking	Whether route tracking is enabled or disabled. When enabled, the output also displays the number of tracked routes.	detail, extensive
Route count	The number of routes being tracked.	detail, extensive
Route	The IP address of the route being tracked.	detail, extensive
VRF name	The VPN routing and forwarding (VRF) routing instance that the tracked route is in.	detail, extensive
Route state	The state of the route being tracked: <b>up</b> , <b>down</b> , or <b>unknown</b> .	detail, extensive
Priority cost	Configured priority cost. This value is incurred when the interface speed drops below the corresponding threshold or when the tracked route goes down.	detail, extensive

Table 147: show vrrp Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Active</b>	Whether the threshold is active (*). If the threshold is active, the corresponding priority cost is incurred.	<b>detail, extensive</b>
<b>Group VRRP PDU statistics</b>	Number of VRRP advertisements sent and received by the group.	<b>extensive</b>
<b>Group VRRP PDU error statistics</b>	<p>Errored statistics for the VRRP group:</p> <ul style="list-style-type: none"> <li>• <b>Bad authentication type received</b>—Number of VRRP PDUs received with an invalid authentication type. The received authentication can be <b>none</b>, <b>simple</b>, or <b>md5</b> and must be the same for all routers in the VRRP group.</li> <li>• <b>Bad password received</b>—Number of VRRP PDUs received with an invalid key (password). The password for simple authentication must be the same for all routers in the VRRP group</li> <li>• <b>Bad MD5 digest received</b>—Number of VRRP PDUs received for which the MD5 digest computed from the VRRP PDU differs from the digest expected by the VRRP instance configured on the router.</li> <li>• <b>Bad advertisement timer received</b>—Number of VRRP PDUs received with an advertisement time interval that is inconsistent with the one in use among the routers in the VRRP group.</li> <li>• <b>Bad VIP count received</b>—Number of VRRP PDUs whose virtual IP address counts differ from the count that has been configured on the VRRP instance.</li> <li>• <b>Bad VIPADDR received</b>—Number of VRRP PDUs whose virtual IP addresses differ from the list of virtual IP addresses configured on the VRRP instance.</li> </ul>	<b>extensive</b>
<b>Group state transition statistics</b>	<p>State transition statistics for the VRRP group:</p> <ul style="list-style-type: none"> <li>• <b>Idle to master transitions</b>—Number of times that the VRRP instance transitioned from the idle state to the master state.</li> <li>• <b>Idle to backup transitions</b>—Number of times that the VRRP instance transitioned from the idle state to the backup state.</li> <li>• <b>Backup to master transitions</b>—Number of times that the VRRP instance transitioned from the backup state to the master state.</li> <li>• <b>Master to backup transitions</b>—Number of times that the VRRP instance transitioned from the master state to the backup state.</li> </ul>	<b>extensive</b>
<b>VR state</b>	<p>VRRP information:</p> <ul style="list-style-type: none"> <li>• <b>backup</b>—The interface is acting as the backup router interface.</li> <li>• <b>bringup</b>—VRRP is just starting, and the physical device is not yet present.</li> <li>• <b>idle</b>—VRRP is configured on the interface and is disabled. This can occur when VRRP is first enabled on an interface whose link is established.</li> <li>• <b>initializing</b>—VRRP is initializing.</li> <li>• <b>master</b>—The interface is acting as the master router interface.</li> <li>• <b>transition</b>—The interface is changing between being the backup and being the master router.</li> </ul>	<b>none, brief</b>
<b>Timer</b>	<p>VRRP timer information:</p> <ul style="list-style-type: none"> <li>• <b>A</b>—Time, in seconds, until the advertisement timer expires.</li> <li>• <b>D</b>—Time, in seconds, until the Master is Dead timer expires.</li> </ul>	<b>none, brief</b>

## Sample Output

```

user@host> show vrrp
show vrrp
Interface      State      Group  VR state  Timer  Type  Address
ge-0/0/0.121  up         1      master   A 1.052  lcl  gec0::12:1:1:1
                                     vip  gec80::12:1:1:99
                                     vip  gec0::12:1:1:99
ge-0/0/2.131  up         1      master   A 0.364  lcl  gec0::13:1:1:1
                                     vip  gec80::13:1:1:99
                                     vip  gec0::13:1:1:99

```

**show vrrp brief** The output for the **show vrrp brief** command is identical to that for the **show vrrp** command. For sample output, see **show vrrp on page 993**.

```

user@host> show vrrp detail
show vrrp detail (IPv6)
Physical interface: ge-0/0/0, Unit: 121, Vlan-id: 212, Address: gec0::12:1:1:1/120

Index: 67, SNMP ifIndex: 45, VRRP-Traps: enabled
Interface state: up, Group: 1, State: master
Priority: 200, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 2, VIP: gec80::12:1:1:99,
gec0::12:1:1:99
Advertisement timer: 1.121s, Master router: gec80::12:1:1:1
Virtual router uptime: 00:03:47, Master router uptime: 00:03:41
Virtual MAC: 00:00:5e:00:02:01
Tracking: disabled

Physical interface: ge-0/0/2, Unit: 131, Vlan-id: 213, Address: gec0::13:1:1:1/120

Index: 69, SNMP ifIndex: 47, VRRP-Traps: enabled
Interface state: up, Group: 1, State: master
Priority: 200, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 2, VIP: gec80::13:1:1:99,
gec0::13:1:1:99
Advertisement timer: 0.327s, Master router: gec80::13:1:1:1
Virtual router uptime: 00:03:47, Master router uptime: 00:03:41
Virtual MAC: 00:00:5e:00:02:01
Tracking: disabled

```

```

user@host> show vrrp detail
show vrrp detail (Route Track)
Physical interface: ge-1/1/0, Unit: 0, Address: 30.30.30.30/24
Index: 67, SNMP ifIndex: 379, VRRP-Traps: enabled
Interface state: up, Group: 100, State: master
Priority: 150, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 1, VIP: 30.30.30.100
Advertisement timer: 1.218s, Master router: 30.30.30.30
Virtual router uptime: 00:04:28, Master router uptime: 00:00:13
Virtual MAC: 00:00:5e:00:01:64
Tracking: enabled
Current priority: 150, Configured priority: 150
Priority hold-time: disabled
Interface tracking: disabled
Route tracking: enabled, Route count: 1

```

Route	VRF name	Route state	Priority cost
192.168.40.0/22	default	up	30

```

user@host> show vrrp extensive
Interface: ge-0/0/0.121, Interface index: 67, Groups: 1, Active : 1
Interface VRRP PDU statistics
  Advertisement sent           :           188
  Advertisement received      :             0
  Packets received            :             0
  No group match received     :             0
Interface VRRP PDU error statistics
  Invalid IPAH next type received :             0
  Invalid VRRP TTL value received :             0
  Invalid VRRP version received  :             0
  Invalid VRRP PDU type received :             0
  Invalid VRRP authentication type received:             0
  Invalid VRRP IP count received :             0
  Invalid VRRP checksum received :             0

Physical interface: ge-0/0/0, Unit: 121, Vlan-id: 212, Address: gec0::12:1:1:1/120

Index: 67, SNMP ifIndex: 45, VRRP-Traps: enabled
Interface state: up, Group: 1, State: master
Priority: 200, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 2, VIP: ge80::12:1:1:99,
gec0::12:1:1:99
Advertisement timer: 1.034s, Master router: ge80::12:1:1:1
Virtual router uptime: 00:04:04, Master router uptime: 00:03:58
Virtual MAC: 00:00:5e:00:02:01
Tracking: disabled
Group VRRP PDU statistics
  Advertisement sent           :           188
  Advertisement received      :             0
Group VRRP PDU error statistics
  Bad authentication type received:             0
  Bad password received        :             0
  Bad MD5 digest received      :             0
  Bad advertisement timer received:             0
  Bad VIP count received       :             0
  Bad VIPADDR received        :             0
Group state transition statistics
  Idle to master transitions   :             0
  Idle to backup transitions  :             1
  Backup to master transitions :             1
  Master to backup transitions:             0

Interface: ge-0/0/2.131, Interface index: 69, Groups: 1, Active : 1
Interface VRRP PDU statistics
  Advertisement sent           :           186
  Advertisement received      :             0
  Packets received            :             0
  No group match received     :             0
Interface VRRP PDU error statistics
  Invalid IPAH next type received :             0
  Invalid VRRP TTL value received :             0
  Invalid VRRP version received  :             0
  Invalid VRRP PDU type received :             0
  Invalid VRRP authentication type received:             0
  Invalid VRRP IP count received :             0
  Invalid VRRP checksum received :             0

```

```

Physical interface: ge-0/0/2, Unit: 131, Vlan-id: 213, Address: gec0::13:1:1:1/120

Index: 69, SNMP ifIndex: 47, VRRP-Traps: enabled
Interface state: up, Group: 1, State: master
Priority: 200, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 2, VIP: ge80::13:1:1:99,
gec0::13:1:1:99
Advertisement timer: 0.396s, Master router: ge80::13:1:1:1
Virtual router uptime: 00:04:04, Master router uptime: 00:03:58
Virtual MAC: 00:00:5e:00:02:01
Tracking: disabled
Group VRRP PDU statistics
  Advertisement sent           :           186
  Advertisement received       :             0
Group VRRP PDU error statistics
  Bad authentication type received:           0
  Bad password received        :             0
  Bad MD5 digest received      :             0
  Bad advertisement timer received:           0
  Bad VIP count received       :             0
  Bad VIPADDR received         :             0
Group state transition statistics
  Idle to master transitions    :             0
  Idle to backup transitions    :             1
  Backup to master transitions  :             1
  Master to backup transitions  :             0

```

**show vrrp interface**

```

user@host> show vrrp interface
Interface: ge-0/0/0.121, Interface index: 67, Groups: 1, Active : 1
Interface VRRP PDU statistics
  Advertisement sent           :           205
  Advertisement received       :             0
  Packets received             :             0
  No group match received      :             0
Interface VRRP PDU error statistics
  Invalid IPAH next type received:           0
  Invalid VRRP TTL value received:           0
  Invalid VRRP version received :           0
  Invalid VRRP PDU type received:           0
  Invalid VRRP authentication type received: 0
  Invalid VRRP IP count received:           0
  Invalid VRRP checksum received:           0

```

```

Physical interface: ge-0/0/0, Unit: 121, Vlan-id: 212, Address: gec0::12:1:1:1/120

Index: 67, SNMP ifIndex: 45, VRRP-Traps: enabled
Interface state: up, Group: 1, State: master
Priority: 200, Advertisement interval: 1, Authentication type: none
Preempt: yes, Accept-data mode: no, VIP count: 2, VIP: ge80::12:1:1:99,
gec0::12:1:1:99
Advertisement timer: 0.789s, Master router: ge80::12:1:1:1
Virtual router uptime: 00:04:26, Master router uptime: 00:04:20
Virtual MAC: 00:00:5e:00:02:01
Tracking: disabled
Group VRRP PDU statistics
  Advertisement sent           :           205
  Advertisement received       :             0
Group VRRP PDU error statistics
  Bad authentication type received:           0
  Bad password received        :             0
  Bad MD5 digest received      :             0

```

```

Bad advertisement timer received:      0
Bad VIP count received                :   0
Bad VIPADDR received                  :   0
Group state transition statistics
Idle to master transitions             :   0
Idle to backup transitions             :   1
Backup to master transitions           :   1
Master to backup transitions           :   0
    
```

**show vrrp summary**

```

user@host> show vrrp summary
Interface      State      Group  VR state  Type  Address
ge-4/1/0.0    up        1      backup   1c1   10.57.0.2
vip           10.57.0.100
    
```

**show vrrp track detail**

```

user@host> show vrrp track detail
Tracked interface: ae1.211
State: up, Speed: 400m
Incurred priority cost: 0
Threshold  Priority cost  Active
400m      10
300m      60
200m      110
100m      160
down      190
Tracking VRRP interface: ae0.210, Group: 1
VR State: master
Current priority: 200, Configured priority: 200
Priority hold-time: disabled, Remaining-time: 50.351
    
```

**show vrrp track summary**

```

user@host> show vrrp track summary
Track if      State  Speed  VRRP if  Group  VR State  Current priority
ae1.211      up     400m   ae0.210  1      master    200
    
```



## PART 12

# Interfaces on J-EX Series Switches

- [Interfaces—Overview on page 999](#)
- [Examples of Interfaces Configuration on page 1015](#)
- [Configuring Interfaces on page 1041](#)
- [Verifying Interfaces on page 1095](#)
- [Troubleshooting Interfaces on page 1103](#)
- [Configuration Statements for Interfaces on page 1111](#)
- [Operational Commands for Interfaces on page 1179](#)



# Interfaces—Overview

- J-EX Series Switches Interfaces Overview on page 999
- Understanding Interface Naming Conventions on J-EX Series Switches on page 1001
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- Understanding Interface Ranges on J-EX Series Switches on page 1005
- Understanding Layer 3 Subinterfaces on page 1007
- Understanding Unicast RPF for J-EX Series Switches on page 1008
- Understanding IP Directed Broadcast for J-EX Series Switches on page 1012
- 802.1Q VLANs Overview on page 1013

## J-EX Series Switches Interfaces Overview

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J-EX Series Switches have two types of interfaces: network interfaces and special interfaces. This topic provides brief information on these interfaces. For additional information, see the *Junos OS Network Interfaces Configuration Guide*.

For information on interface-naming conventions on J-EX Series switches, see “Understanding Interface Naming Conventions on J-EX Series Switches” on page 1001.

This topic describes:

- Network Interfaces on page 999
- Special Interfaces on page 1000

## Network Interfaces

Network interfaces connect to the network and carry network traffic. Table 148 on page 999 lists the types of network interfaces supported on J-EX Series switches.

**Table 148: Network Interface Types and Purposes**

Type	Purpose
Aggregated Ethernet interfaces	All J-EX Series switches allow you to group Ethernet interfaces at the physical layer to form a single link layer interface, also known as a <i>link aggregation group (LAG)</i> or <i>bundle</i> . These aggregated Ethernet interfaces help to balance traffic and increase the uplink bandwidth.

**Table 148: Network Interface Types and Purposes (continued)**

Type	Purpose
LAN access interfaces	Use these J-EX Series switch interfaces to connect a personal computer, laptop, file server, or printer to the network. When you power on a J-EX Series switch and use the factory-default configuration, the software automatically configures interfaces in access mode for each of the network ports. The default configuration also enables autonegotiation for both speed and link mode.
Power over Ethernet (PoE) interfaces	J-EX Series switches provide PoE network ports with various switch models. These ports can be used to connect voice over IP (VoIP) telephones, wireless access points, video cameras, and point-of-sale devices to safely receive power from the same access ports that are used to connect personal computers to the network. PoE interfaces are enabled by default in the factory configuration.
Trunk interfaces	J-EX Series access switches can be connected to a distribution switch or customer-edge (CE) switches or routers. To use a port for this type of connection, you must explicitly configure the port interface for trunk mode. The interfaces from the distribution switch or CE switch to the access switches must also be configured for trunk mode.

## Special Interfaces

Table 149 on page 1000 lists the types of special interfaces supported on J-EX Series switches.

**Table 149: Special Interface Types and Purposes**

Type	Purpose
Console port	Each J-EX Series switch has a serial port, labeled <b>CON</b> or <b>CONSOLE</b> , for connecting tty-type terminals to the switch using standard PC-type tty cables. The console port does not have a physical address or IP address associated with it. However, it is an interface in the sense that it provides access to the switch. On a J-EX4200 Virtual Chassis or a J-EX4500 Virtual Chassis, you can access the master and configure all members of the Virtual Chassis through any member's console port. For more information on the console port in a Virtual Chassis, see "Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis" on page 718.
Loopback	All J-EX Series switches have this software-only virtual interface that is always up. The loopback interface provides a stable and consistent interface and IP address on the switch.
Management interface	The Junos operating system (Junos OS) for J-EX Series switches automatically creates the switch's management Ethernet interface, <b>me0</b> . The management Ethernet interface provides an out-of-band method for connecting to the switch. To use <b>me0</b> as a management port, you must configure its logical port, <b>me0.0</b> , with a valid IP address. You can connect to the management interface over the network using utilities such as SSH or Telnet. SNMP can use the management interface to gather statistics from the switch. (The management interface <b>me0</b> is analogous to the <b>fxp0</b> interfaces on routers running Junos OS.)
Routed VLAN Interface (RVI)	J-EX Series switches use a Layer 3 routed VLAN interface (RVI) named <b>vlan</b> to route traffic from one broadcast domain to another and to perform other Layer 3 functions such as traffic engineering. These functions are typically performed by a router interface in a traditional network.  The RVI functions as a logical router, eliminating the need for having both a switch and a router. The RVI (the <b>vlan</b> interface) must be configured as part of a broadcast domain or virtual private LAN service (VPLS) routing instance for Layer 3 traffic to be routed out of it.

Table 149: Special Interface Types and Purposes (*continued*)

Type	Purpose
Virtual Chassis port (VCP) interfaces	<p>Virtual Chassis ports (VCPs) are used to interconnect switches in a Virtual Chassis:</p> <ul style="list-style-type: none"> <li>J-EX4200 and J-EX4500 switches—Each J-EX4200 switch or J-EX4500 switch with a Virtual Chassis module installed has two dedicated VCPs on its rear panel. These ports can be used to interconnect up to ten J-EX4200 switches in a J-EX4200 Virtual Chassis, two J-EX4500 switches in a J-EX4500 Virtual Chassis, and up to two J-EX4500 switches and up to eight J-EX4200 switches in a mixed J-EX4200 and J-EX4500 Virtual Chassis. When you power on J-EX Series switches that are interconnected in this manner, the software automatically configures the VCP interfaces for the dedicated ports that have been interconnected. These VCP interfaces are not configurable or modifiable. See “Understanding the High-Speed Interconnection of the J-EX4200 and J-EX4500 Virtual Chassis Members” on page 721.</li> </ul> <p>You can also interconnect J-EX4200 switches across distances of up to 25 miles (40 km) by using the SFP or SFP+ uplink module ports. To do so, you must explicitly configure the uplink module ports on the members you want to connect as VCPs. See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.</p> <p>Similarly, you can interconnect J-EX4500 switches across distances of up to 25 miles (40 km) by using the SFP+ ports. To do so, you must explicitly configure the SFP+ ports as VCPs. See “Setting an SFP+ Port as a Virtual Chassis Port on a J-EX4500 Switch (CLI Procedure)” on page 850.</p>
Virtual management Ethernet (VME) interface	<p>J-EX4200 and J-EX4500 switches have a VME interface. This is a logical interface that is used for Virtual Chassis configurations and allows you to manage all the members of the Virtual Chassis through the master. For more information on the VME interface, see “Understanding Global Management of a J-EX4200 or J-EX4500 Virtual Chassis” on page 718.</p>

**Related Documentation**

- J-EX4200 Switches Hardware Overview on page 29
- J-EX4500 Switches Hardware Overview on page 31
- J-EX8208 Switch Hardware Overview on page 35
- J-EX8216 Switch Hardware Overview on page 38
- PoE and J-EX Series Switches Overview
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- Understanding Layer 3 Subinterfaces on page 1007

## Understanding Interface Naming Conventions on J-EX Series Switches

J-EX Series Switches use a naming convention for defining the interfaces that is similar to that of other platforms running under the Junos operating system (Junos OS). This topic provides brief information on the naming conventions used for interfaces on J-EX Series switches. For additional information, see the *Junos OS Network Interfaces Configuration Guide*.

This topic describes:

- Physical Part of an Interface Name on page 1002
- Logical Part of an Interface Name on page 1003
- Wildcard Characters in Interface Names on page 1003

## Physical Part of an Interface Name

Interfaces in Junos OS are specified as follows:

*type-fpc / pic / port*

J-EX Series switches apply this convention as follows:

- *type*—J-EX Series interfaces use the following media types:
  - **ge**—Gigabit Ethernet interface
  - **xe**—10 Gigabit Ethernet interface
- *fpc*—Flexible PIC Concentrator. J-EX Series interfaces use the following convention for the FPC number in interface names:
  - On a standalone J-EX4200 switch and a standalone J-EX4500 switch, FPC refers to the switch itself. The FPC number is always **0** on these switches.
  - On a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis, the FPC number indicates the member ID of the switch in the Virtual Chassis.
  - On a J-EX8200 standalone switch, the FPC number indicates the slot number of the line card that contains the physical interface.
- *pic*—J-EX Series interfaces use the following convention for the PIC (Physical Interface Card) number in interface names:
  - On J-EX4200 and J-EX4500 switches, the PIC number is **0** for all built-in interfaces (interfaces that are not an uplink port).
  - On J-EX4200 switches, the PIC number is **1** for uplink ports.
  - On J-EX4500 switches, the PIC number is **1** for uplink ports on the left-hand uplink module and **2** for uplink ports on right-hand uplink module.
  - On J-EX8200 switches, the PIC number is always **0**.
- *port*—J-EX Series interfaces use the following convention for port numbers:
  - On J-EX4200 and J-EX4500 switches, built-in network ports are numbered from left to right. On models that have two rows of ports, the ports on the top row start with **0** followed by the remaining even-numbered ports, and the ports on the bottom row start with **1** followed by the remaining odd-numbered ports.
  - Uplink ports in J-EX4200 and J-EX4500 switches are labeled from left to right, starting with **0**.
  - On J-EX8200 switches, the network ports are numbered from left to right on each line card. On line cards that have two rows of ports, the ports on the top row start with **0** followed by the remaining even-numbered ports, and the ports on the bottom row start with **1** followed by the remaining odd-numbered ports.

## Logical Part of an Interface Name

The logical unit part of the interface name corresponds to the logical unit number, which can be a number from 0 through 16384. In the virtual part of the name, a period (.) separates the port and logical unit numbers: *type-fpc/pic/port.logical-unit-number*. For example, if you issue the **show ethernet-switching interfaces** command on a system with a default VLAN, the resulting display shows the logical interfaces associated with the VLAN:

Interface	State	VLAN members	Blocking
ge-0/0/0.0	down	remote-analyzer	unblocked
ge-0/0/1.0	down	default	unblocked
ge-0/0/10.0	down	default	unblocked

When you configure aggregated Ethernet interfaces, you configure a logical interface that is called a *bundle* or a *LAG*. Each LAG can include up to 8 or 12 Ethernet interfaces, depending on the switch model.

## Wildcard Characters in Interface Names

In the **show interfaces** and **clear interfaces** commands, you can use wildcard characters in the *interface-name* option to specify groups of interface names without having to type each name individually. You must enclose all wildcard characters except the asterisk (\*) in quotation marks (" ").

### Related Documentation

- J-EX Series Switches Interfaces Overview on page 999
- For information about switch front panels and slot-numbering schemes, see the Dell PowerConnect Ethernet switch hardware guides at <http://www.support.dell.com>.

## Understanding Aggregated Ethernet Interfaces and LACP

IEEE 802.3ad link aggregation enables you to group Ethernet interfaces to form a single link layer interface, also known as a *link aggregation group (LAG)* or *bundle*.

Aggregating multiple links between physical interfaces creates a single logical point-to-point trunk link or a LAG. The LAG balances traffic across the member links within an aggregated Ethernet bundle and effectively increases the uplink bandwidth. Another advantage of link aggregation is increased availability, because the LAG is composed of multiple member links. If one member link fails, the LAG continues to carry traffic over the remaining links.

Link Aggregation Control Protocol (LACP), a component of IEEE 802.3ad, provides additional functionality for LAGs.

This topic describes:

- Link Aggregation Group (LAG) on page 1004
- Link Aggregation Control Protocol (LACP) on page 1005

## Link Aggregation Group (LAG)

You configure a LAG by specifying the link number as a physical device and then associating a set of interfaces (ports) with the link. All the interfaces must have the same speed and be in full-duplex mode. The Junos operating system (Junos OS) for J-EX Series Switches assigns a unique ID and port priority to each interface. The ID and priority are not configurable.

The number of interfaces that can be grouped into a LAG and the total number of LAGs supported on a switch varies according to switch model. Table 150 on page 1004 lists the J-EX Series switches and the maximum number of interfaces per LAG and maximum number of LAGs they support.

**Table 150: Maximum Interfaces per LAG and Maximum LAGs per Switch**

Switch Model	Maximum Interfaces per LAG	Maximum LAGs
J-EX4200 and J-EX4200 Virtual Chassis	8	64
J-EX4500 and J-EX4500 Virtual Chassis	8	64
J-EX8200	12	255

When configuring LAGs, consider the following guidelines:

- The LAG must be configured on both sides of the link.
- The interfaces on either side of the link must be set to the same speed.
- You can configure and apply firewall filters on a LAG.
- LACP can optionally be configured for link negotiation.

You can combine physical Ethernet ports belonging to different member switches of a Virtual Chassis configuration to form a LAG. See “Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation” on page 721.



**NOTE:** The interfaces that are included within a bundle or LAG are sometimes referred to as *member interfaces*. Do not confuse this term with *member switches*, which refers to switches that are interconnected as a Virtual Chassis. It is possible to create a LAG that is composed of member interfaces that are located in different member switches of a Virtual Chassis.

A LAG creates a single logical point-to-point connection. A typical deployment for a LAG would be to aggregate trunk links between an access switch and a distribution switch or customer edge (CE) router.



## Link Aggregation Control Protocol (LACP)

When LACP is configured, it detects misconfigurations on the local end or the remote end of the link.

About enabling LACP:

- When LACP is not enabled, a local LAG might attempt to transmit packets to a remote single interface, which causes the communication to fail.
- When LACP is enabled, a local LAG cannot transmit packets unless a LAG with LACP is also configured on the remote end of the link.

By default, Ethernet links do not exchange protocol data units (PDUs), which contain information about the state of the link. You can configure Ethernet links to actively transmit PDUs, or you can configure the links to passively transmit them, sending out LACP PDUs only when they receive them from another link. The transmitting link is known as the *actor* and the receiving link is known as the *partner*.

In a scenario where a dual-homed server is deployed with a switch, the network interface cards form a LAG with the switch. During a server upgrade, the server may not be able to exchange LACP PDUs. In such a situation you can configure an interface to be in the UP state even if no PDUs are exchanged. Use the **force-up** statement to configure an interface when the peer has limited LACP capability. The interface selects the associated LAG by default, whether the switch and peer are both in active or passive mode. When there are no received PDUs, the partner is considered to be working in the passive mode. Therefore, LACP PDU transmissions are controlled by the transmitting link.

If the remote end of the LAG link is a security device, LACP might not be supported because security devices require a deterministic configuration. In this case, do not configure LACP. All links in the LAG are permanently operational unless the switch detects a link failure within the Ethernet physical layer or data link layers.

### Related Documentation

- Understanding J-EX4200 and J-EX4500 Virtual Chassis Link Aggregation on page 721
- Understanding Redundant Trunk Links on J-EX Series Switches
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- *Junos OS Network Interfaces Configuration Guide*

## Understanding Interface Ranges on J-EX Series Switches

You can use the interface ranges to group interfaces of the same type that share a common configuration profile. This helps reduce the time and effort in configuring

interfaces on J-EX Series switches. The configurations common to all the interfaces can be included in the interface range definition.

The interface range definition contains the name of the interface range defined, the names of the individual member interfaces that do not fall in a series of interfaces, a range of interfaces defined in the member range, and the configuration statements common to all the interfaces. An interface range defined with member ranges and individual members but without any common configurations, is also a valid definition.



**NOTE:** The interface range definition is supported only for Gigabit, 10-Gigabit, and Fast Ethernet interfaces.

The common configurations defined in the interface range will be overridden by the local configuration.

The defined interface ranges can be used at places where the **interface** node is used in the following configuration hierarchies:

- **ethernet-switching-options analyzer *name* input egress interface**
- **ethernet-switching-options analyzer *name* input ingress interface**
- **ethernet-switching-options analyzer output interface**
- **ethernet-switching-options bpdu-block interface**
- **ethernet-switching-options interfaces**
- **ethernet-switching-options redundant-trunk-group group-name interface**
- **ethernet-switching-options secure-access-port interface**
- **ethernet-switching-options voip interface**
- **poe interface**
- **protocols dot1x authentication interface**
- **protocols gvrp interface**
- **protocols igmp interface**
- **protocols igmp-snooping vlan *vlan-name* interface**
- **protocols isis interface**
- **protocols link-management peer lmp-control-channel interface**
- **protocols link-management te-link *name* interface**
- **protocols lldp interface**
- **protocols lldp-med interface**
- **protocols mpls interface**
- **protocols mstp interface**
- **protocols mstp msti-*id* interface**

- `protocols mstp msti-id vlan vlan-id interface`
- `protocols oam ethernet link-fault-management interface`
- `protocols ospf area`
- `protocols pim interface`
- `protocols rip group group-name neighbor`
- `protocols ripng group group-name neighbor`
- `protocols router-advertisement interface`
- `protocols router-discovery interface`
- `protocols rsvp interface`
- `protocols sflow interfaces`
- `protocols stp interface`
- `protocols vstp vlan vlan-id interface`
- `vlan vlan-name interface`

#### Related Documentation

- [J-EX Series Switches Interfaces Overview on page 999](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Aggregated Ethernet Interfaces \(CLI Procedure\) on page 1081](#)
- [Configuring a Layer 3 Subinterface \(CLI Procedure\) on page 1089](#)
- [Junos OS Network Interfaces Configuration Guide](#)
- [interface-range on page 1139](#)

## Understanding Layer 3 Subinterfaces

A Layer 3 subinterface is a logical division of a physical interface that operates at the network level and therefore can receive and forward 802.1Q VLAN tags. You can use Layer 3 subinterfaces to route traffic among multiple VLANs along a single trunk line that connects a J-EX Series Switch to a Layer 2 switch. Only one physical connection is required between the switches. This topology is often called a “router on a stick” or a “one-armed router” when the Layer 3 device is a router.

To create Layer 3 subinterfaces on a J-EX Series switch, you enable VLAN tagging, partition the physical interface into logical partitions, and bind the VLAN ID to the logical interface.

You can partition one physical interface into up to 4094 different subinterfaces, one for each VLAN. We recommend that you use the VLAN ID as the subinterface number when you configure the subinterface. The Junos operating system (Junos OS) reserves VLAN IDs 0 and 4095.

VLAN tagging places the VLAN ID in the frame header, allowing each physical interface to handle multiple VLANs. When you configure multiple VLANs on an interface, you must

also enable tagging on that interface. Junos OS on J-EX Series switches supports a subset of the 802.1Q standard for receiving and forwarding routed or bridged Ethernet frames with single VLAN tags and running Virtual Router Redundancy Protocol (VRRP) over 802.1Q-tagged interfaces. Double-tagging is not supported.

**Related  
Documentation**

- J-EX Series Switches Interfaces Overview on page 999
- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026
- *Junos OS Network Interfaces Configuration Guide*

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## Understanding Unicast RPF for J-EX Series Switches

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Unicast reverse-path forwarding (RPF) helps protect the switch against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by verifying the unicast source address of each packet that arrives on an ingress interface where unicast RPF is enabled. It also helps ensure that traffic arriving on ingress interfaces comes from a network source that the receiving interface can reach.

When you enable unicast RPF, the switch forwards a packet only if the receiving interface is the best return path to the packet's unicast source address. This is known as strict mode unicast RPF.



**NOTE:** On Dell PowerConnect J-EX Series J-EX4200 Ethernet Switches, the switch applies unicast RPF *globally* to all interfaces when unicast RPF is configured on any interface. For additional information, see “Limitations of the Unicast RPF Implementation on J-EX4200 Switches” on page 1011.

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This topic covers:

- Unicast RPF for J-EX Series Switches Overview on page 1008
- Unicast RPF Implementation for J-EX Series Switches on page 1009
- When to Enable Unicast RPF on page 1009
- When Not to Enable Unicast RPF on page 1010
- Limitations of the Unicast RPF Implementation on J-EX4200 Switches on page 1011

### Unicast RPF for J-EX Series Switches Overview

Unicast RPF functions as an ingress filter that reduces the forwarding of IP packets that might be spoofing an address. By default, unicast RPF is disabled on the switch interfaces.

The type of unicast RPF provided on the switches—that is, strict mode unicast RPF is especially useful on untrusted interfaces. An untrusted interface is an interface where untrusted users or processes can place packets on the network segment.

The switch supports only the active paths method of determining the best return path back to a unicast source address. The active paths method looks up the best reverse

path entry in the forwarding table. It does not consider alternate routes specified using routing-protocol-specific methods when determining the best return path.

If the forwarding table lists the receiving interface as the interface to use to forward the packet back to its unicast source, it is the best return path interface. Strict mode unicast RPF recognizes only one best return path to a unicast source address.

Use strict mode unicast RPF only on symmetrically routed interfaces. (For information about symmetrically routed interfaces, see “When to Enable Unicast RPF” on page 1009.)

For more information about strict unicast RPF, see RFC 3704, *Ingress Filtering for Multihomed Networks* at <http://www.ietf.org/rfc/rfc3704.txt>.

## Unicast RPF Implementation for J-EX Series Switches

This section includes:

- Unicast RPF Packet Filtering on page 1009
- Bootstrap Protocol (BOOTP) and DHCP Requests on page 1009
- Default Route Handling on page 1009

### Unicast RPF Packet Filtering

---

When you enable unicast RPF on the switch, the switch handles traffic in the following manner:

- If the switch receives a packet on the interface that is the best return path to the unicast source address of that packet, the switch forwards the packet.
- If the best return path from the switch to the packet's unicast source address is not the receiving interface, the switch discards the packet.
- If the switch receives a packet that has a source IP address that does not have a routing entry in the forwarding table, the switch discards the packet.

### Bootstrap Protocol (BOOTP) and DHCP Requests

---

Bootstrap protocol (BOOTP) and DHCP request packets are sent with a broadcast MAC address and therefore the switch does not perform unicast RPF checks on them. The switch forwards all BOOTP packets and DHCP request packets without performing unicast RPF checks.

### Default Route Handling

---

If the best return path to the source is the default route (**0.0.0.0**) and the default route points to **reject**, the switch discards all unicast RPF packets. If the default route points to a valid network interface, the switch performs a normal unicast RPF check on the packets.

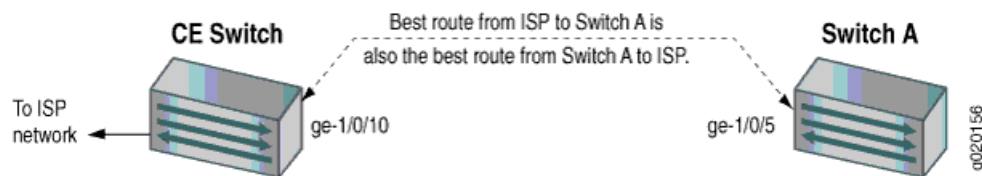
## When to Enable Unicast RPF

Enable unicast RPF when you want to ensure that traffic arriving on a network interface comes from a source that resides on a network that that interface can reach. You can enable unicast RPF on untrusted interfaces to filter spoofed packets. For example, a

common application for unicast RPF is to help defend an enterprise network from DoS/DDoS attacks coming from the Internet.

Enable unicast RPF only on symmetrically routed interfaces. A symmetrically routed interface uses the same route in both directions between the source and the destination, as shown in Figure 31 on page 1010. Symmetrical routing means that if an interface receives a packet, the switch uses the same interface to send a reply to the packet source (the receiving interface matches the forwarding-table entry for the best return path to the source).

Figure 31: Symmetrically Routed Interfaces



Enabling unicast RPF on asymmetrically routed interfaces (where different interfaces receive a packet and reply to its source) results in packets from legitimate sources being filtered (discarded) because the best return path is not the same interface that received the packet.

The following switch interfaces are most likely to be symmetrically routed and thus are candidates for unicast RPF enabling:

- The service provider edge to a customer
- The customer edge to a service provider
- A single access point out of the network (usually on the network perimeter)
- A terminal network that has only one link



**NOTE:** Because unicast RPF is enabled globally on J-EX4200 switches, ensure that *all* interfaces are symmetrically routed before you enable unicast RPF on those switches. Enabling unicast RPF on asymmetrically routed interfaces results in packets from legitimate sources being filtered.



**TIP:** Enabling unicast RPF as close as possible to the traffic source stops spoofed traffic before it can proliferate or reach interfaces that do not have unicast RPF enabled.

## When Not to Enable Unicast RPF

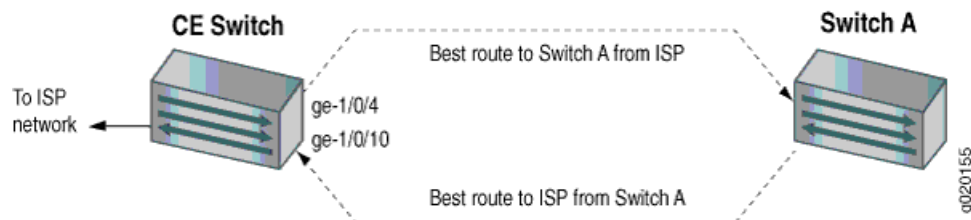
Typically, you will not enable unicast RPF if:

- Switch interfaces are multihomed.
- Switch interfaces are trusted interfaces.

- BGP is carrying prefixes and some of those prefixes are not advertised or are not accepted by the ISP under its policy. (The effect in this case is the same as filtering an interface by using an incomplete access list.)
- Switch interfaces face the network core. Core-facing interfaces are usually asymmetrically routed.

An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination, as shown in Figure 32 on page 1011. This means that if an interface receives a packet, that interface does not match the forwarding table entry as the best return path back to the source. If the receiving interface is not the best return path to the source of a packet, unicast RPF causes the switch to discard the packet even though it comes from a valid source.

Figure 32: Asymmetrically Routed Interfaces



**NOTE:** Do not enable unicast RPF on J-EX4200 switches if any switch interfaces are asymmetrically routed, because unicast RPF is enabled globally on all interfaces of those switches. All switch interfaces must be symmetrically routed for you to enable unicast RPF without the risk of the switch discarding traffic that you want to forward.

### Limitations of the Unicast RPF Implementation on J-EX4200 Switches

On J-EX4200 switches, the switch implements unicast RPF on a global basis. You cannot enable unicast RPF on a per-interface basis. Unicast RPF is globally disabled by default.

- When you enable unicast RPF on any interface, it is automatically enabled on all switch interfaces, including link aggregation groups (LAGs) and routed VLAN interfaces (RVIs).
- When you disable unicast RPF on the interface (or interfaces) on which you enabled unicast RPF, it is automatically disabled on all switch interfaces.



**NOTE:** You must explicitly disable unicast RPF on every interface on which it was explicitly enabled. Otherwise, unicast RPF remains enabled on all switch interfaces.

The J-EX4200 switches do not perform unicast RPF filtering on equal-cost multipath (ECMP) traffic. The unicast RPF check examines only one best return path to the packet source, but ECMP traffic employs an address block consisting of multiple paths.

Using unicast RPF to filter ECMP traffic on J-EX4200 switches can result in the switch discarding packets that you want to forward because the unicast RPF filter does not examine the entire ECMP address block.

**Related  
Documentation**

- Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033
- Configuring Unicast RPF (CLI Procedure) on page 1089
- Disabling Unicast RPF (CLI Procedure) on page 1091

## Understanding IP Directed Broadcast for J-EX Series Switches

---

IP directed broadcast helps you implement remote administration tasks such as backups and wake-on-LAN (WOL) application tasks by sending broadcast packets targeted at the hosts in a specified destination subnet. IP directed broadcast packets traverse the network in the same way as unicast IP packets until they reach the destination subnet. When they reach the destination subnet and IP directed broadcast is enabled on the receiving switch, the switch translates (“explodes”) the IP directed broadcast packet into a broadcast that floods the packet on the target subnet. All hosts on the target subnet receive the IP directed broadcast packet.

This topic covers:

- IP Directed Broadcast for J-EX Series Switches Overview on page 1012
- IP Directed Broadcast Implementation for J-EX Series Switches on page 1013
- When to Enable IP Directed Broadcast on page 1013
- When Not to Enable IP Directed Broadcast on page 1013

### IP Directed Broadcast for J-EX Series Switches Overview

IP directed broadcast packets have a destination IP address that is a valid broadcast address for the subnet that is the target of the directed broadcast (the target subnet). The intent of an IP directed broadcast is to flood the target subnet with the broadcast packets without broadcasting to the entire network. IP directed broadcast packets cannot originate from the target subnet.

When you send an IP directed broadcast packet, as it travels to the target subnet, the network forwards it in the same way as it forwards a unicast packet. When the packet reaches a switch that is directly connected to the target subnet, the switch checks to see whether IP directed broadcast is enabled on the interface that is directly connected to the target subnet:

- If IP directed broadcast is enabled on that interface, the switch broadcasts the packet on that subnet by rewriting the destination IP address as the configured broadcast IP address for the subnet. The switch converts the packet to a link-layer broadcast packet that every host on the network processes.
- If IP directed broadcast is disabled on the interface that is directly connected to the target subnet, the switch drops the packet.



## IP Directed Broadcast Implementation for J-EX Series Switches

You configure IP directed broadcast on a per-subnet basis by enabling IP directed broadcast on the Layer 3 interface of the subnet's VLAN. When the switch that is connected to that subnet receives a packet that has the subnet's broadcast IP address as the destination address, the switch broadcasts the packet to all hosts on the subnet.

By default, IP directed broadcast is disabled.

### When to Enable IP Directed Broadcast

IP directed broadcast is disabled by default. Enable IP directed broadcast when you want to perform remote management or administration services such as backups or WOL tasks on hosts in a subnet that does not have a direct connection to the Internet.

Enabling IP directed broadcast on a subnet affects only the hosts within that subnet. Only packets received on the subnet's Layer 3 interface that have the subnet's broadcast IP address as the destination address are flooded on the subnet.

### When Not to Enable IP Directed Broadcast

Typically, you do not enable IP directed broadcast on subnets that have direct connections to the Internet. Disabling IP directed broadcast on a subnet's Layer 3 interface affects only that subnet. If you disable IP directed broadcast on a subnet and a packet that has the broadcast IP address of that subnet arrives at the switch, the switch drops the broadcast packet.

If a subnet has a direct connection to the Internet, enabling IP directed broadcast on it increases the network's susceptibility to denial-of-service (DoS) attacks.

For example, a malicious attacker can spoof a source IP address (use a source IP address that is not the actual source of the transmission to deceive a network into identifying the attacker as a legitimate source) and send IP directed broadcasts containing Internet Control Message Protocol (ICMP) echo (ping) packets. When the hosts on the network with IP directed broadcast enabled receive the ICMP echo packets, they all send replies to the victim that has the spoofed source IP address. This creates a flood of ping replies in a DoS attack that can overwhelm the spoofed source address; this is known as a "smurf" attack. Another common DoS attack on exposed networks with IP directed broadcast enabled is a "fraggle" attack, which is similar to a smurf attack except that the malicious packet is a User Datagram Protocol (UDP) echo packet instead of an ICMP echo packet.

#### Related Documentation

- Example: Configuring IP Directed Broadcast on a J-EX Series Switch on page 1037
- Configuring IP Directed Broadcast (CLI Procedure) on page 1091

## 802.1Q VLANs Overview

For Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet interfaces supporting VPLS, the Junos OS supports a subset of the IEEE 802.1Q standard for channelizing an Ethernet interface into multiple

logical interfaces, allowing many hosts to be connected to the same Gigabit Ethernet switch, but preventing them from being in the same routing or bridging domain.

## Examples of Interfaces Configuration

- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 1015
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 1021
- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026
- Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033
- Example: Configuring IP Directed Broadcast on a J-EX Series Switch on page 1037

### Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch

J-EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. The number of Ethernet links you can combine into a LAG depends on your J-EX Series switch model. See “Understanding Aggregated Ethernet Interfaces and LACP” on page 1003 for more information.

This example describes how to configure uplink LAGs to connect a Virtual Chassis access switch to a Virtual Chassis distribution switch:

- Requirements on page 1015
- Overview and Topology on page 1016
- Configuration on page 1018
- Verification on page 1020
- Troubleshooting on page 1021

### Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX4200-48T switches
- Two J-EX4200-24F switches
- Four uplink modules

Before you configure the LAGs, be sure you have:

- Configured the Virtual Chassis switches. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.
- Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042.

## Overview and Topology

For maximum speed and resiliency, you can combine uplinks between an access switch and a distribution switch into LAGs. Using LAGs can be particularly effective when connecting a multimember Virtual Chassis access switch to a multimember Virtual Chassis distribution switch.

The Virtual Chassis access switch in this example is composed of two member switches. Each member switch has an uplink module with two 10-Gigabit Ethernet ports. These ports are configured as trunk ports, connecting the access switch with the distribution switch.

Configuring the uplinks as LAGs has the following advantages:

- Link Aggregation Control Protocol (LACP) can optionally be configured for link negotiation.
- It doubles the speed of each uplink from 10 Gbps to 20 Gbps.
- If one physical port is lost for any reason (a cable is unplugged or a switch port fails, or one member switch is unavailable), the logical port transparently continues to function over the remaining physical port.

The topology used in this example consists of one Virtual Chassis access switch and one Virtual Chassis distribution switch. The access switch is composed of two J-EX4200-48T switches (SWA-0 and SWA-1), interconnected to each other with their Virtual Chassis ports (VCPs) as member switches of Host-A. The distribution switch is composed of two J-EX4200-24F switches (SWD-0 and SWD-1), interconnected with their VCPs as member switches of Host-D.

Each member of the access switch has an uplink module installed. Each uplink module has two ports. The uplinks are configured to act as trunk ports, connecting the access switch with the distribution switch. One uplink port from SWA-0 and one uplink port from SWA-1 are combined as LAG **ae0** to SWD-0. This link is used for one VLAN. The remaining uplink ports from SWA-0 and from SWA-1 are combined as a second LAG connection (**ae1**) to SWD-1. LAG **ae1** is used for another VLAN.



**NOTE:** If the remote end of the LAG link is a security device, LACP might not be supported because security devices require a deterministic configuration. In this case, do not configure LACP. All links in the LAG are permanently operational unless the switch detects a link failure within the Ethernet physical layer or data link layers.

Figure 33: Topology for LAGs Connecting a J-EX4200 Virtual Chassis Access Switch to a J-EX4200 Virtual Chassis Distribution Switch

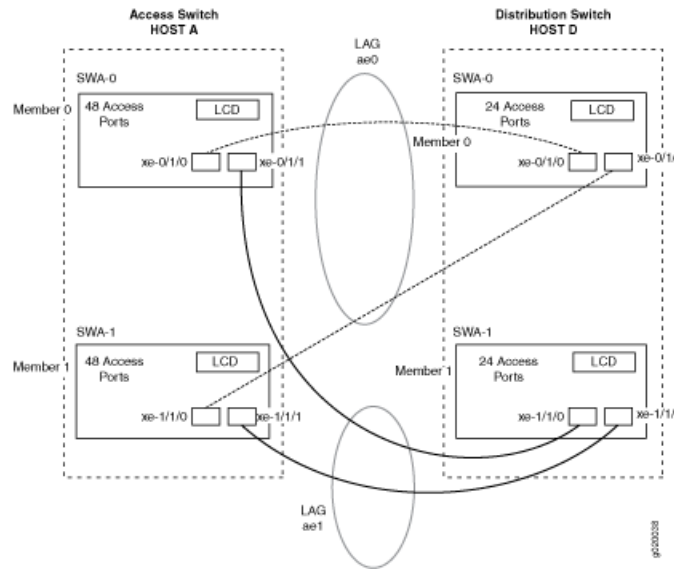


Table 151 on page 1017 details the topology used in this configuration example.

Table 151: Components of the Topology for Connecting a Virtual Chassis Access Switch to a Virtual Chassis Distribution Switch

Switch	Hostname and VCID	Base Hardware	Uplink Module	Member ID	Trunk Port
SWA-0	Host-A Access switch VCID 1	J-EX4200-48T switch	One uplink module	0	xe-0/1/0 to SWD-0 xe-0/1/1 to SWD-1
SWA-1	Host-A Access switch VCID 1	J-EX4200-48T switch	One plink module	1	xe-1/1/0 to SWD-0 xe-1/1/1 to SWD-1
SWD-0	Host-D Distribution switch VCID 4	J-EX4200-24F switch	One uplink module	0	xe-0/1/0 to SWA-0 xe-0/1/1 to SWA-1

Table 151: Components of the Topology for Connecting a Virtual Chassis Access Switch to a Virtual Chassis Distribution Switch (*continued*)

Switch	Hostname and VCID	Base Hardware	Uplink Module	Member ID	Trunk Port
SWD-1	Host-D Distribution switch  VCID 4	J-EX4200-24F switch	One uplink module	1	xe-1/1/0 to SWA-0  xe-1/1/1 to SWA-1

## Configuration

To configure two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch:

### CLI Quick Configuration

To quickly configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch, copy the following commands and paste them into the switch terminal window:

```
[edit]
set chassis aggregated-devices ethernet device-count 2
set interfaces ae0 aggregated-ether-options minimum-links 1
set interfaces ae0 aggregated-ether-options link-speed 10g
set interfaces ae1 aggregated-ether-options minimum-links 1
set interfaces ae1 aggregated-ether-options link-speed 10g
set interfaces ae0 unit 0 family inet address 192.0.2.0/25
set interfaces ae1 unit 0 family inet address 192.0.2.128/25
set interfaces ge-0/1/0 ether-options 802.3ad ae0
set interfaces ge-1/1/0 ether-options 802.3ad ae0
set interfaces ge-0/1/1 ether-options 802.3ad ae1
set interfaces ge-1/1/1 ether-options 802.3ad ae1
```

### Step-by-Step Procedure

To configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch:

1. Specify the number of LAGs to be created on the chassis:

```
[edit chassis]
user@Host-A# set aggregated-devices ethernet device-count 2
```

2. Specify the number of links that need to be present for the **ae0** LAG interface to be **up**:

```
[edit interfaces]
user@Host-A# set ae0 aggregated-ether-options minimum-links 1
```

3. Specify the number of links that need to be present for the **ae1** LAG interface to be **up**:

```
[edit interfaces]
user@Host-A# set ae1 aggregated-ether-options minimum-links 1
```

4. Specify the media speed of the **ae0** link:

```
[edit interfaces]
user@Host-A# set ae0 aggregated-ether-options link-speed 10g
```

5. Specify the media speed of the **ae1** link:

```
[edit interfaces]
```

```
user@Host-A# set ae1 aggregated-ether-options link-speed 10g
```

- Specify the interface ID of the uplinks to be included in LAG ae0:

```
[edit interfaces]
user@Host-A# set ge-0/1/0 ether-options 802.3ad ae0
user@Host-A# set ge-1/1/0 ether-options 802.3ad ae0
```

- Specify the interface ID of the uplinks to be included in LAG ae1:

```
[edit interfaces]
user@Host-A# set ge-0/1/1 ether-options 802.3ad ae1
user@Host-A# set ge-1/1/1 ether-options 802.3ad ae1
```

- Specify that LAG ae0 belongs to the subnet for the employee broadcast domain:

```
[edit interfaces]
user@Host-A# set ae0 unit 0 family inet address 192.0.2.0/25
```

- Specify that LAG ae1 belongs to the subnet for the guest broadcast domain:

```
[edit interfaces]
user@Host-A# set ae1 unit 0 family inet address 192.0.2.128/25
```

**Results** Display the results of the configuration:

```
[edit]
chassis {
  aggregated-devices {
    ethernet {
      device-count 2;
    }
  }
}
interfaces {
  ae0 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 1;
    }
    unit 0 {
      family inet {
        address 192.0.2.0/25;
      }
    }
  }
  ae1 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 1;
    }
    unit 0 {
      family inet {
        address 192.0.2.128/25;
      }
    }
  }
  ge-0/1/0 {
    ether-options {
```

```

        802.3ad ae0;
    }
}
ge-1/1/0 {
    ether-options {
        802.3ad ae0;
    }
}
ge-0/1/1 {
    ether-options {
        802.3ad ae1;
    }
}
ge-1/1/1 {
    ether-options {
        802.3ad ae1;
    }
}
}
}

```

## Verification

To verify that switching is operational and two LAGs have been created, perform these tasks:

- Verifying That LAG ae0 Has Been Created on page 1020
- Verifying That LAG ae1 Has Been Created on page 1020

### Verifying That LAG ae0 Has Been Created

---

**Purpose** Verify that LAG ae0 has been created on the switch.

**Action** `show interfaces ae0 terse`

Interface	Admin	Link	Proto	Local	Remote
ae0	up	up			
ae0.0	up	up	inet	192.0.2.0/25	

**Meaning** The output confirms that the ae0 link is up and shows the family and IP address assigned to this link.

### Verifying That LAG ae1 Has Been Created

---

**Purpose** Verify that LAG ae1 has been created on the switch

**Action** `show interfaces ae1 terse`

Interface	Admin	Link	Proto	Local	Remote
ae1	up	down			
ae1.0	up	down	inet	192.0.2.128/25	

**Meaning** The output shows that the ae1 link is down.



## Troubleshooting

### Troubleshooting a LAG That Is Down

---

**Problem** The `show interfaces terse` command shows that the LAG is **down**.

**Solution** Check the following:

- Verify that there is no configuration mismatch.
- Verify that all member ports are up.
- Verify that a LAG is part of family ethernet switching (Layer 2 LAG) or family inet (Layer 3 LAG).
- Verify that the LAG member is connected to the correct LAG at the other end.
- Verify that the LAG members belong to the same switch (or the same Virtual Chassis).

**Related Documentation**

- Example: Configuring a J-EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet on page 736
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Example: Connecting an Access Switch to a Distribution Switch.
- Virtual Chassis Cabling Configuration Examples for J-EX4200 Switches
- Installing an Uplink Module in a J-EX4200 Switch
- Uplink Modules in J-EX4200 Switches

### Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch

---

J-EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. J-EX Series switches allow you to further enhance these links by configuring Link Aggregation Control Protocol (LACP).

This example describes how to overlay LACP on the LAG configurations that were created in “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777:

- Requirements on page 1022
- Overview and Topology on page 1022
- Configuring LACP for the LAGs on the Virtual Chassis Access Switch on page 1022
- Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch on page 1023

- Verification on page 1024
- Troubleshooting on page 1025

## Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX4200-48T switches
- Two J-EX4200-24F switches
- Four J-EX Series uplink modules

Before you configure LACP, be sure you have:

- Set up the Virtual Chassis switches. See “Configuring a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure)” on page 822.
- Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 1042.
- Configured the LAGs. See “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777.

## Overview and Topology

This example assumes that you are familiar with “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch” on page 777. The topology in this example is exactly the same as the topology in that other example. This example shows how to use LACP to enhance the LAG functionality.

LACP exchanges are made between *actors* (the transmitting link) and *partners* (the receiving link). The LACP mode can be either active or passive.



**NOTE:** If the actor and partner are both in passive mode, they do not exchange LACP packets, which results in the aggregated Ethernet links not coming up. By default, LACP is in passive mode. To initiate transmission of LACP packets and responses to LACP packets, you must enable LACP in active mode.

By default, the actor and partner send LACP packets every second.

The interval can be fast (every second) or slow (every 30 seconds).

## Configuring LACP for the LAGs on the Virtual Chassis Access Switch

To configure LACP for the access switch LAGs, perform these tasks:

- |                                |   |
|--------------------------------|---|
| <b>CLI Quick Configuration</b> | To quickly configure LACP for the access switch LAGs, copy the following commands and paste them into the switch terminal window: |
|--------------------------------|---|

```
[edit]
set interfaces ae0 aggregated-ether-options lACP active periodic fast
set interfaces ae1 aggregated-ether-options lACP active periodic fast
```

**Step-by-Step Procedure**

To configure LACP for Host-A LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

```
[edit interfaces]
user@Host-A#set ae0 aggregated-ether-options lACP active periodic fast
user@Host-A#set ae1 aggregated-ether-options lACP active periodic fast
```

**Results** Display the results of the configuration:

```
[edit interfaces]
user@Host-A# show
ae0 {
  aggregated-ether-options {
    lACP {
      active;
      periodic fast;
    }
  }
}
ae1 {
  aggregated-ether-options {
    lACP {
      active;
      periodic fast;
    }
  }
}
```

## Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch

To configure LACP for the two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch, perform these tasks:

**CLI Quick Configuration**

To quickly configure LACP for the distribution switch LAGs, copy the following commands and paste them into the switch terminal window:

```
[edit interfaces]
set ae0 aggregated-ether-options lACP passive periodic fast
set ae1 aggregated-ether-options lACP passive periodic fast
```

**Step-by-Step Procedure**

To configure LACP for Host D LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

```
[edit interfaces]
user@Host-D#set ae0 aggregated-ether-options lACP passive periodic fast
user@Host-D#set ae1 aggregated-ether-options lACP passive periodic fast
```

**Results** Display the results of the configuration:

```
[edit interfaces]
user@Host-D# show
```

```

ae0 {
  aggregated-ether-options {
    lacp {
      passive;
      periodic fast;
    }
  }
}
ae1 {
  aggregated-ether-options {
    lacp {
      passive
      periodic fast;
    }
  }
}

```

## Verification

To verify that LACP packets are being exchanged, perform these tasks:

- Verifying the LACP Settings on page 1024
- Verifying That the LACP Packets Are Being Exchanged on page 1024

### Verifying the LACP Settings

---

**Purpose** Verify that LACP has been set up correctly.

**Action** Use the `show lacp interfaces interface-name` command to check that LACP has been enabled as active on one end.

```
user@Host-A> show lacp interfaces ge-0/1/0
```

```
Aggregated interface: ae0
```

LACP state:	Role	Exp	Def	Dist	Co1	Syn	Aggr	Timeout	Activity
ge-0/1/0	Actor	No	Yes	No	No	No	Yes	Fast	Active
ge-0/1/0	Partner	No	Yes	No	No	No	Yes	Fast	Passive
LACP protocol:	Receive State	Transmit State		Mux State					
ge-0/1/0	Defaulted	Fast periodic		Detached					

**Meaning** The output indicates that LACP has been set up correctly and is active at one end.

### Verifying That the LACP Packets Are Being Exchanged

---

**Purpose** Verify that LACP packets are being exchanged.

**Action** Use the `show interfaces aex statistics` command to display LACP information.

```
user@Host-A> show interfaces ae0 statistics
```

```

Physical interface: ae0, Enabled, Physical link is Down
  Interface index: 153, SNMP ifIndex: 30
  Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
  Minimum bandwidth needed: 0
  Device flags   : Present Running
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
  Current address: 02:19:e2:50:45:e0, Hardware address: 02:19:e2:50:45:e0
  Last flapped   : Never
  Statistics last cleared: Never
    Input packets : 0
    Output packets: 0
  Input errors: 0, Output errors: 0

Logical interface ae0.0 (Index 71) (SNMP ifIndex 34)
  Flags: Hardware-Down Device-Down SNMP-Traps Encapsulation: ENET2
  Statistics
    Packets      pps      Bytes      bps
  Bundle:
    Input :      0      0      0      0
    Output:      0      0      0      0
  Protocol inet
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255

```

**Meaning** The output here shows that the link is down and that no protocol data units (PDUs) are being exchanged.

## Troubleshooting

To troubleshoot a nonworking LACP link, perform these tasks:

### [Troubleshooting a Nonworking LACP Link](#)

**Problem** The LACP link is not working.

**Solution** Check the following:

- Remove the LACP configuration and verify whether the static LAG is up.
- Verify that LACP is configured at both ends.
- Verify that LACP is not passive at both ends.
- Verify whether LACP protocol data units (PDUs) are being exchanged by running the `monitor traffic-interface lag-member detail` command.

### Related Documentation

- Example: Connecting an Access Switch to a Distribution Switch
- Virtual Chassis Cabling Configuration Examples for J-EX4200 Switches
- Installing an Uplink Module in a J-EX4200 Switch
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003

## Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch

---

In a large LAN, you commonly need to partition the network into multiple VLANs. You can configure Layer 3 subinterfaces to route traffic between the VLANs. In one common topology, known as a “router on a stick” or a “one-armed router,” you connect a router to an access switch with connections to multiple VLANs.

This example describes how to create Layer 3 subinterfaces on trunk interfaces of a distribution switch and access switch so that you can route traffic among multiple VLANs:

- Requirements on page 1026
- Overview and Topology on page 1026
- Configuring the Access Switch Subinterfaces on page 1027
- Configuring the Distribution Switch Subinterfaces on page 1029
- Verification on page 1031

### Requirements

This example uses the following hardware and software components:

- For the distribution switch, one J-EX4200-24F switch. This model is designed to be used as a distribution switch for aggregation or collapsed core network topologies and in space-constrained data centers. It has twenty-four 1-Gigabit Ethernet fiber SFP ports and an uplink module with two 10-Gigabit Ethernet SFP+ ports.
- For the access switch, any Layer 2 switch that supports 802.1Q VLAN tags.
- Junos OS Release 10.2 or later for J-EX Series switches.

Before you connect the switches, make sure you have:

- Connected the two switches.
- Configured the necessary VLANs. See the instructions for configuring VLANs in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

### Overview and Topology

In a large office with multiple buildings and VLANs, you commonly aggregate traffic from a number of access switches into a distribution switch. This configuration example shows a simple topology to illustrate how to connect a single Layer 2 access switch connected to multiple VLANs to a distribution switch, enabling traffic to pass between those VLANs.

In the example topology, the LAN is segmented into five VLANs, all associated with interfaces on the access switch. One 1-Gigabit Ethernet port on the access switch's uplink module connects to one 1-Gigabit Ethernet port on the distribution switch.

Table 152 on page 1027 lists the settings for the example topology.

**Table 152: Components of the Topology for Creating Layer 3 Subinterfaces on an Access Switch and a Distribution Switch**

Property	Settings
Access switch hardware	Any Layer 2 switch with multiple 1-Gigabit Ethernet ports and at least one 1-Gigabit Ethernet uplink module
Distribution switch hardware	J-EX4200-24F, 24 1-Gigabit Ethernet fiber SPF ports ( <b>ge-0/0/0</b> through <b>ge-0/0/23</b> ); one 2-port 10-Gigabit Ethernet SFP+ uplink module
VLAN names and tag IDs	vlan1, tag 101 vlan2, tag 102 vlan3, tag 103 vlan4, tag 104 vlan5, tag 105
VLAN subnets	vlan1: 1.1.1.0/24 (addresses 1.1.1.1 through 1.1.1.254) vlan2: 2.1.1.0/24 (addresses 2.1.1.1 through 2.1.1.254) vlan3: 3.1.1.0/24 (addresses 3.1.1.1 through 3.1.1.254) vlan4: 4.1.1.0/24 (addresses 4.1.1.1 through 4.1.1.254) vlan5: 5.1.1.0/24 (addresses 5.1.1.1 through 5.1.1.254)
Port interfaces	On the access switch: <b>ge-0/1/0</b> On the distribution switch: <b>ge-0/0/0</b>

## Configuring the Access Switch Subinterfaces

**CLI Quick Configuration** To quickly create and configure subinterfaces on the access switch, copy the following commands and paste them into the switch terminal window:

```
[edit]
set interfaces ge-0/1/0 vlan-tagging
set interfaces ge-0/1/0 unit 0 vlan-id 101 family inet address 1.1.1.1/24
set interfaces ge-0/1/0 unit 1 vlan-id 102 family inet address 2.1.1.1/24
set interfaces ge-0/1/0 unit 2 vlan-id 103 family inet address 3.1.1.1/24
set interfaces ge-0/1/0 unit 3 vlan-id 104 family inet address 4.1.1.1/24
set interfaces ge-0/1/0 unit 4 vlan-id 105 family inet address 5.1.1.1/24
```

**Step-by-Step Procedure** To configure the subinterfaces on the access switch:

- On the trunk interface of the access switch, enable VLAN tagging:
 

```
[edit interfaces ge-0/1/0]
user@access-switch# set vlan-tagging
```
- Bind vlan1's VLAN ID to the logical interface:
 

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 0 vlan-id 101
```

3. Set vlan1's subinterface IP address:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 0 family inet address 1.1.1/24
```
4. Bind vlan2's VLAN ID to the logical interface:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 1 vlan-id 102
```
5. Set vlan2's subinterface IP address:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 1 family inet address 2.1.1/24
```
6. Bind vlan3's VLAN ID to the logical interface:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 2 vlan-id 103
```
7. Set vlan3's subinterface IP address:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 2 family inet address 3.1.1/24
```
8. Bind vlan4's VLAN ID to the logical interface:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 3 vlan-id 104
```
9. Set vlan4's subinterface IP address:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 3 family inet address 4.1.1/24
```
10. Bind vlan5's VLAN ID to the logical interface:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 4 vlan-id 105
```
11. Set vlan5's subinterface IP address:  

```
[edit interfaces ge-0/1/0]
user@access-switch# set unit 4 family inet address 5.1.1/24
```

**Results** Check the results of the configuration:

```
user@access-switch> show configuration
interfaces {
  ge-0/1/0 {
    vlan-tagging;
    unit 0 {
      vlan-id 101;
      family inet {
        address 1.1.1/24;
      }
    }
    unit 1 {
      vlan-id 102;
      family inet {
        address 2.1.1/24;
      }
    }
  }
}
```



```

    }
  }
  unit 2 {
    vlan-id 103;
    family inet {
      address 3.1.1.1/24;
    }
  }
  unit 3 {
    vlan-id 104;
    family inet {
      address 4.1.1.1/24;
    }
  }
  unit 4 {
    vlan-id 105;
    family inet {
      address 5.1.1.1/24;
    }
  }
}

```

## Configuring the Distribution Switch Subinterfaces

**CLI Quick Configuration** To quickly create and configure subinterfaces on the distribution switch, copy the following commands and paste them into the switch terminal window:

```

[edit]
set interfaces ge-0/0/0 vlan-tagging
set interfaces ge-0/0/0 unit 0 vlan-id 101 family inet address 1.1.1.2/24
set interfaces ge-0/0/0 unit 1 vlan-id 102 family inet address 2.1.1.2/24
set interfaces ge-0/0/0 unit 2 vlan-id 103 family inet address 3.1.1.2/24
set interfaces ge-0/0/0 unit 3 vlan-id 104 family inet address 4.1.1.2/24
set interfaces ge-0/0/0 unit 4 vlan-id 105 family inet address 5.1.1.2/24

```

**Step-by-Step Procedure** To configure subinterfaces on the distribution switch:

1. On the trunk interface of the distribution switch, enable VLAN tagging:
 

```

[edit interfaces ge-0/0/0]
user@distribution-switch# set vlan-tagging

```
2. Bind vlan1's VLAN ID to the logical interface:
 

```

[edit interfaces ge-0/0/0]
user@distribution-switch# set unit 0 vlan-id 101

```
3. Set vlan1's subinterface IP address:
 

```

[edit interfaces ge-0/0/0]
user@distribution-switch# set unit 0 family inet address 1.1.1.2/24

```
4. Bind vlan2's VLAN ID to the logical interface:
 

```

[edit interfaces ge-0/0/0]
user@distribution-switch# set unit 1 vlan-id 102

```
5. Set vlan2's subinterface IP address:
 

```

[edit interfaces ge-0/0/0]

```

- ```
user@distribution-switch# set unit 1 family inet address 2.1.1.2/24
```
6. Bind vlan3's VLAN ID to the logical interface:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 2 vlan-id 103
```
  7. Set vlan3's subinterface IP address:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 2 family inet address 3.1.1.2/24
```
  8. Bind vlan4's VLAN ID to the logical interface:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 3 vlan-id 104
```
  9. Set vlan4's subinterface IP address:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 3 family inet address 4.1.1.2/24
```
  10. Bind vlan5's VLAN ID to the logical interface:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 4 vlan-id 105
```
  11. Set vlan5's subinterface IP address:

```
[edit interfaces ge-0/0/0]  
user@distribution-switch# set unit 4 family inet address 5.1.1.2/24
```

```
Results user@distribution-switch> show configuration  
interfaces {  
  ge-0/0/0 {  
    vlan-tagging;  
    unit 0 {  
      vlan-id 101;  
      family inet {  
        address 1.1.1.2/24;  
      }  
    }  
    unit 1 {  
      vlan-id 102;  
      family inet {  
        address 2.1.1.2/24;  
      }  
    }  
    unit 2 {  
      vlan-id 103;  
      family inet {  
        address 3.1.1.2/24;  
      }  
    }  
    unit 3 {  
      vlan-id 104;  
      family inet {  
        address 4.1.1.2/24;  
      }  
    }  
  }  
}
```

```

unit 4 {
  vlan-id 105;
  family inet {
    address 5.1.1.2/24;
  }
}
}

```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying That Subinterfaces Were Created on page 1031
- Verifying That Traffic Passes Between VLANs on page 1031

### Verifying That Subinterfaces Were Created

**Purpose** Verify that the subinterfaces were properly created on the access switch and distribution switch.

**Action** 1. Use the **show interfaces** command on the access switch:

```
user@access-switch> show interfaces ge-0/1/0 terse
```

| Interface      | Admin | Link | Proto | Local      | Remote |
|----------------|-------|------|-------|------------|--------|
| ge-0/1/0       | up    | up   |       |            |        |
| ge-0/1/0.0     | up    | up   | inet  | 1.1.1.1/24 |        |
| ge-0/1/0.1     | up    | up   | inet  | 2.1.1.1/24 |        |
| ge-0/1/0.2     | up    | up   | inet  | 3.1.1.1/24 |        |
| ge-0/1/0.3     | up    | up   | inet  | 4.1.1.1/24 |        |
| ge-0/1/0.4     | up    | up   | inet  | 5.1.1.1/24 |        |
| ge-0/1/0.32767 | up    | up   |       |            |        |

2. Use the **show interfaces** command on the distribution switch:

```
user@distribution-switch> show interfaces ge-0/0/0 terse
```

| Interface      | Admin | Link | Proto | Local      | Remote |
|----------------|-------|------|-------|------------|--------|
| ge-0/0/0       | up    | up   |       |            |        |
| ge-0/0/0.0     | up    | up   | inet  | 1.1.1.2/24 |        |
| ge-0/0/0.1     | up    | up   | inet  | 2.1.1.2/24 |        |
| ge-0/0/0.2     | up    | up   | inet  | 3.1.1.2/24 |        |
| ge-0/0/0.3     | up    | up   | inet  | 4.1.1.2/24 |        |
| ge-0/0/0.4     | up    | up   | inet  | 5.1.1.2/24 |        |
| ge-0/0/0.32767 | up    | up   |       |            |        |

**Meaning** Each subinterface created is displayed as a *ge-fpc/pic/port.x* logical interface, where *x* is the unit number in the configuration. The status is listed as **up**, indicating the link is working.

### Verifying That Traffic Passes Between VLANs

**Purpose** Verify that the distribution switch is correctly routing traffic from one VLAN to another.

**Action** Ping from the access switch to the distribution switch on each subinterface.

1. From the access switch, ping the address of the vlan1 subinterface on the distribution switch:

```
user@access-switch> ping 1.1.1.2 count 4

PING 1.1.1.2 (1.1.1.2): 56 data bytes
64 bytes from 1.1.1.2: icmp_seq=0 ttl=64 time=0.333 ms
64 bytes from 1.1.1.2: icmp_seq=1 ttl=64 time=0.113 ms
64 bytes from 1.1.1.2: icmp_seq=2 ttl=64 time=0.112 ms
64 bytes from 1.1.1.2: icmp_seq=3 ttl=64 time=0.158 ms

--- 1.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.112/0.179/0.333/0.091 ms
```

2. From the access switch, ping the address of the vlan2 subinterface on the distribution switch:

```
user@access-switch> ping 2.1.1.2 count 4

PING 2.1.1.2 (2.1.1.2): 56 data bytes
64 bytes from 2.1.1.2: icmp_seq=0 ttl=64 time=0.241 ms
64 bytes from 2.1.1.2: icmp_seq=1 ttl=64 time=0.113 ms
64 bytes from 2.1.1.2: icmp_seq=2 ttl=64 time=0.162 ms
64 bytes from 2.1.1.2: icmp_seq=3 ttl=64 time=0.167 ms

--- 2.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.113/0.171/0.241/0.046 ms
```

3. From the access switch, ping the address of the vlan3 subinterface on the distribution switch:

```
user@access-switch> ping 3.1.1.2 count 4

PING 3.1.1.2 (3.1.1.2): 56 data bytes
64 bytes from 3.1.1.2: icmp_seq=0 ttl=64 time=0.341 ms
64 bytes from 3.1.1.2: icmp_seq=1 ttl=64 time=0.162 ms
64 bytes from 3.1.1.2: icmp_seq=2 ttl=64 time=0.112 ms
64 bytes from 3.1.1.2: icmp_seq=3 ttl=64 time=0.208 ms

--- 3.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.112/0.206/0.341/0.085 ms
```

4. From the access switch, ping the address of the vlan4 subinterface on the distribution switch:

```
user@access-switch> ping 4.1.1.2 count 4

PING 4.1.1.2 (4.1.1.2): 56 data bytes
64 bytes from 4.1.1.2: icmp_seq=0 ttl=64 time=0.226 ms
64 bytes from 4.1.1.2: icmp_seq=1 ttl=64 time=0.166 ms
64 bytes from 4.1.1.2: icmp_seq=2 ttl=64 time=0.107 ms
64 bytes from 4.1.1.2: icmp_seq=3 ttl=64 time=0.221 ms

--- 4.1.1.2 ping statistics ---
```

```
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.107/0.180/0.226/0.048 ms
```

- From the access switch, ping the address of the vlan5 subinterface on the distribution switch:

```
user@access-switch> ping 5.1.1.2 count 4

PING 5.1.1.2 (5.1.1.2): 56 data bytes
64 bytes from 5.1.1.2: icmp_seq=0 ttl=64 time=0.224 ms
64 bytes from 5.1.1.2: icmp_seq=1 ttl=64 time=0.104 ms
64 bytes from 5.1.1.2: icmp_seq=2 ttl=64 time=0.102 ms
64 bytes from 5.1.1.2: icmp_seq=3 ttl=64 time=0.170 ms

--- 5.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.102/0.150/0.224/0.051 ms
```

**Meaning** If all the ping packets are transmitted and are received by the destination address, the subinterfaces are up and working.

- Related Documentation**
- Example: Connecting an Access Switch to a Distribution Switch
  - Configuring a Layer 3 Subinterface (CLI Procedure) on page 1089

## Example: Configuring Unicast RPF on a J-EX Series Switch

Unicast reverse-path forwarding (RPF) helps protect the switch against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by verifying the unicast source address of each packet that arrives on an ingress interface where unicast RPF is enabled.

This example shows how to help defend the switch ingress interfaces against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by configuring unicast reverse-path forwarding (RPF) on a customer-edge interface to filter incoming traffic:

- Requirements on page 1033
- Overview and Topology on page 1034
- Configuration on page 1034
- Verification on page 1035

### Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- Two J-EX8200 switches

Before you begin, be sure you have:

- Connected the two switches by symmetrically routed interfaces.

- Ensured that the interface on which you will configure unicast RPF is symmetrically routed.

## Overview and Topology

Large amounts of unauthorized traffic such as attempts to flood a network with fake (bogus) service requests in a denial-of-service (DoS) attack can consume network resources and deny service to legitimate users. One way to help prevent DoS and distributed denial-of-service (DDoS) attacks is to verify that incoming traffic originates from legitimate network sources.

Unicast RPF helps ensure that a traffic source is legitimate (authorized) by comparing the source address of each packet that arrives on an interface to the forwarding-table entry for its source address. If the switch uses the same interface that the packet arrived on to reply to the packet's source, this verifies that the packet originated from an authorized source, and the switch forwards the packet. If the switch does not use the same interface that the packet arrived on to reply to the packet's source, the packet might have originated from an unauthorized source, and the switch discards the packet.

This example uses two J-EX8200 switches. On J-EX4200 switches, you cannot configure individual interfaces for unicast RPF. On J-EX4200 switches, the switch applies unicast RPF globally to all interfaces on the switch. See "Understanding Unicast RPF for J-EX Series Switches" on page 1008 for more information on limitations regarding the configuration of unicast RPF on J-EX4200 switches.

In this example, an enterprise network's system administrator wants to protect Switch A against potential DoS and DDoS attacks from the Internet. The administrator configures unicast RPF on interface **ge-1/0/10** on Switch A. Packets arriving on interface **ge-1/0/10** on Switch A from the Switch B source also use incoming interface **ge-1/0/10** as the best return path to send packets back to the source.

The topology of this configuration example uses two J-EX8200 switches, Switch A and Switch B, connected by symmetrically routed interfaces:

- Switch A is on the edge of an enterprise network. The interface **ge-1/0/10** on Switch A connects to the interface **ge-1/0/5** on Switch B.
- Switch B is on the edge of the service provider network that connects the enterprise network to the Internet.

## Configuration

To enable unicast RPF, perform these tasks:

### CLI Quick Configuration

To quickly configure unicast RPF on Switch A, copy the following command and paste it into the switch terminal window:

```
[edit interfaces]  
set ge-1/0/10 unit 0 family inet rpf-check
```

**Step-by-Step Procedure** To configure unicast RPF on Switch A:

1. Enable unicast RPF on interface `ge-1/0/10`:

```
[edit interfaces]
user@switch# set ge-1/0/10 unit 0 family inet rpf-check
```

**Results** Check the results:

```
[edit interfaces]
user@switch# show
ge-1/0/10 {
  unit 0 {
    family inet {
      rpf-check;
    }
  }
}
```

## Verification

To confirm that the configuration is correct, perform these tasks:

- [Verifying That Unicast RPF Is Enabled on the Switch on page 1035](#)

### [Verifying That Unicast RPF Is Enabled on the Switch](#)

**Purpose** Verify that unicast RPF is enabled.

**Action** Verify that unicast RPF is enabled on interface `ge-1/0/10` by using the `show interfaces ge-1/0/10 extensive` or `show interfaces ge-1/0/10 detail` command.

```
user@switch> show interfaces ge-1/0/10 extensive
Physical interface: ge-1/0/10, Enabled, Physical link is Down
Interface index: 139, SNMP ifIndex: 58, Generation: 140
Link-level type: Ethernet, MTU: 1514, Speed: Auto, MAC-REWRITE Error: None,
Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled,
Auto-negotiation: Enabled, Remote fault: Online
Device flags   : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Link flags     : None
CoS queues     : 8 supported, 8 maximum usable queues
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:19:e2:50:95:ab, Hardware address: 00:19:e2:50:95:ab
Last flapped   : Never
Statistics last cleared: Never
Traffic statistics:
Input bytes   :                0          0 bps
Output bytes  :                0          0 bps
Input packets :                0          0 pps
Output packets:                0          0 pps
IPv6 transit statistics:
Input bytes   :                0
Output bytes  :                0
Input packets :                0
Output packets:                0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
```

```

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

  FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort          0                0                0
  1 assured-forw        0                0                0
  5 expedited-fo       0                0                0
  7 network-cont        0                0                0

Active alarms : LINK
Active defects : LINK
MAC statistics:
  Total octets          Receive          Transmit
  Total packets        0                0
  Unicast packets      0                0
  Broadcast packets    0                0
  Multicast packets    0                0
  CRC/Align errors     0                0
  FIFO errors          0                0
  MAC control frames   0                0
  MAC pause frames     0                0
  Oversized frames     0
  Jabber frames        0
  Fragment frames      0
  VLAN tagged frames   0
  Code violations      0
Filter statistics:
  Input packet count   0
  Input packet rejects 0
  Input DA rejects    0
  Input SA rejects    0
  Output packet count  0
  Output packet pad count 0
  Output packet error count 0
  CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
  Negotiation status: Incomplete
Packet Forwarding Engine configuration:
  Destination slot: 1

Logical interface ge-1/0/10.0 (Index 69) (SNMP ifIndex 59) (Generation 135)
Flags: Device-Down SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
  Input bytes :          0
  Output bytes :         0
  Input packets:        0
  Output packets:       0
IPv6 transit statistics:
  Input bytes :          0
  Output bytes :         0
  Input packets:        0
  Output packets:       0
Local statistics:

```



```

Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Protocol inet, Generation: 144, Route table: 0
Flags: uRPF
Addresses, Flags: Is-Preferred Is-Primary

```

**Meaning** The second-to-last line of the display shows the unicast RPF flag enabled, confirming that unicast RPF is enabled on interface **ge-1/0/10**.

- Related Documentation**
- [Configuring Unicast RPF \(CLI Procedure\) on page 1089](#)
  - [Disabling Unicast RPF \(CLI Procedure\) on page 1091](#)

## Example: Configuring IP Directed Broadcast on a J-EX Series Switch

IP directed broadcast provides a method of sending broadcast packets to hosts on a specified subnet without broadcasting those packets to hosts on the entire network.

This example shows how to enable a subnet to receive IP directed broadcast packets so you can perform backups and other network management tasks remotely:

- [Requirements on page 1037](#)
- [Overview and Topology on page 1038](#)
- [Configuration on page 1038](#)

### Requirements

This example uses the following software and hardware components:

- Junos OS Release 10.2 or later for J-EX Series switches
- One PC
- One J-EX Series switch

Before you configure IP directed broadcast for a subnet:

- Ensure that the subnet does not have a direct connection to the Internet.
- Configure routed VLAN interfaces (RVIs) for the ingress and egress VLANs on the switch. See [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#) or [Configuring VLANs for J-EX Series Switches \(J-Web Procedure\)](#).

## Overview and Topology

You might want to perform remote administration tasks such as backups and wake-on-LAN (WOL) application tasks to manage groups of clients on a subnet. One way to do this is to send IP directed broadcast packets targeted at the hosts in a particular target subnet.

The network forwards IP directed broadcast packets as if they were unicast packets. When the IP directed broadcast packet is received by a VLAN that is enabled for **targeted-broadcast**, the switch broadcasts the packet to all the hosts in its subnet.

In this topology (see Figure 34 on page 1038), a host is connected to an interface on a J-EX Series switch to manage the clients in subnet **10.1.2.1/24**. When the switch receives a packet with the broadcast IP address of the target subnet as its destination address, it forwards the packet to the subnet's Layer 3 interface and broadcasts it to all the hosts within the subnet.

Figure 34: Topology for IP Directed Broadcast

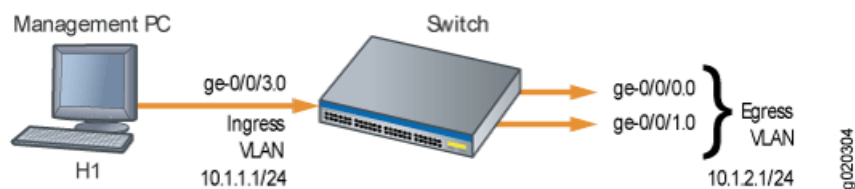


Table 153 on page 1038 shows the settings of the components in this example.

Table 153: Components of the IP Directed Broadcast Topology

| Property                | Settings                  |
|-------------------------|---------------------------|
| Switch hardware         | J-EX Series switch        |
| Ingress VLAN name       | v0                        |
| Ingress VLAN IP address | 10.1.1.1/24               |
| Egress VLAN name        | v1                        |
| Egress VLAN IP address  | 10.1.2.1/24               |
| Interfaces in VLAN v0   | ge-0/0/3.0                |
| Interfaces in VLAN v1   | ge-0/0/0.0 and ge-0/0/1.0 |

## Configuration

To configure IP directed broadcast on a subnet to enable remote management of its hosts:

**CLI Quick Configuration** To quickly configure the switch to accept IP directed broadcasts targeted at subnet 10.1.2.1/24, copy the following commands and paste them into the switch's terminal window:

```
[edit]
set interfaces ge-0/0/0.0 family ethernet-switching vlan members v1
set interfaces ge-0/0/1.0 family ethernet-switching vlan members v1
set interfaces vlan.1 family inet address 10.1.2.1/24
set interfaces ge-0/0/3.0 family ethernet-switching vlan members v0
set interfaces vlan.0 family inet address 10.1.1.1/24
set vlans v1 l3-interface vlan.1
set vlans v0 l3-interface vlan.0
set interfaces vlan.1 family inet targeted-broadcast
```

**Step-by-Step Procedure** To configure the switch to accept IP directed broadcasts targeted at subnet 10.1.2.1/24:

1. Add logical interface **ge-0/0/0.0** to VLAN **v1**:
 

```
[edit interfaces]
user@switch# set ge-0/0/0.0 family ethernet-switching vlan members v1
```
2. Add logical interface **ge-0/0/1.0** to VLAN **v1**:
 

```
[edit interfaces]
user@switch# set ge-0/0/1.0 family ethernet-switching vlan members v1
```
3. Configure the IP address for the egress VLAN, **v1**:
 

```
[edit interfaces]
user@switch# set vlan.1 family inet address 10.1.2.1/24
```
4. Add logical interface **ge-0/0/3.0** to VLAN **v0**:
 

```
[edit interfaces]
user@switch# set ge-0/0/3.0 family ethernet-switching vlan members v0
```
5. Configure the IP address for the ingress VLAN:
 

```
[edit interfaces]
user@switch# set vlan.0 family inet address 10.1.1.1/24
```
6. To route traffic between the ingress and egress VLANs, associate a Layer 3 interface with each VLAN:
 

```
[edit vlans]
user@switch# set v1 l3-interface vlan.1
user@switch# set v0 l3-interface vlan.0
```
7. Enable the Layer 3 interface for the egress VLAN to receive IP directed broadcasts:
 

```
[edit interfaces]
user@switch# set vlan.1 family inet targeted-broadcast
```

**Results** Check the results:

```
user@switch# show
interfaces {
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching {
        vlan {
```

```
        members v1;
    }
}
}
ge-0/0/1 {
    unit 0 {
        family ethernet-switching {
            vlan {
                members v1;
            }
        }
    }
}
ge-0/0/3 {
    unit 0 {
        family ethernet-switching {
            vlan {
                members v0;
            }
        }
    }
}
vlan {
    unit 0 {
        family inet {
            targeted-broadcast;
            address 10.1.1.1/24;
        }
    }
    unit 1 {
        family inet {
            targeted-broadcast;
            address 10.1.2.1/24;
        }
    }
}
vlans {
    default;
    v0 {
        l3-interface vlan.0;
    }
    v1 {
        l3-interface vlan.1;
    }
}
```

**Related Documentation**

- [Configuring IP Directed Broadcast \(CLI Procedure\) on page 1091](#)

# Configuring Interfaces

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\) on page 1045](#)
- [Port Role Configuration with the J-Web Interface \(with CLI References\) on page 1051](#)
- [Adding an Interface Description to the Configuration on page 1055](#)
- [Adding a Logical Unit Description to the Configuration on page 1056](#)
- [Disabling a Physical Interface on page 1057](#)
- [Disabling a Logical Interface on page 1058](#)
- [Configuring Flow Control on page 1058](#)
- [Configuring the Interface Address on page 1059](#)
- [Configuring the Interface Bandwidth on page 1061](#)
- [Configuring the Media MTU on page 1062](#)
- [Setting the Protocol MTU on page 1065](#)
- [Interface Ranges on page 1066](#)
- [Configuring Accounting for the Physical Interface on page 1074](#)
- [Configuring Accounting for the Logical Interface on page 1076](#)
- [Configuring Ethernet Loopback Capability on page 1077](#)
- [Configuring Gratuitous ARP on page 1078](#)
- [Configuring Static ARP Table Entries on page 1078](#)
- [Disabling the Transmission of Redirect Messages on an Interface on page 1079](#)
- [Configuring Unrestricted Proxy ARP on page 1080](#)
- [Enabling or Disabling SNMP Notifications on Logical Interfaces on page 1080](#)
- [Enabling or Disabling SNMP Notifications on Physical Interfaces on page 1080](#)
- [Configuring Aggregated Ethernet Interfaces \(CLI Procedure\) on page 1081](#)
- [Configuring Aggregated Ethernet Interfaces \(J-Web Procedure\) on page 1082](#)
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 1085](#)
- [Configuring Aggregated Ethernet Link Protection on page 1086](#)
- [Configuring Aggregated Ethernet Link Speed on page 1087](#)
- [Configuring Aggregated Ethernet Minimum Links on page 1088](#)

- Configuring Tagged Aggregated Ethernet Interfaces on page 1088
- Configuring a Layer 3 Subinterface (CLI Procedure) on page 1089
- Configuring Unicast RPF (CLI Procedure) on page 1089
- Disabling Unicast RPF (CLI Procedure) on page 1091
- Configuring IP Directed Broadcast (CLI Procedure) on page 1091
- Tracing Operations of an Individual Router or Switch Interface on page 1092
- Tracing Operations of the Interface Process on page 1093
- Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 1093

## Configuring Gigabit Ethernet Interfaces (CLI Procedure)

---

An Ethernet interface must be configured for optimal performance in a high-traffic network. J-EX Series switches include a factory default configuration that:

- Enables all the network interfaces on the switch
- Sets a default port mode (access)
- Sets default link settings
- Specifies a logical unit (**unit 0**) and assigns it to **family ethernet-switching** (except on J-EX8200 switches and Virtual Chassis)
- Specifies Rapid Spanning Tree Protocol (RSTP) and Link Layer Discovery Protocol (LLDP)

This topic describes:

- Configuring VLAN Options and Port Mode on page 1042
- Configuring the Link Settings on page 1043
- Configuring the IP Options on page 1044

### Configuring VLAN Options and Port Mode

By default, when you boot a switch and use the factory default configuration, or when you boot the switch and do not explicitly configure a port mode, all interfaces on the switch are in access mode and accept only untagged packets from the VLAN named **default**. You can optionally configure another VLAN and use that instead of **default**. You can also configure a port to accept untagged packets from the user-configured VLAN. For details on this concept (native VLAN), see “Understanding Bridging and VLANs on J-EX Series Switches” in *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

If you are connecting either a desktop phone, wireless access point or a security camera to a Power over Ethernet (PoE) port, you can configure some parameters for the PoE interface. PoE interfaces are enabled by default. For detailed information on PoE settings, see *Configuring PoE (CLI Procedure)*.

If you are connecting a device to other switches and to routers on the LAN, you need to assign the interface to a logical port and configure the logical port as a trunk port. See

“Port Role Configuration with the J-Web Interface (with CLI References)” on page 1051 for more information about port configuration.

If you are connecting to a server that contains virtual machines and a VEPA for packet aggregation from those virtual machines, configure the port as a tagged-access port. For more information about tagged access, see “Understanding Bridging and VLANs on J-EX Series Switches” in *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

To configure a Gigabit Ethernet interface or 10-Gigabit Ethernet interface for trunk port mode:

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family ethernet-switching
port-mode trunk
```

To configure a Gigabit Ethernet interface or 10-Gigabit Ethernet interface for tagged-access port mode:

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family ethernet-switching
port-mode tagged-access
```

## Configuring the Link Settings

J-EX Series switches include a factory default configuration that enables interfaces with the following link settings:

- All Gigabit Ethernet interfaces are set to **auto-negotiation**.
- The speed for Gigabit Ethernet interfaces is set to **auto**, allowing the interface to operate at 10m, 100m, or 1g. The link operates at the highest possible speed, depending on the capabilities of the remote end.
- The flow control for Gigabit Ethernet interfaces and 10-Gigabit Ethernet interfaces is set to **enabled**.
- The link mode is set to **auto**, allowing the interface to operate as either full duplex or half duplex. The link operates as full duplex unless this mode is not supported at the remote end.
- The 10-Gigabit Ethernet interfaces default to **no auto-negotiation**. The default speed is 10g and the default link mode is full duplex.

To configure the link settings:

- Set link settings for a Gigabit Ethernet interface:

```
[edit]
user@switch# set interfaces ge-fpc/pic/port ether-options
```

- Set link settings for a 10-Gigabit Ethernet interface:

```
[edit]
user@switch# set interfaces xe-fpc/pic/port ether-options
```



**NOTE:** On J-EX Series switches, *fpc* can have the following values:

- On a standalone J-EX4200 switch and standalone J-EX4500 switch, FPC refers to the switch itself. The FPC number is always 0 on these switches.
- On a J-EX4200 Virtual Chassis, a J-EX4500 Virtual Chassis, or a mixed J-EX4200 and J-EX4500 Virtual Chassis, the FPC number indicates the member ID of the switch within the Virtual Chassis.
- On a standalone J-EX8200 switch, the FPC number indicates the slot number of the line card that contains the physical interface.

*pic* can have the following values:

- On J-EX4200 and J-EX4500 switches, the PIC number is 0 for all built-in interfaces (interfaces that are not an uplink port).
- On J-EX4200 switches, the PIC number is 1 for uplink ports.
- On J-EX4500 switches, the PIC number is 1 for uplink ports on the left-hand uplink module and 2 for uplink ports on the right-hand uplink module.
- On J-EX8200 switches, the PIC number is always 0.

The `ether-options` statement allows you to modify the configuration:

- **802.3ad**—Specify an aggregated Ethernet bundle. See “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 1081.
- **auto-negotiation**—Enable or disable autonegotiation of flow control, link mode, and speed.
- **flow-control**—Enable or disable flow control.
- **link-mode**—Specify **full-duplex**, **half-duplex**, or **automatic**.
- **loopback**—Enable or disable loopback mode.
- **speed**—Specify **10m**, **100m**, **1g**, or **autonegotiation**.

## Configuring the IP Options

To specify an IP address for the logical unit using IPv4:



```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family inet address ip-address
```

To specify an IP address for the logical unit using IPv6:

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family inet6 address
ip-address
```



**NOTE:** Access interfaces on J-EX4200 and J-EX4500 switches are set to **family ethernet-switching** by default. You might have to delete this or another user-configured family setting before changing the setting to **family inet** or **family inet6**.

#### Related Documentation

- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\) on page 1045](#)
- [Monitoring Interface Status and Traffic on page 1095](#)
- [show interfaces ge- on page 1204](#)
- [show interfaces xe- on page 1228](#)
- [Understanding Interface Naming Conventions on J-EX Series Switches on page 1001](#)

## Configuring Gigabit Ethernet Interfaces (J-Web Procedure)

An Ethernet interface must be configured for optimal performance in a high-traffic network.

To configure properties on a Gigabit Ethernet interface or a 10-Gigabit Ethernet interface on a J-EX Series switch:

1. Select **Interfaces > Ports**.

The page lists Gigabit Ethernet and 10-Gigabit Ethernet interfaces and their link status.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes immediately for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

2. Select the interface you want to configure. If the interface you want to configure is not listed under **Ports** in the top table on the page, select the FPC (the FPC is the line card on a J-EX8200 switch or the member switch in a Virtual Chassis configuration) that includes that interface from the **List Ports for FPC** list.

Details for the selected interface such as administrative status, link status, speed, duplex, and flow control are displayed in the bottom table on the page.



**NOTE:** You can select multiple interfaces and modify their settings at the same time. When you do this, you cannot modify the IP address or enable or disable the administrative status of the selected interface.

3. Click **Edit** and select the set of options you want to configure first:

- Port Role—Enables you to assign a profile for the selected interface.



**NOTE:** When you select a particular port role, pre-configured port security parameters are set for the VLAN that the interface belongs to. For example, if you select the port role **Desktop**, the port security options **examine-dhcp** and **arp-inspection** are enabled on the VLAN that the interface belongs to. If there are interfaces in the VLAN that have static IP addresses, those interfaces might lose connectivity because those static IP addresses might not be present in the DHCP pool. Therefore, when you are selecting a port role, ensure that the corresponding port security settings for the VLAN are applicable to the interface.

For basic information on port security features such as DHCP snooping (CLI option **examine-dhcp**) or dynamic ARP inspection (DAI) (CLI option **arp-inspection**) and for port security configuration instructions, see *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

Click **Details** to view the configuration parameters for the selected port role.

- VLAN Options—Enables you to configure VLAN options for the selected interface.
  - Link Options—Enables you to modify the following link options for the selected interface:
    - Speed
    - MTU
    - Autonegotiation
    - Flow Control
    - Duplex
  - IP Options—Enables you to configure an IP address for the interface.
4. Configure the interface by configuring options in the selected option set. See Table 154 on page 1047 for details on options.
5. Repeat Steps 3 and 4 for the remaining option sets that you want to configure for the interface.



**NOTE:** To enable or disable the administrative status for a selected interface, click **Enable Port** or **Disable Port**.

**Table 154: Port Edit Options**

| Field                 | Function                                                                                                                                                                                                                                                                                                                                                                                                 | Your Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Port Role</b>      | <p>Specifies a profile (role) to assign to the interface.</p> <p><b>NOTE:</b> Once a port role is configured on the interface, you cannot specify VLAN options or IP options.</p> <p><b>NOTE:</b> Only the following port roles can be applied on J-EX8200 switch interfaces:</p> <ul style="list-style-type: none"> <li>• Default</li> <li>• Layer 2 uplink</li> <li>• Routed uplink</li> </ul>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Default               | <p>Applies the default role.</p> <p>The interface family is set to <b>ethernet-switching</b>, port mode is set to <b>access</b>, and RSTP is enabled.</p>                                                                                                                                                                                                                                                | <ol style="list-style-type: none"> <li>1. Click <b>Details</b> to view CLI commands for this role.</li> <li>2. Click <b>OK</b>.</li> </ol>                                                                                                                                                                                                                                                                                                                                           |
| Desktop               | <p>Applies the desktop role.</p> <p>The interface family is set to <b>ethernet-switching</b>, port mode is set to <b>access</b>, RSTP is enabled with the <b>edge</b> and <b>point-to-point</b> options, and port security parameters (MAC limit =1; dynamic ARP inspection and DHCP snooping enabled) are set.</p>                                                                                      | <ol style="list-style-type: none"> <li>1. Select an existing VLAN configuration or type the name of a new VLAN configuration to be associated with the interface.</li> <li>2. Click <b>Details</b> to view CLI commands for this role.</li> <li>3. Click <b>OK</b>.</li> </ol>                                                                                                                                                                                                       |
| Desktop and Phone     | <p>Applies the desktop and phone role.</p> <p>The interface family is set to <b>ethernet-switching</b>, port mode is set to <b>access</b>, port security parameters (MAC limit =1; dynamic ARP inspection and DHCP snooping enabled) are set, and recommended CoS parameters are specified for forwarding classes, schedulers, and classifiers. See Table 155 on page 1050 for more CoS information.</p> | <ol style="list-style-type: none"> <li>1. Select an existing VLAN configuration or type the name of a new VLAN configuration to be associated with the interface. <p>You can also select an existing VoIP VLAN configuration or a new VoIP VLAN configuration to be associated with the interface.</p> <p><b>NOTE:</b> VoIP is not supported on J-EX8200 switches.</p> </li> <li>2. Click <b>Details</b> to view CLI commands for this role.</li> <li>3. Click <b>OK</b>.</li> </ol> |
| Wireless Access Point | <p>Applies the wireless access point role.</p> <p>The interface family is set to <b>ethernet-switching</b>, port mode is set to <b>access</b>, and RSTP is enabled with the <b>edge</b> and <b>point-to-point</b> options.</p>                                                                                                                                                                           | <ol style="list-style-type: none"> <li>1. Select an existing VLAN configuration or type the name of a new VLAN configuration to be associated with the interface. Type the <b>VLAN ID</b> for a new VLAN.</li> <li>2. Click <b>Details</b> to view CLI commands for this role.</li> <li>3. Click <b>OK</b>.</li> </ol>                                                                                                                                                               |

Table 154: Port Edit Options (*continued*)

| Field                                                                                                                                                                                                                                                                                                     | Function                                                                                                                                                                                                                                           | Your Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Routed Uplink                                                                                                                                                                                                                                                                                             | <p>Applies the routed uplink role.</p> <p>The interface family is set to <b>inet</b>, and recommended CoS parameters are set for schedulers and classifiers. See Table 155 on page 1050 for more CoS information.</p>                              | <p>To specify an IPv4 address:</p> <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv4 address</b>.</li> <li>2. Type an IP address—for example: <b>10.10.10.10</b>.</li> <li>3. Enter the subnet mask or address prefix. For example, 24 bits represents <b>255.255.255.0</b>.</li> <li>4. Click <b>OK</b>.</li> </ol> <p>To specify an IPv6 address:</p> <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv6 address</b>.</li> <li>2. Type an IP address—for example: <b>2001:ab8:85a3::8a2e:370:7334</b>.</li> <li>3. Enter the subnet mask or address prefix.</li> <li>4. Click <b>OK</b>.</li> </ol> <p><b>NOTE:</b> IPv6 is not supported on J-EX4500 switches.</p> |
| Layer 2 Uplink                                                                                                                                                                                                                                                                                            | <p>Applies the Layer 2 uplink role.</p> <p>The interface family is set to <b>ethernet-switching</b>, port mode is set to <b>trunk</b>, RSTP is enabled with the <b>point-to-point</b> option, and port security is set to <b>dhcp-trusted</b>.</p> | <ol style="list-style-type: none"> <li>1. For this port role you can select a VLAN member and associate a native VLAN with the interface.</li> <li>2. Click <b>Details</b> to view CLI commands for this role.</li> <li>3. Click <b>OK</b>.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| None                                                                                                                                                                                                                                                                                                      | <p>Specifies that no port role is configured for the selected interface.</p>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>NOTE:</b> See “Port Role Configuration with the J-Web Interface (with CLI References)” on page 1051 for details on the CLI commands that are associated with each port role.</p> <p><b>NOTE:</b> For a J-EX8200 switch, dynamic ARP inspection and DHCP snooping parameters are not configured.</p> |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>VLAN Options</b></p>                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 154: Port Edit Options (*continued*)

| Field                   | Function                                                                                                                                                  | Your Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Port Mode               | Specifies the mode of operation for the interface: trunk or access.                                                                                       | <p>If you select <b>Trunk</b>, you can:</p> <ol style="list-style-type: none"> <li>1. Click <b>Add</b> to add a VLAN member.</li> <li>2. Select the VLAN and click <b>OK</b>.</li> <li>3. (Optional) Associate a native VLAN with the interface and click <b>OK</b>.</li> </ol> <p>If you select <b>Access</b>, you can:</p> <ol style="list-style-type: none"> <li>1. Select the VLAN member to be associated with the interface.</li> <li>2. (Optional) Associate a VoIP VLAN with the interface. Only a VLAN with a VLAN ID can be associated as a VoIP VLAN.</li> </ol> <p><b>NOTE:</b> VoIP is not supported on J-EX8200 switches.</p> <ol style="list-style-type: none"> <li>3. Click <b>OK</b>.</li> </ol> |
| <b>Link Options</b>     |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MTU (bytes)             | Specifies the maximum transmission unit size for the interface.                                                                                           | Type a value from <b>256</b> through <b>9216</b> . The default MTU for Gigabit Ethernet interfaces is <b>1514</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Speed                   | Specifies the speed for the mode.                                                                                                                         | Select one of the following values: 10 Mbps, 100 Mbps, 1000 Mbps, or Auto-Negotiation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Duplex                  | Specifies the link mode.                                                                                                                                  | Select one: <b>automatic</b> , <b>half</b> , or <b>full</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description             | <p>Describes the link.</p> <p><b>NOTE:</b> If the interface is part of a link aggregation group (LAG), only the option <b>Description</b> is enabled.</p> | Enter a brief description for the link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Enable Auto Negotiation | Enables or disables autonegotiation.                                                                                                                      | Select the check box to enable autonegotiation, or clear the check box to disable it. By default, autonegotiation is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Enable Flow Control     | Enables or disables flow control.                                                                                                                         | Select the check box to enable flow control to regulate the amount of traffic sent out of the interface, or clear the check box to disable flow control and permit unrestricted traffic. Flow control is enabled by default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IP Options</b>       |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 154: Port Edit Options (*continued*)

| Field        | Function                                                                                                                                              | Your Action                                                                                                                                                                                                                                                                                                                                       |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPv4 Address | Specifies an IPv4 address for the interface.<br><br><b>NOTE:</b> If the IP address is cleared, the interface still belongs to the <b>inet</b> family. | <ol style="list-style-type: none"> <li>To specify an IPv4 address, select the check box <b>IPv4 address</b>.</li> <li>Type an IP address—for example: <b>10.10.10.10</b>.</li> <li>Enter the subnet mask or address prefix. For example, 24 bits represents <b>255.255.255.0</b>.</li> <li>Click <b>OK</b>.</li> </ol>                            |
| IPv6 Address | Specifies an IPv6 address for the interface.<br><br><b>NOTE:</b> If the IP address is cleared, the interface still belongs to the <b>inet</b> family. | <ol style="list-style-type: none"> <li>To specify an IPv6 address, select the check box <b>IPv6 address</b>.</li> <li>Type an IP address—for example: <b>2001:ab8:85a3::8a2e:370:7334</b>.</li> <li>Enter the subnet mask or address prefix.</li> <li>Click <b>OK</b>.</li> </ol> <p><b>NOTE:</b> IPv6 is not supported on J-EX4500 switches.</p> |

Table 155: Recommended CoS Settings for Port Roles

| CoS Parameter         | Recommended Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Forwarding Classes    | <p>There are four forwarding classes:</p> <ul style="list-style-type: none"> <li><b>voice</b>—Queue number is set to 7.</li> <li><b>expedited-forwarding</b>—Queue number is set to 5.</li> <li><b>assured-forwarding</b>—Queue number is set to 1.</li> <li><b>best-effort</b>—Queue number is set to 0.</li> </ul>                                                                                                                                                                                                                                                     |
| Schedulers            | <p>The schedulers and their settings are:</p> <ul style="list-style-type: none"> <li>Strict-priority—Transmission rate is set to 10 percent and buffer size to 5 percent.</li> <li>Expedited-scheduler—Transmission rate is set to 30 percent, buffer size to 30 percent, and priority to <b>low</b>.</li> <li>Assured-scheduler—Transmission rate is set to 25 percent, buffer size to 25 percent, and priority to <b>low</b>.</li> <li>Best-effort scheduler—Transmission rate is set to 35 percent, buffer size to 40 percent, and priority to <b>low</b>.</li> </ul> |
| Scheduler maps        | When a desktop and phone, routed uplink, or layer 2 uplink role is applied on an interface, the forwarding classes and schedulers are mapped using the scheduler map.                                                                                                                                                                                                                                                                                                                                                                                                    |
| ieee-802.1 classifier | Imports the default <b>ieee-802.1</b> classifier configuration and sets the loss priority to <b>low</b> for the code point 101 for the <b>voice</b> forwarding class.                                                                                                                                                                                                                                                                                                                                                                                                    |
| dscp classifier       | Imports the default <b>dscp</b> classifier configuration and sets the loss priority to <b>low</b> for the code point 101110 for the <b>voice</b> forwarding class.                                                                                                                                                                                                                                                                                                                                                                                                       |

- Related Documentation**
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
  - Monitoring Interface Status and Traffic on page 1095
  - J-EX Series Switches Interfaces Overview on page 999
  - For information about the class of service (CoS) implementation in the Junos OS, see the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>,
  - Understanding Interface Naming Conventions on J-EX Series Switches on page 1001

## Port Role Configuration with the J-Web Interface (with CLI References)

When you configure Gigabit Ethernet interface properties with the J-Web interface (**Configure > Interfaces**) you can optionally select pre-configured port roles for those interfaces. When you select a role from the **Port Role** field and apply it to a port, the J-Web interface modifies the switch configuration using CLI commands. Table 156 on page 1051 lists the CLI commands applied for each port role.



**NOTE:** If there is an existing port role configuration, it is cleared before the new port role configuration is applied.

**Table 156: Port Role Configuration Summary**

| Configuration Description                                                          | CLI Commands                                                                                   |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Default Port Role</b>                                                           |                                                                                                |
| Set the port role to <b>Default</b> .                                              | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Default</code>          |
| Set port family to <b>ethernet-switching</b> .<br>Set port mode to <b>access</b> . | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching port-mode access</code> |
| Enable RSTP if redundant trunk groups are not configured.                          | <code>delete protocols rstp interface <i>interface</i> disable</code>                          |
| Disable RSTP if redundant trunk groups are configured.                             | <code>set protocols rstp interface <i>interface</i> disable</code>                             |
| <b>Desktop Port Role</b>                                                           |                                                                                                |
| Set the port role to desktop.                                                      | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Desktop</code>          |
| Set VLAN if new VLAN is specified.                                                 | <code>set vlans &lt;<i>vlan name</i>&gt; vlan-id &lt;<i>vlan-id</i>&gt;</code>                 |
| Set port family to <b>ethernet-switching</b> .<br>Set Port Mode to <b>Access</b> . | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching port-mode access</code> |

Table 156: Port Role Configuration Summary (*continued*)

| Configuration Description                                                                                                                                       | CLI Commands                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set VLAN if new VLAN is specified.                                                                                                                              | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching vlan members <i>vlan-members</i></code>                                                                                                                                                                                                        |
| Set port security parameters.                                                                                                                                   | <code>set ethernet-switching-options secure-access-port vlan MacTest arp-inspection</code>                                                                                                                                                                                                                            |
| Set RSTP protocol with <b>edge</b> option.                                                                                                                      | <code>set protocols rstp interface <i>interface</i> edge</code>                                                                                                                                                                                                                                                       |
| RSTP protocol is disabled if redundant trunk groups are configured.                                                                                             | <code>set protocols rstp interface <i>interface</i> disable</code>                                                                                                                                                                                                                                                    |
| <b>Desktop and Phone Port Role</b>                                                                                                                              |                                                                                                                                                                                                                                                                                                                       |
| Set the port role to desktop and phone.                                                                                                                         | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Desktop and Phone</code>                                                                                                                                                                                                                       |
| Set data VLAN if new VLAN is specified.                                                                                                                         | <code>set vlans <i>vlan-name</i> vlan-id <i>vlan id</i></code>                                                                                                                                                                                                                                                        |
| Set voice VLAN if new voice VLAN is specified.                                                                                                                  |                                                                                                                                                                                                                                                                                                                       |
| Set port family to <b>ethernet-switching</b> .                                                                                                                  | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching</code>                                                                                                                                                                                                                                         |
| Set Port Mode to <b>access</b> .                                                                                                                                | <code>port-mode access</code>                                                                                                                                                                                                                                                                                         |
| Set data VLAN on port stanza.                                                                                                                                   | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching vlan members <i>vlan-members</i></code>                                                                                                                                                                                                        |
| Set port security parameters.                                                                                                                                   | <code>set ethernet-switching-options secure-access-port vlan MacTest arp-inspection</code>                                                                                                                                                                                                                            |
| Set VOIP VLAN.                                                                                                                                                  | <code>set ethernet-switching-options voip interface <i>interface</i>.0 vlan <i>vlan name</i></code>                                                                                                                                                                                                                   |
| Set class of service parameters<br>SCHEDULER_MAP=juniper-port-profile-map<br>IEEE_CLASSIFIER=juniper-ieee-classifier<br>DSCP_CLASSIFIER=juniper-dscp-classifier | <code>set class-of-service interfaces <i>interfaces</i> scheduler-map juniper-port-profile-map<br/>set class-of-service interfaces <i>interface</i> unit 0 classifiers ieee-802.1 juniper_ieee_classifier<br/>set class-of-service interfaces <i>interface</i> unit 0 classifiers dscp juniper-dscp-classifier</code> |
| Set CoS Configuration                                                                                                                                           | Refer Table 157 on page 1054 for details.                                                                                                                                                                                                                                                                             |
| <b>Wireless Access Point Port Role</b>                                                                                                                          |                                                                                                                                                                                                                                                                                                                       |
| Set the port role to wireless access point.                                                                                                                     | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Wireless Access Point</code>                                                                                                                                                                                                                   |
| Set VLAN on VLANs stanza.                                                                                                                                       | <code>set vlans <i>vlan name</i> vlan-id <i>vlan-id</i></code>                                                                                                                                                                                                                                                        |
| Set port family to <b>ethernet-switching</b> .                                                                                                                  | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching</code>                                                                                                                                                                                                                                         |
| Set port mode to <b>Access</b> .                                                                                                                                | <code>port-mode access</code>                                                                                                                                                                                                                                                                                         |
| Set VLAN on port stanza.                                                                                                                                        | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching vlan members <i>vlan-members</i></code>                                                                                                                                                                                                        |



Table 156: Port Role Configuration Summary (*continued*)

| Configuration Description                                                                                                                                                                | CLI Commands                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set RSTP protocol with edge option.                                                                                                                                                      | <code>set protocols rstp interface <i>interface</i> edge</code>                                                                                                                                                                                                                                                                               |
| RSTP protocol is disabled if redundant trunk groups are configured.                                                                                                                      | <code>set protocols rstp interface <i>interface</i> disable</code>                                                                                                                                                                                                                                                                            |
| <b>Routed Uplink Port Role</b>                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                               |
| Set the port role to Routed Uplink.                                                                                                                                                      | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Routed Uplink</code>                                                                                                                                                                                                                                                   |
| Set port family to inet.<br>Set IP address on the port.                                                                                                                                  | <code>set interfaces <i>interface</i> unit 0 family inet address <i>ipaddress</i></code>                                                                                                                                                                                                                                                      |
| Set class-of-service parameters<br><b>SCHEDULER_MAP=</b> juniper-port-profile-map<br><b>IEEE_CLASSIFIER=</b> juniper-ieee-classifier<br><b>DSCP_CLASSIFIER=</b> juniper-dscp-classifier  | <code>set class-of-service interfaces <i>interfaces</i> scheduler-map juniper-port-profile-map</code><br><code>set class-of-service interfaces <i>interface</i> unit 0 classifiers ieee-802.1 juniper_ieee_classifier</code><br><code>set class-of-service interfaces <i>interface</i> unit 0 classifiers dscp juniper-dscp-classifier</code> |
| Set CoS configuration                                                                                                                                                                    | Refer Table 157 on page 1054 for details.                                                                                                                                                                                                                                                                                                     |
| <b>Layer 2 Uplink Port Role</b>                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                               |
| Set the port role to Layer 2 Uplink.                                                                                                                                                     | <code>set interfaces <i>interface</i> apply-macro juniper-port-profile Layer2 Uplink</code>                                                                                                                                                                                                                                                   |
| Set port family to <b>ethernet-switching</b><br>Set port mode to <b>trunk</b> .                                                                                                          | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching port-mode trunk</code>                                                                                                                                                                                                                                                 |
| Set Native VLAN name.                                                                                                                                                                    | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching native-vlan-id <i>vlan-name</i></code>                                                                                                                                                                                                                                 |
| Set the port as part of all valid VLANs; "valid" refers to all VLANs except native VLAN and voice VLANs.                                                                                 | <code>set interfaces <i>interface</i> unit 0 family ethernet-switching vlan members <i>vlan-members</i></code>                                                                                                                                                                                                                                |
| Set port security parameter.                                                                                                                                                             | <code>set ethernet-switching-options secure-access-port dhcp-trusted</code>                                                                                                                                                                                                                                                                   |
| Set RSTP protocol with point-to-point option.                                                                                                                                            | <code>set protocols rstp interface <i>interface</i> mode point-to-point</code>                                                                                                                                                                                                                                                                |
| Disable RSTP if redundant trunk groups are configured.                                                                                                                                   | <code>set protocols rstp interface <i>interface</i> disable</code>                                                                                                                                                                                                                                                                            |
| Set class-of-service parameters.<br><b>SCHEDULER_MAP=</b> juniper-port-profile-map<br><b>IEEE_CLASSIFIER=</b> juniper_ieee_classifier<br><b>DSCP_CLASSIFIER=</b> juniper_dscp_classifier | <code>set class-of-service interfaces <i>interfaces</i> scheduler-map juniper-port-profile-map</code><br><code>set class-of-service interfaces <i>interface</i> unit 0 classifiers ieee-802.1 juniper_ieee_classifier</code><br><code>set class-of-service interfaces <i>interface</i> unit 0 classifiers dscp juniper-dscp-classifier</code> |

Table 156: Port Role Configuration Summary (*continued*)

| Configuration Description | CLI Commands                                 |
|---------------------------|----------------------------------------------|
| Set CoS configuration     | Refer to Table 157 on page 1054 for details. |

Table 157 on page 1054 lists the CLI commands for the recommended CoS settings that are committed when the CoS configuration is set.

Table 157: Recommended CoS Settings for Port Roles

| CoS Parameter                    | CLI Command                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Forwarding Classes</b>        |                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>voice</b>                     | <code>set class-of-service forwarding-classes class voice queue-num 7</code>                                                                                                                                                                                                                                                                                                       |
| <b>expedited-forwarding</b>      | <code>set class-of-service forwarding-classes class expedited-forwarding queue-num 5</code>                                                                                                                                                                                                                                                                                        |
| <b>assured-forwarding</b>        | <code>set class-of-service forwarding-classes class assured-forwarding queue-num 1</code>                                                                                                                                                                                                                                                                                          |
| <b>best-effort</b>               | <code>set class-of-service forwarding-classes class best-effort queue-num 0</code>                                                                                                                                                                                                                                                                                                 |
| <b>Schedulers</b>                |                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>strict-priority-scheduler</b> | The CLI commands are: <ul style="list-style-type: none"> <li><code>set class-of-service schedulers strict-priority-scheduler transmit-rate percent 10</code></li> <li><code>set class-of-service schedulers strict-priority-scheduler buffer-size percent 5</code></li> <li><code>set class-of-service schedulers strict-priority-scheduler priority strict-high</code></li> </ul> |
| <b>expedited-scheduler</b>       | The CLI commands are: <ul style="list-style-type: none"> <li><code>set class-of-service schedulers expedited-scheduler transmit-rate percent 30</code></li> <li><code>set class-of-service schedulers expedited-scheduler buffer-size percent 30</code></li> <li><code>set class-of-service schedulers expedited-scheduler priority low</code></li> </ul>                          |
| <b>assured-scheduler</b>         | The CLI commands are: <pre>set class-of-service schedulers assured-scheduler transmit-rate percent 25 set class-of-service schedulers strict-priority-scheduler buffer-size percent 25 set class-of-service schedulers strict-priority-scheduler priority low</pre>                                                                                                                |
| <b>best-effort-scheduler</b>     | The CLI commands are: <pre>set class-of-service schedulers best-effort-scheduler transmit-rate percent 35 set class-of-service schedulers best-effort-scheduler buffer-size percent 40 set class-of-service schedulers best-effort-scheduler priority low</pre>                                                                                                                    |

Table 157: Recommended CoS Settings for Port Roles (*continued*)

| CoS Parameter         | CLI Command                                                                                                                                                                                                                                                                                                                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Classifiers           | <p>The classifiers are:</p> <pre>set class-of-service classifiers ieee-802.1 juniper_ieee_classifier import default forwarding-class voice loss-priority low code-points 101 set class-of-service classifiers dscp juniper_dscp_classifier import default forwarding-class voice loss-priority low code-points 101110</pre> |
| Related Documentation | <ul style="list-style-type: none"> <li>Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045</li> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> </ul>                                                                                                                      |

## Adding an Interface Description to the Configuration

You can include a text description of each physical interface in the configuration file. Any descriptive text you include is displayed in the output of the **show interfaces** commands, and is also exposed in the **ifAlias** Management Information Base (MIB) object. It has no impact on the interface's configuration. To add a text description, include the **description** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
description text;
```

The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.



**NOTE:** You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See “Enabling and Disabling Insertion of Option 82 Information” in the *Junos OS Subscriber Access Configuration Guide*.

For information about describing logical units, see “Adding a Logical Unit Description to the Configuration” on page 1056.

### Example: Adding an Interface Description to the Configuration

Add a description to a Fast Ethernet interface:

```
[edit interfaces]
user@host#
set fe-0/0/1 description "Backbone connection to PHL01"
[edit interfaces]
user@host#
show
fe-0/0/1 {
  description "Backbone connection to PHL01";
  unit 0 {
    family inet {
      address 192.168.0.1/30;
    }
  }
}
```

```
    }
}
```

To display the description from the router or switch CLI, use the **show interfaces** command:

```
user@host>
```

```
show interfaces fe-0/0/1
```

```
Physical interface: fe-0/0/1, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 23
  Description: Backbone connection to PHL01
  ...
```

To display the interface description from the interfaces MIB, use the **snmpwalk** command from a server. To isolate information for a specific interface, search for the interface index shown in the **SNMP ifIndex** field of the **show interfaces** command output. The **ifAlias** object is in **ifXTable**.

```
user-server>snmpwalk host-fxp0.mylab public ifXTable | grep -e '\.23'
snmpwalk host-fxp0.mylab public ifXTable | grep -e '\.23'
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifName.23 = fe-0/0/1
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInOctets.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCInBroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutOctets.23 = Counter64: 42
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutBroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifLinkUpDownTrapEnable.23 = enabled(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHighSpeed.23 = Gauge32: 100
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifPromiscuousMode.23 = false(2)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifConnectorPresent.23 = true(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifAlias.23 = Backbone connection to PHL01
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifCounterDiscontinuityTime.23 = Timeticks:
(0) 0:00:00.00
```

## Adding a Logical Unit Description to the Configuration

You can include a text description of each logical unit in the configuration file. Any descriptive text you include is displayed in the output of the **show interfaces** commands, and is also exposed in the **ifAlias** Management Information Base (MIB) object. It has no impact on the interface's configuration. To add a text description, include the **description** statement:

```
description text;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.



**NOTE:** You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See “Enabling and Disabling Insertion of Option 82 Information” in the *Junos OS Subscriber Access Configuration Guide*.

For information about describing physical interfaces, see “Adding an Interface Description to the Configuration” on page 1055.

## Disabling a Physical Interface

You can disable a physical interface, marking it as being down, without removing the interface configuration statements from the configuration. To do this, include the `disable` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]  
disable;
```



**CAUTION:** Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.



**NOTE:** On the router, when you use the `disable` statement at the `edit interfaces` hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet PICs with SFP transceivers do support it and the laser will be turned off when the interface is disabled.



**WARNING:** Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

### Example: Disabling a Physical Interface

Disable a physical interface:

```
[edit interfaces]  
so-1/1/0 {  
  mtu 8000;  
  clocking internal;  
  encapsulation ppp;  
  sonet-options {
```

```

        fcs 16;
    }
    unit 0 {
        family inet {
            address 172.16.0.0/12 {
                destination 172.16.0.4;
            }
        }
    }
}
[edit interfaces]
user@host# set so-1/1/0 disable
[edit interfaces]
user@host# show so-1/1/0
so-1/1/0 {
    disable;# Interface is marked as disabled
    mtu 8000;
    clocking internal;
    encapsulation ppp;
    sonet-options {
        fcs 16;
    }
    unit 0 {
        family inet {
            address 172.16.0.0 {
                destination 172.16.0.3;
            }
        }
    }
}
}

```

## Disabling a Logical Interface

You can unconfigure a logical interface, effectively disabling that interface, without removing the logical interface configuration statements from the configuration. To do this, include the **disable** statement:

```
disable;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

When an interface is disabled, a route (pointing to the reserved target “REJECT”) with the IP address of the interface and a 32-bit subnet mask is installed in the routing table. See the *Junos Software Routing Protocols Configuration Guide*.

## Configuring Flow Control

By default, the router or switch imposes flow control to regulate the amount of traffic sent out on a Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit

Ethernet interface. Flow control is not supported on the 4-port Fast Ethernet PIC. This is useful if the remote side of the connection is a Fast Ethernet or Gigabit Ethernet switch.

You can disable flow control if you want the router or switch to permit unrestricted traffic. To disable flow control, include the **no-flow-control** statement:

```
no-flow-control;
```

To explicitly reinstate flow control, include the **flow-control** statement:

```
flow-control;
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* aggregated-ether-options]
- [edit interfaces *interface-name* ether-options]
- [edit interfaces *interface-name* fastether-options]
- [edit interfaces *interface-name* gigheter-options]

## Configuring the Interface Address

You assign an address to an interface by specifying the address when configuring the protocol family. For the **inet** or **inet6** family, configure the interface IP address. For the **iso** family, configure one or more addresses for the loopback interface. For the **ccc**, **ethernet-switching**, **tcc**, **mpls**, **tnp**, and **vpls** families, you never configure an address.



**NOTE:** The point-to-point (PPP) address is taken from the loopback interface address that has the primary attribute. When the loopback interface is configured as an unnumbered interface, it takes the primary address from the donor interface.

To assign an address to an interface, include the **address** statement:

```
address address {
  broadcast address;
  destination address;
  destination-profile name;
  eui-64;
  preferred;
  primary;
}
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

In the **address** statement, specify the network address of the interface.

For each address, you can optionally configure one or more of the following:

- Broadcast address for the interface subnet—Specify this in the **broadcast** statement; this applies only to Ethernet interfaces, such as the management interface **fxp0**, **em0**, or **me0** the Fast Ethernet interface, and the Gigabit Ethernet interface.
- Address of the remote side of the connection (for point-to-point interfaces only)—Specify this in the **destination** statement.
- PPP properties to the remote end—Specify this in the **destination-profile** statement. You define the profile at the **[edit access group-profile name ppp]** hierarchy level (for point-to-point interfaces only).
- Whether the router or switch automatically generates the host number portion of interface addresses—The **eui-64** statement applies only to interfaces that carry IPv6 traffic, in which the prefix length of the address is 64 bits or less, and the low-order 64 bits of the address are zero. This option does not apply to the loopback interface (**lo0**) because IPv6 addresses configured on the loopback interface must have a 128-bit prefix length.
- Whether this address is the preferred address—Each subnet on an interface has a preferred local address. If you configure more than one address on the same subnet, the preferred local address is chosen by default as the source address when you originate packets to destinations on the subnet. For more information about preferred addresses, see “Configuring Default, Primary, and Preferred Addresses and Interfaces” in the *Junos OS Network Interfaces Configuration Guide*.

By default, the preferred address is the lowest-numbered address on the subnet. To override the default and explicitly configure the preferred address, include the **preferred** statement when configuring the address.

- Whether this address is the primary address—Each interface has a primary local address. If an interface has more than one address, the primary local address is used by default as the source address when you originate packets out the interface where the destination gives no hint about the subnet (for example, some **ping** commands). For more information about primary addresses, see “Configuring Default, Primary, and Preferred Addresses and Interfaces” in the *Junos OS Network Interfaces Configuration Guide*.

By default, the primary address on an interface is the lowest-numbered non-127 preferred address on the interface. To override the default and explicitly configure the preferred address, include the **primary** statement when configuring the address.

- Configuring Interface IPv4 Addresses on page 1060
- Configuring Interface IPv6 Addresses on page 1061

## Configuring Interface IPv4 Addresses

You can configure router or switch interfaces with a 32-bit IP version 4 (IPv4) address and optionally with a destination prefix, sometimes called a *subnet mask*. An IPv4 address utilizes a 4-octet dotted decimal address syntax (for example, **192.16.1.1**). An IPv4 address with destination prefix utilizes a 4-octet dotted decimal address syntax appended with a destination prefix (for example, **192.16.1.1/30**).



To configure an IPv4 address on routers and switches running Junos OS, use the **edit interface** *interface-name* **unit** *number* **family** *inet* **address** *a.b.c.d/nn* statement at the [edit interfaces] hierarchy level.



**NOTE:** Routers and switches running the Junos OS support /31 destination prefixes when used in point-to-point Ethernet configurations; however, they are not supported by many other devices, such as hosts, hubs, routers, or switches. You must determine if the peer system also supports /31 destination prefixes before configuration.

## Configuring Interface IPv6 Addresses

You represent IP version 6 (IPv6) addresses in hexadecimal notation using a colon-separated list of 16-bit values.

You assign a 128-bit IPv6 address to an interface by including the **address** statement:

```
address aaaa:bbbb:...:zzzz/nn;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *inet6*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *inet6*]

The double colon (::) represents all bits set to 0, as shown in the following example:

```
interfaces fe-0/0/1 {
  unit 0 {
    family inet6 {
      address fec0:1:1::2/64;
    }
  }
}
```



**NOTE:** You must manually configure the switch advertisement and advertise the default prefix for autoconfiguration to work on a specific interface.

### Related Documentation

- Configuring IPCP Options
- Configuring Default, Primary, and Preferred Addresses and Interfaces

## Configuring the Interface Bandwidth

By default, the Junos OS uses the physical interface's speed for the MIB-II object, **ifSpeed**. You can configure the logical unit to populate the **ifSpeed** variable by configuring a bandwidth value for the logical interface. The **bandwidth** statement sets an

informational-only parameter; you cannot adjust the actual bandwidth of an interface with this statement.



**NOTE:** We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the **bandwidth** statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:

$$\text{cost} = \text{reference-bandwidth}/\text{bandwidth},$$

where bandwidth is the physical interface speed. However, if you specify a value for bandwidth using the **bandwidth** statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.

To configure the bandwidth value for a logical interface, include the **bandwidth** statement:

**bandwidth** *rate*;

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]

**rate** is the peak rate, in bps or cps. You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation **k** (1000), **m** (1,000,000), or **g** (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation **c**; values expressed in cells per second are converted to bits per second using the formula 1 cps = 384 bps. The value can be any positive integer. The **bandwidth** statement is valid for all logical interfaces, except multilink interfaces.

## Configuring the Media MTU

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO). Table 158 on page 1062 lists the media and protocol MTU sizes by interface type, and Table 159 on page 1063 lists the encapsulation overhead by encapsulation type.

**Table 158: Media MTU Sizes by Interface Type for J-EX Series Switches**

| Interface Type   | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|------------------|---------------------------|---------------------|---------------------------------|
| Gigabit Ethernet | 1514                      | 9192                | 1500 (IPv4), 1497 (ISO)         |

**Table 158: Media MTU Sizes by Interface Type for J-EX Series Switches (continued)**

| Interface Type      | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|---------------------|---------------------------|---------------------|---------------------------------|
| 10-Gigabit Ethernet | 1514                      | 9192                | 1500 (IPv4), 1497 (ISO)         |

**Table 159: Encapsulation Overhead by Encapsulation Type**

| Interface Encapsulation                                                     | Encapsulation Overhead (Bytes) |
|-----------------------------------------------------------------------------|--------------------------------|
| 802.1Q/Ethernet 802.3                                                       | 21                             |
| 802.1Q/Ethernet Subnetwork Access Protocol (SNAP)                           | 26                             |
| 802.1Q/Ethernet version 2                                                   | 18                             |
| ATM Cell Relay                                                              | 4                              |
| ATM permanent virtual connection (PVC)                                      | 12                             |
| Cisco HDLC                                                                  | 4                              |
| Ethernet 802.3                                                              | 17                             |
| Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS) | 4                              |
| Ethernet over ATM                                                           | 32                             |
| Ethernet SNAP                                                               | 22                             |
| Ethernet translational cross-connect (TCC)                                  | 18                             |
| Ethernet version 2                                                          | 14                             |
| Extended virtual local area network (VLAN) CCC and VPLS                     | 4                              |
| Extended VLAN TCC                                                           | 22                             |
| Frame Relay                                                                 | 4                              |
| PPP                                                                         | 4                              |
| VLAN CCC                                                                    | 4                              |
| VLAN VPLS                                                                   | 4                              |
| VLAN TCC                                                                    | 22                             |

The default media MTU is calculated as follows:

Default media MTU = Default IP MTU + encapsulation overhead

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size.



**NOTE:** The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

The physical MTU for Ethernet interfaces does not include the 4-byte frame check sequence (FCS) field of the Ethernet frame.

If you do not configure an MPLS MTU, the Junos OS derives the MPLS MTU from the physical interface MTU. From this value, the software subtracts the encapsulation-specific overhead and space for the maximum number of labels that might be pushed in the Packet Forwarding Engine. Currently, the software provides for three labels of four bytes each, for a total of 12 bytes.

In other words, the formula used to determine the MPLS MTU is the following:

$$\text{MPLS MTU} = \text{physical interface MTU} - \text{encapsulation overhead} - 12$$

If you configure an MTU value by including the `mtu` statement at the [edit interfaces *interface-name* unit *logical-unit-number* family mpls] hierarchy level, the configured value is used.

For information about configuring the encapsulation on an interface, see “Configuring Interface Encapsulation on Physical Interfaces” in the *Junos OS Network Interfaces Configuration Guide*.

To modify the default media MTU size for a physical interface, include the `mtu` statement at the [edit interfaces *interface-name*] hierarchy level:

```
[edit interfaces interface-name]  
  mtu bytes;
```

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead.



**NOTE:** Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

You configure the protocol MTU by including the `mtu` statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

Because tunnel services interfaces are considered logical interfaces, you cannot configure the MTU setting for the physical interface. This means you cannot include the `mtu` statement at the [edit interfaces *interface-name*] hierarchy level for the following interface types: generic routing encapsulation (`gr-`), IP-IP (`ip-`), loopback (`lo-`), link services (`ls-`), multilink services (`ml-`), and multicast (`pe-`, `pd-`). You can, however, configure the protocol MTU on tunnel interfaces, as described in “Setting the Protocol MTU” on page 1065.

## Setting the Protocol MTU

When you initially configure an interface, the protocol maximum transmission unit (MTU) is calculated automatically. If you subsequently change the media MTU, the protocol MTU on existing address families automatically changes.

For a list of default protocol MTU values, see “Configuring the Media MTU” on page 1062.

To modify the MTU for a particular protocol family, include the `mtu` statement:

```
mtu bytes;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

If you increase the size of the protocol MTU, you must ensure that the size of the media MTU is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. For a list of encapsulation overhead values, see Table 159 on page 1063. If you reduce the media MTU size, but there are already one or more address families configured and active on the interface, you must also reduce the protocol MTU size. (You configure the media MTU by including the `mtu` statement at the [edit interfaces *interface-name*] hierarchy level, as discussed in “Configuring the Media MTU” on page 1062.)



**NOTE:** Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

The maximum number of data-link connection identifiers (DLCIs) is determined by the MTU on the interface. If you have keepalives enabled, the maximum number of DLCIs is 1000, with the MTU set to 5012.

The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the MTU. For example, the default protocol MTU for a Gigabit Ethernet

interface is 1500 bytes, but the largest possible frame size is actually 1504 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

## Interface Ranges

---

The Junos OS allows you to group a range of identical interfaces into an *interface range*. You first specify the group of identical interfaces in the interface range. Then you can apply a common configuration to the specified interface range, reducing the number of configuration statements required and saving time while producing a compact configuration.

- Configuring Interface Ranges on page 1066
- Expanding Interface Range Member and Member Range Statements on page 1069
- Configuration Inheritance for Member Interfaces on page 1070
- Member Interfaces Inheriting Configuration from Configuration Groups on page 1071
- Interfaces Inheriting Common Configuration on page 1073
- Configuring Inheritance Range Priorities on page 1073
- Configuration Expansion Where Interface Range Is Used on page 1073

## Configuring Interface Ranges

To configure an interface range, include the **interface-range** statement at the **[edit interfaces]** hierarchy level.

The **interface-range** statement accepts only physical networking interface names in its definition. The following interface types are supported for J-EX Ethernet switches and example CLI descriptors are shown:

- Ethernet—**(xe | ge | fe)-fpc/pic/port**

Interfaces can be grouped either as a range of interfaces or using a number range under the **interface-range** statement definition.

Interfaces in an **interface-range** definition can be added as part of a member range or as individual members or multiple members using a number range.

To specify a member range, use the **member-range** statement at the **[edit interfaces interface-range name]** hierarchy level.

To specify interfaces in lexical order, use the **member-range start-range to end-range** statement.

A range for a member statement should contain the following:

- **\***—All, specifies all available interfaces.
- **num**—Number, specifies one specific interface by its number.
- **[low-high]**—Numbers between low to high, specifies a range of sequential interfaces.
- **[num1, num2, num3]**—Numbers **num1**, **num2**, and **num3** specify multiple specific interfaces.

**Example: Specifying an Interface Range Member Range**

```
member-range ge-0/0/0 to ge-4/0/40;
```

To specify one or multiple members, use the **member** statement at the **[edit interfaces interface-range name]** hierarchy level.

To specify the list of interface range members individually or for multiple interfaces using regex, use the **member list of interface names** statement.

**Example: Specifying an Interface Range Member**

```
member ge-0/0/0;
member ge-0/*/*
member ge-0/[1-10]/0;
member ge-0/[1,2,3]/3;
```

Regex or wildcards are not supported for interface-type prefixes. For example, prefixes **ge**, **fe**, and **xe** must be mentioned explicitly.

An **interface-range** definition can contain both **member** and **member-range** statements within it. There is no maximum limit on the number of **member** or **member-range** statements within an interface-range. However, at least one **member** or **member-range** statement must exist within an **interface-range** definition.

**Example: Interface Range Common Configuration**

Configuration common to an interface range can be added as a part of the **interface-range** definition, as follows:

```
[edit]
interfaces {
+ interface-range foo {
+ member-range ge-1/0/0 to ge-4/0/40;
+ member ge-0/1/1;
+ member ge-5/[1-10]/*;
/*Common configuration is added as part of interface-range definition*/
mtu 256;
hold-time up 10;
ether-options {
flow-control;
speed {
100m;
}
802.3ad primary;
}
}
}
```

An **interface-range** definition having just **member** or **member-range** statements and no common configurations statements is valid.

These defined interface ranges can be used in other configuration hierarchies, in places where an **interface** node exists.

**Example: Interface-Range foo Used Under the Protocols Hierarchy**

```
protocols {
dot1x {
authenticator {
interface foo{
retries 1;
```

```
    }  
  }  
}
```

**foo** should be an **interface-range** defined at the **[interfaces]** hierarchy level. In the above example, the **interface** node can accept both individual interfaces and interface ranges.



**TIP:** To view an interface range in expanded configuration, use the **(show | display inheritance)** command. For more information, see the *Junos OS CLI User Guide*.

By default, **interface-range** is not available to configure in the CLI where the **interface** statement is available. The following locations are supported; however, some of the hierarchies shown in this list are product specific:

- protocols dot1x authentication interface
- protocols dvmrp interface
- protocols oam ethernet lmi interface
- protocols esis interface
- protocols igmp interface
- protocols igmp-host client *num* interface
- protocols mld-host client *num* interface
- protocols router-advertisement interface
- protocols isis interface
- protocols ldp interface
- protocols oam ethernet link-fault-management interface
- protocols lldp interface
- protocols link-management peer lmp-control-channel interface
- protocols link-management peer control-channel
- protocols link-management te-link *name* interface
- protocols mld interface
- protocols ospf area *id* interface
- protocols pim interface
- protocols router-discovery interface
- protocols rip group *name* neighbour
- protocols ripng group *name* neighbour
- protocols rsvp interface



- protocols snmp interface
- protocols layer2-control bpdu-block interface
- protocols layer2-control mac-rewrite interface
- protocols mpls interface
- protocols stp interface
- protocols rstp interface
- protocols mstp interface
- protocols vstp interface
- protocols mstp msti *id* interface
- protocols mstp msti vlan *id* interface
- protocols vstp vlan *name* interface
- protocols gvrp interface
- protocols igmp-snooping vlan *name* interface
- protocols lldp interface
- protocols lldp-med interface
- protocols sflow interfaces
- ethernet-switching-options analyzer *name* input [egress | ingress ] interface
- ethernet-switching-options analyzer *name* output interface
- ethernet-switching-options secure-access-port interface
- ethernet-switching-options interfaces ethernet-switching-options voip interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options bpdu-block interface
- poe interface vlans pro-bng-mc1-bsd1 interface

## Expanding Interface Range Member and Member Range Statements

All **member** and **member-range** statements in an interface range definition are expanded to generate the final list of interface names for the specified interface range.

### Example: Expanding Interface Range Member and Member Range Statements

```
[edit]
interfaces {
  interface-range range-1 {
    member-range ge-0/0/0 to ge-4/0/20;
    member ge-10/1/1;
    member ge-5/[0-5]/*;
    /*Common configuration is added part of the interface-range definition*/
    mtu 256;
    hold-time up 10;
    ether-options {
```

```

    flow-control;
    speed {
        100m;
    }
    802.3ad primary;
}
}
}

```

For the **member-range** statement, all possible interfaces between **start-range** and **end-range** are considered in expanding the members. For example, the following **member-range** statement:

```
member-range ge-0/0/0 to ge-4/0/20
```

expands to:

```

[ge-0/0/0, ge-0/0/1 ... ge-0/0/max_ports
ge-0/1/0 ge-0/1/1 ... ge-0/1/max_ports
ge-0/2/0 ge-0/2/1 ... ge-0/2/max_ports
.
.
ge-0/MAX_PICS/0 ... ge-0/max_pics/max_ports
ge-1/0/0 ge-1/0/1 ... ge-1/0/max_ports
.
ge-1/MAX_PICS/0 ... ge-1/max_pics/max_ports
.
.
ge-4/0/0 ge-4/0/1 ... ge-4/0/max_ports]

```

The following **member** statement:

```
ge-5/[0-5]/*
```

expands to:

```

ge-5/0/0 ... ge-5/0/max_ports
ge-5/1/0 ... ge-5/0/max_ports
.
.
ge-5/5/0 ... ge-5/5/max_ports

```

The following **member** statement:

```
ge-5/1/[2,3,6,10]
```

expands to:

```

ge-5/1/2
ge-5/1/3
ge-5/1/6
ge-5/1/10

```

## Configuration Inheritance for Member Interfaces

When the Junos OS expands the **member** and **member-range** statements present in an **interface-range**, it creates *interface objects* if they are not explicitly defined in the configuration. The common configuration is copied to all its member interfaces in the **interface-range**.

**Example:** Foreground interface configuration takes priority compared to configuration inherited by the interface through the `interface-range`.

**Configuration Priorities**

```

interfaces {
  interface-range range-1 {
    member-range ge-1/0/0/ to ge-10/0/47;
    mtu 256;
  }
  ge-1/0/1 {
    mtu 1024;
  }
}

```

In the preceding example, interface `ge-1/0/1` will have an MTU value of 1024.

This can be verified with output of the `show interfaces | display inheritance` command, as follows:

```

user@host: # show interfaces | display inheritance
## 'ge-1/0/0' was expanded from interface-range 'range-1'
##
ge-1/0/0 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
ge-1/0/1 {
  mtu 1024;
}
##
## 'ge-1/0/2' was expanded from interface-range 'range-1'
##
ge-1/0/2 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
.....
.....
##
## 'ge-10/0/47' was expanded from interface-range 'range-1'
##
ge-10/0/47 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}

```

## Member Interfaces Inheriting Configuration from Configuration Groups

Interface range member interfaces inherit the config-groups configuration like any other foreground configuration. `interface-range` is similar to any other foreground configuration statement. The only difference is that the `interface-range` goes through a member interfaces expansion before the Junos OS reads this configuration.

```

groups {

```

```

global {
  interfaces {
    <*> {
      hold-time up 10;
    }
  }
}
apply-groups [global];
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0 to ge-10/0/47;
    mtu 256;
  }
}
}

```

The **hold-time** configuration is applied to all members of **interface-range** *range-1*.

This can be verified with **show interfaces | display inheritance** as below:

```

user@host# show interfaces | display inheritance
ge-1/0/0 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
  ##
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
  ##
  hold-time up 10;
}
ge-1/0/1 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
  ##
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
  ##
  hold-time up 10;
}
ge-10/0/47 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
  ##
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
  ##
  hold-time up 10;
}

```

## Interfaces Inheriting Common Configuration

If an interface is a member of several interface ranges, that interface will inherit the common configuration from all of those interface ranges.

```
[edit]
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0 to ge-10/0/47;
    mtu 256;
  }
}
interfaces {
  interface-range range-1 {
    member-range ge-10/0/0 to ge-10/0/47;
    hold-time up 10;
  }
}
```

In this example, interfaces `ge-10/0/0` through `ge-10/0/47` will have both **hold-time** and **mtu**.

## Configuring Inheritance Range Priorities

The interface ranges are defined in the order of inheritance priority, with the first interface range configuration data taking priority over subsequent interface ranges.

```
[edit]
interfaces {
  interface-range int-grp-one {
    member-range ge-0/0/0 to ge-4/0/40;
    member ge-1/1/1;
    /*Common config is added part of the interface-range definition*/
    mtu 256;
    hold-time up 10;
  }
}
interfaces {
  interface-range int-grp-two {
    member-range ge-5/0/0 to ge-10/0/40;
    member ge-1/1/1;
    mtu 1024;
  }
}
```

Interface `ge-1/1/1` exists in both `interface-range int-grp-one` and `interface-range int-grp-two`. This interface inherits **mtu 256** from `interface-range int-grp-one` because it was defined first.

## Configuration Expansion Where Interface Range Is Used

In this example, `interface-range range-1` is used under the `protocols` hierarchy:

```
[edit]
interfaces {
  interface-range range-1 {
```

```

    member ge-10/1/1;
    member ge-5/5/1;
    mtu 256;
    hold-time up 10;
    ether-options {
        flow-control;
        speed {
            100m;
        }
        802.3ad primary;
    }
}
protocols {
    dot1x {
        authenticator {
            interface range-1 {
                retries 1;
            }
        }
    }
}
}
}

```

The **interface** node present under **authenticator** is expanded into member interfaces of the **interface-range *range-1*** as follows:

```

protocols {
    dot1x {
        authenticator {
            interface ge-10/1/1 {
                retries 1;
            }
            interface ge-5/5/1 {
                retries 1;
            }
        }
    }
}
}
}

```

The **interface *range-1*** statement is expanded into two interfaces, **ge-10/1/1** and **ge-5/5/1**, and configuration **retries 1** is copied under those two interfaces.

This configuration can be verified using the **show protocols dot1x | display inheritance** command.

## Configuring Accounting for the Physical Interface

Routers and switches running the Junos OS can collect various kinds of data about traffic passing through the router and switch. You can set up one or more *accounting profiles* that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file

- The polling period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the **[edit accounting-options]** hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the **interface-profile** statement at the **[edit accounting-options]** hierarchy level. You configure filter profiles by including the **filter-profile** statement at the **[edit accounting-options]** hierarchy level. For more information, see the *Junos OS Network Management Configuration Guide*.

You apply filter profiles by including the **accounting-profile** statement at the **[edit firewall filter *filter-name*]** and **[edit firewall family *family* filter *filter-name*]** hierarchy levels. For more information, see the *Junos OS Policy Framework Configuration Guide*.

## Applying an Accounting Profile to the Physical Interface

To enable accounting on an interface, include the **accounting-profile** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
  accounting-profile name;
```

You can also reference profiles by logical unit; for more information, see “Configuring Accounting for the Logical Interface” on page 1076.

### Example: Applying an Accounting Profile to the Physical Interface

Configure an accounting profile for an interface and apply it to a physical interface:

```
[edit]  
  accounting-options {  
    file if_stats {  
      size 4m files 10 transfer-interval 15;  
      archive-sites {  
        "ftp://login:password@host/path";  
      }  
    }  
  }  
  interface-profile if_profile {  
    interval 15;  
    file if_stats {  
      fields {  
        input-bytes;  
        output-bytes;  
        input-packets;  
        output-packets;  
        input-errors;  
        output-errors;  
      }  
    }  
  }  
}  
[edit interfaces ge-1/0/1]  
  accounting-profile if_profile;
```

## Configuring Accounting for the Logical Interface

---

Routers or switches running the Junos OS can collect various kinds of data about traffic passing through the router or switch. You can set up one or more *accounting profiles* that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file
- The period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the **[edit accounting-options]** hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the **interface-profile** statement at the **[edit accounting-options]** hierarchy level. You configure filter profiles by including the **filter-profile** statement at the **[edit accounting-options]** hierarchy level. For more information, see the *Junos OS Network Management Configuration Guide*.

You apply filter profiles by including the **accounting-profile** statement at the **[edit firewall filter *filter-name*]** and **[edit firewall family *family* filter *filter-name*]** hierarchy levels. For more information, see the *Junos OS Policy Framework Configuration Guide*.

## Applying an Accounting Profile to the Logical Interface

To enable accounting on a logical interface, include the **accounting-profile** statement:

```
accounting-profile name;
```

You can include this statement at the following hierarchy level:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**

You can also reference profiles for the physical interface; for more information, see “Configuring Accounting for the Physical Interface” on page 1074.

### Example: Applying an Accounting Profile to the Logical Interface

---

Configure an accounting profile for an interface and apply it to a logical interface:

```
[edit]
accounting-options {
  file if_stats {
    size 4m files 10 transfer-interval 15;
    archive-sites {
      "ftp://login:password@host/path";
    }
  }
  interface-profile if_profile {
    interval 15;
    file if_stats {
      fields {
```



```

        input-bytes;
        output-bytes;
        input-packets;
        output-packets;
        input-errors;
        output-errors;
    }
}
}
[edit interfaces ge-1/0/1 unit 1]
accounting-profile if_profile;

```

To reference profiles by physical interface, see “Applying an Accounting Profile to the Physical Interface” on page 1075. For information about configuring a firewall filter accounting profile, see the *Junos OS Policy Framework Configuration Guide*.

## Configuring Ethernet Loopback Capability

By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system. To place an interface in loopback mode, include the **loopback** statement:

```
loopback;
```



**NOTE:** If you configure a local loopback on a 1-port 10-Gigabit IQ2 and IQ2-E PIC using the **loopback** statement at the [edit interfaces *interface-name* *gigether-options*] hierarchy level, the transmit-path stops working, causing the remote end to detect a link down.

To return to the default—that is, to disable loopback mode—delete the **loopback** statement from the configuration:

```
[edit]
user@host# delete interfaces fe-fpc/pic/port fastether-options loopback
```

To explicitly disable loopback mode, include the **no-loopback** statement:

```
no-loopback;
```

You can include the **loopback** and **no-loopback** statements at the following hierarchy levels:

- [edit interfaces *interface-name* aggregated-ether-options]
- [edit interfaces *interface-name* ether-options]
- [edit interfaces *interface-name* fastether-options]
- [edit interfaces *interface-name* gigether-options]

## Configuring Gratuitous ARP

---

Gratuitous Address Resolution Protocol (ARP) requests provide duplicate IP address detection. A gratuitous ARP request is a broadcast request for a router's own IP address. If a router or switch sends an ARP request for its own IP address and no ARP replies are received, the router- or switch-assigned IP address is not being used by other nodes. If a router or switch sends an ARP request for its own IP address and an ARP reply is received, the router- or switch-assigned IP address is already being used by another node.

By default, the router or switch responds to gratuitous ARP requests. On Ethernet interfaces, you can disable responses to gratuitous ARP requests. To disable responses to gratuitous ARP requests, include the **no-gratuitous-arp-request** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
no-gratuitous-arp-request;
```

To return to the default—that is, to respond to gratuitous ARP requests—delete the **no-gratuitous-arp-request** statement from the configuration:

```
[edit]  
user@host# delete interfaces interface-name no-gratuitous-arp-request
```

Gratuitous ARP replies are reply packets sent to the broadcast MAC address with the target IP address set to be the same as the sender's IP address. When the router or switch receives a gratuitous ARP reply, the router or switch can insert an entry for that reply in the ARP cache.

By default, updating the ARP cache on gratuitous ARP replies is disabled on the router or switch. On Ethernet interfaces, you can enable handling of gratuitous ARP replies on a specific interface by including the **gratuitous-arp-reply** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
gratuitous-arp-reply;
```

To restore the default behavior, include the **no-gratuitous-arp-reply** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
no-gratuitous-arp-reply;
```

## Configuring Static ARP Table Entries

---

To configure static ARP table entries, include the **arp** statement:

```
arp ip-address (mac | multicast-mac) mac-address <publish>;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* family inet address *address*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family inet address *address*]**

The IP address that you specify must be part of the subnet defined in the enclosing **address** statement.

To associate a multicast MAC address with a unicast IP address, include the **multicast-mac** statement.

Specify the MAC address as six hexadecimal bytes in one of the following formats: *nnnn.nnnn.nnnn* or *nn:nn:nn:nn:nn:nn*; for example, **0011.2233.4455** or **00:11:22:33:44:55**.

For unicast MAC addresses only, if you include the **publish** option, the router or switch replies to proxy ARP requests.



**NOTE:** When you need to conserve IP addresses, you can configure an Ethernet interface to be unnumbered by including the **unnumbered-address** statement at the [edit interfaces *interface-name* unit *logical-unit-number* family inet] hierarchy level. For more information, see “Configuring an Unnumbered Interface” in the *Junos OS Network Interfaces Configuration Guide*.



**NOTE:** The Junos OS supports the IPv6 static neighbor discovery cache entries, similar to the static ARP entries in IPv4.

## Example: Configuring Static ARP Table Entries

Configure two static ARP table entries on the router or switch's management interface:

```
[edit interfaces]
fxp0 {
  unit 0 {
    family inet {
      address 10.10.0.11/24 {
        arp 10.10.0.99 mac 0001.0002.0003;
        arp 10.10.0.101 mac 00:11:22:33:44:55 publish;
      }
    }
  }
}
```

- Related Documentation**
- Applying Policers
  - Configuring an Unnumbered Interface

## Disabling the Transmission of Redirect Messages on an Interface

By default, the interface sends protocol redirect messages. To disable the sending of these messages on an interface, include the **no-redirects** statement:

```
no-redirects;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family*]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family*]

To disable the sending of protocol redirect messages for the entire router or switch, include the **no-redirects** statement at the [edit system] hierarchy level.

## Configuring Unrestricted Proxy ARP

---

To configure unrestricted proxy ARP, include the **proxy-arp** statement:

```
proxy-arp;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ]

To return to the default—that is, to disable unrestricted proxy ARP—delete the **proxy-arp** statement from the configuration:

```
[edit]
user@host# delete interfaces interface-name unit logical-unit-number proxy-arp
```

You can track the number of unrestricted proxy ARP requests processed by the router or switch by issuing the **show system statistics arp** operational mode command.

## Enabling or Disabling SNMP Notifications on Logical Interfaces

---

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. To explicitly enable these notifications on the logical interface, include the **traps** statement; to disable these notifications on the logical interface, include the **no-traps** statement:

```
(traps | no-traps);
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ]

## Enabling or Disabling SNMP Notifications on Physical Interfaces

---

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. To explicitly enable these notifications on the physical interface, include the **traps** statement at the [edit interfaces

*interface-name*] hierarchy level. To disable these notifications on the physical interface, include the **no-traps** statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]  
(traps | no-traps);
```

## Configuring Aggregated Ethernet Interfaces (CLI Procedure)

Use the link aggregation feature to aggregate one or more links to form a virtual link or link aggregation group (LAG). The MAC client can treat this virtual link as if it were a single link. Link aggregation increases bandwidth, provides graceful degradation as failure occurs, and increases availability.



**NOTE:** An interface with an already configured IP address cannot form part of the aggregation group.

To configure aggregated Ethernet interfaces, using the CLI:

1. Specify the number of aggregated Ethernet interfaces to be created:

```
[edit chassis]  
user@switch# set aggregated-devices ethernet device-count 2
```

2. Specify the minimum number of links for the aggregated Ethernet interface (aex), that is, the defined bundle, to be labeled “up”:



**NOTE:** By default only one link must be up for the bundle to be labeled “up”.

```
[edit interfaces]  
user@switch# set ae0 aggregated-ether-options minimum-links 2
```

3. Specify the link speed for the aggregated Ethernet bundle:

```
[edit interfaces]  
user@switch# set ae0 aggregated-ether-options link-speed 10g
```

4. Specify the members to be included within the aggregated Ethernet bundle:

```
[edit interfaces]  
user@switch# set ge-0/1/0 ether-options 802.3ad ae0  
user@switch# set ge-1/1/0 ether-options 802.3ad ae0
```

5. Specify an interface family for the aggregated Ethernet bundle:

```
[edit interfaces]  
user@switch# set ae0 unit 0 family inet address 192.0.2.0/25
```

For information about adding LACP to a LAG, see “Configuring Aggregated Ethernet LACP (CLI Procedure)” on page 1085.

### Related Documentation

- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 1082

- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Verifying the Status of a LAG Interface on page 1096
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003

## Configuring Aggregated Ethernet Interfaces (J-Web Procedure)

---

Use the link aggregation feature to aggregate one or more Ethernet interfaces to form a virtual link or link aggregation group (LAG) on a J-EX Series switch. The MAC client can treat this virtual link as if it were a single link. Link aggregation increases bandwidth, provides graceful degradation as failure occurs, and increases availability. You can use the J-Web interface to configure aggregated Ethernet interfaces, or a LAG, on the switch.



**NOTE:** Interfaces that are already configured with MTU, duplex, flow control, or logical interfaces are listed but are not available for aggregation.

To configure an aggregated Ethernet interface (also referred to as a LAG):

1. Select **Configure > Interfaces > Link Aggregation**.

The list of aggregated interfaces is displayed.



**NOTE:** After you make changes to the configuration in this page, you must commit the changes immediately for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See “Using the Commit Options to Commit Configuration Changes (J-Web Procedure)” on page 346 for details about all commit options.

2. Click one of the following:
  - **Add**—Creates an aggregated Ethernet interface, or LAG. Enter information as specified in Table 160 on page 1083.
  - **Edit**—Modifies a selected LAG.
    - **Aggregation**—Modifies settings for the selected LAG. Enter information as specified in Table 160 on page 1083.
    - **VLAN**—Specifies VLAN options for the selected LAG. Enter information as specified in Table 161 on page 1084.
    - **IP Option**—Specifies IP options for the selected LAG. Enter information as specified in Table 162 on page 1084.

- **Delete**—Deletes the selected LAG.
- **Disable Port** or **Enable Port**—Disables or enables the administrative status on the selected interface.
- **Device Count**—Configures the number of aggregated logical devices available to the switch. Select the number and click **OK**.

Table 160: Aggregated Ethernet Interface Options

| Field                | Function                                                                                                                                                                                                                                                                                                                                                                               | Your Action                                                                                                                                                                                                                                                                                             |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregated Interface | Specifies the name of the aggregated interface.                                                                                                                                                                                                                                                                                                                                        | None. The name is supplied by the software.                                                                                                                                                                                                                                                             |
| LACP Mode            | Specifies the mode in which LACP packets are exchanged between the interfaces. The modes are: <ul style="list-style-type: none"> <li>• <b>None</b>—Indicates that no mode is applicable.</li> <li>• <b>Active</b>—Indicates that the interface initiates transmission of LACP packets</li> <li>• <b>Passive</b>—Indicates that the interface responds only to LACP packets.</li> </ul> | Select from the list.                                                                                                                                                                                                                                                                                   |
| Description          | Specifies a description for the LAG.                                                                                                                                                                                                                                                                                                                                                   | Enter a description.                                                                                                                                                                                                                                                                                    |
| Interface            | Specifies the interfaces in the LAG.                                                                                                                                                                                                                                                                                                                                                   | To add interfaces to the LAG, select the interfaces and click <b>Add</b> . Click <b>OK</b> .<br><br>To remove an interface from the LAG, select the interface and click <b>Remove</b> .<br><br><b>NOTE:</b> Only interfaces that are configured with the same speed can be selected together for a LAG. |
| Enable Log           | Specifies whether to enable generation of log entries for the LAG.                                                                                                                                                                                                                                                                                                                     | Select the check box to enable log generation, or clear the check box to disable log generation.                                                                                                                                                                                                        |

Table 161: VLAN Options

| Field     | Function                                                       | Your Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Port Mode | Specifies the mode of operation for the port: trunk or access. | <p>If you select <b>Trunk</b>, you can:</p> <ol style="list-style-type: none"> <li>1. Click <b>Add</b> to add a VLAN member.</li> <li>2. Select the VLAN and click <b>OK</b>.</li> <li>3. (Optional) Associate a native VLAN ID with the port.</li> </ol> <p>If you select <b>Access</b>, you can:</p> <ol style="list-style-type: none"> <li>1. Select the VLAN member to be associated with the port.</li> <li>2. (Optional) Associate a VoIP VLAN with the interface. Only a VLAN with a VLAN ID can be associated as a VoIP VLAN.</li> </ol> <p>Click <b>OK</b>.</p> |

Table 162: IP Options

| Field        | Function                                        | Your Action                                                                                                                                                                                                                                                                                            |
|--------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPv4 Address | Specifies an IPv4 address for the selected LAG. | <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv4 address</b>.</li> <li>2. Type an IP address—for example, <b>10.10.10.10</b>.</li> <li>3. Enter the subnet mask or address prefix. For example, 24 bits represents <b>255.255.255.0</b>.</li> <li>4. Click <b>OK</b>.</li> </ol> |
| IPv6 Address | Specifies an IPv6 address for the selected LAG. | <ol style="list-style-type: none"> <li>1. Select the check box <b>IPv6 address</b>.</li> <li>2. Type an IP address—for example, <b>2001:ab8:85a3::8a2e:370:7334</b>.</li> <li>3. Enter the subnet mask or address prefix.</li> <li>4. Click <b>OK</b>.</li> </ol>                                      |

**Related Documentation**

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Verifying the Status of a LAG Interface on page 1096



- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003

## Configuring Aggregated Ethernet LACP (CLI Procedure)

For aggregated Ethernet interfaces on J-EX Series switches, you can configure the Link Aggregation Control Protocol (LACP). LACP is one method of bundling several physical interfaces to form one logical interface. You can configure aggregated Ethernet with or without LACP enabled.

Before you configure LACP, be sure you have:

- Configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs). See “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 1081

When LACP is enabled, the local and remote sides of the aggregated Ethernet links exchange protocol data units (PDUs), containing information about the state of the link. You can configure Ethernet links to actively transmit PDUs, or you can configure the links to passively transmit them, sending out LACP PDUs only when they receive them from another link. One side of the link must be configured as **active** for the link to be up.



**NOTE:** Do not add LACP to a LAG if the remote end of the LAG link is a security device, unless the security device supports LACP. Security devices often do not support LACP because they require a deterministic configuration.

To configure LACP:

1. Enable one side of the aggregated Ethernet link as active:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lACP active
```

2. Specify the interval at which the interfaces send LACP packets:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lACP periodic fast
```

### Related Documentation

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 1082
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
- Verifying the Status of a LAG Interface on page 1096

- Understanding Aggregated Ethernet Interfaces and LACP on page 1003

## Configuring Aggregated Ethernet Link Protection

---

You can configure link protection for aggregated Ethernet interfaces to provide QoS on the links during operation.

On aggregated Ethernet interfaces, you designate a primary and backup link to support link protection. Egress traffic passes only through the designated primary link. This includes transit traffic and locally generated traffic on the router or switch. When the primary link fails, traffic is routed through the backup link. Because some traffic loss is unavoidable, egress traffic is not automatically routed back to the primary link when the primary link is reestablished. Instead, you manually control when traffic should be diverted back to the primary link from the designated backup link.

- Configuring Link Protection for Aggregated Ethernet Interfaces on page 1086
- Configuring Primary and Backup Links for Link Aggregated Ethernet Interfaces on page 1086
- Reverting Traffic to a Primary Link When Traffic is Passing Through a Backup Link on page 1087
- Disabling Link Protection for Aggregated Ethernet Interfaces on page 1087

## Configuring Link Protection for Aggregated Ethernet Interfaces

Aggregated Ethernet interfaces support link protection to ensure QoS on the interface.

To configure link protection:

1. Specify that you want to configure the options for an aggregated Ethernet interface.

```
user@host#edit interfaces aex aggregated-ether-options
```

2. Configure the link protection mode.

```
[edit interfaces aex aggregated-ether-options]  
user@host#set link-protection mode
```

## Configuring Primary and Backup Links for Link Aggregated Ethernet Interfaces

To configure link protection, you must specify a primary and a secondary, or backup, link.

To configure a primary link and a backup link:

1. Configure the primary logical interface.

```
[edit interfaces interface-name]  
user@host# set (ether-options | fastether-options | ggether-options) 802.3ad aex  
primary
```

2. Configure the backup logical interface.

```
[edit interfaces interface-name]  
user@host# set (ether-options | fastether-options | ggether-options) 802.3ad aex  
backup
```

---

## Reverting Traffic to a Primary Link When Traffic is Passing Through a Backup Link

On aggregated Ethernet interfaces, you designate a primary and backup link to support link protection. Egress traffic passes only through the designated primary link. This includes transit traffic and locally generated traffic on the router or switch. When the primary link fails, traffic is routed through the backup link. Because some traffic loss is unavoidable, egress traffic is not automatically routed back to the primary link when the primary link is reestablished. Instead, you manually control when traffic should be diverted back to the primary link from the designated backup link.

To manually control when traffic should be diverted back to the primary link from the designated backup link:

```
user@host# request interface revert aex
```

## Disabling Link Protection for Aggregated Ethernet Interfaces

To disable link protection, issue the [request interface revert aex operational command.]

```
user@host# request interface revert aex aggregated-ether-options link-protection
```

---

## Configuring Aggregated Ethernet Link Speed

On aggregated Ethernet interfaces, you can set the required link speed for all interfaces included in the bundle. All interfaces that make up a bundle must be the same speed. If you include in the aggregated Ethernet interface an individual link that has a speed different from the speed you specify in the **link-speed** parameter, an error message will be logged.

To set the required link speed:

1. Specify that you want to configure the aggregated Ethernet options.

```
user@host# edit interfaces interface-name aggregated-ether-options
```

2. Configure the link speed.

```
[edit interfaces interface-name aggregated-ether-options ]  
user@host# set link-speed speed
```

*speed* can be in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation **k** (1000), **m** (1,000,000), or **g** (1,000,000,000).

Aggregated Ethernet links on J-EX Series switches can be configured to operate at one of the following speeds:

- 10m
- 100m
- 1g
- 10g
- 50g

## Configuring Aggregated Ethernet Minimum Links

---

On aggregated Ethernet interfaces, you can configure the minimum number of links that must be up for the bundle as a whole to be labeled **up**. By default, only one link must be up for the bundle to be labeled **up**.

To configure the minimum number of links:

1. Specify that you want to configure the aggregated Ethernet options.

```
user@host# edit interfaces interface-name aggregated-ether-options
```

2. Configure the minimum number of links.

```
[edit interfaces interface-name aggregated-ether-options]  
user@host# set minimum-links number
```

On J-EX Series switches, other than J-EX8200 switches, the range of valid values for **minimum-links *number*** is 1 through 8. When the maximum value (8) is specified, all configured links of a bundle must be up for the bundle to be labeled **up**.

On J-EX8200 switches, the range of valid values for **minimum-links *number*** is 1 through 12. When the maximum value (12) is specified, all configured links of a bundle must be up for the bundle to be labeled **up**.

If the number of links configured in an aggregated Ethernet interface is less than the minimum link value configured under the **aggregated-ether-options** statement, the configuration commit fails and an error message is displayed.

## Configuring Tagged Aggregated Ethernet Interfaces

---

To specify aggregated Ethernet interfaces, include the **vlan-tagging** statement at the **[edit interfaces *aex*]** hierarchy level:

```
[edit interfaces aex]  
vlan-tagging;
```

You must also include the **vlan-id** statement:

```
vlan-id number;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

For more information about the **vlan-tagging** and **vlan-id** statements, see “802.1Q VLANs Overview” on page 1013.

### Related Documentation

- **vlan-id**
- **vlan-tagging on page 1177**

## Configuring a Layer 3 Subinterface (CLI Procedure)

J-EX Series switches use Layer 3 subinterfaces to divide a physical interface into multiple logical interfaces, each corresponding to a VLAN. The switch uses the Layer 3 subinterfaces to route traffic between subnets.

To configure Layer 3 subinterfaces, you enable VLAN tagging and partition one or more physical ports into multiple logical interfaces, each corresponding to a VLAN ID.

Before you begin, make sure you set up your VLANs. See the instructions in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.

To configure Layer 3 subinterfaces:

1. Enable VLAN tagging:

```
[edit interfaces interface-name]
user@switch# set vlan-tagging
```

2. Bind each VLAN ID to a logical interface:

```
[edit interfaces interface-name]
user@switch# set unit logical-unit-number vlan-id vlan-id-number
```

### Related Documentation

- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026
- Verifying That Layer 3 Subinterfaces Are Working on page 1098
- Understanding Layer 3 Subinterfaces on page 1007

## Configuring Unicast RPF (CLI Procedure)

Unicast reverse-path forwarding (RPF) can help protect your LAN from denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks on untrusted interfaces. Enabling unicast RPF on the switch interfaces filters traffic with source addresses that do not use the incoming interface as the best return path back to the source. When a packet comes into an interface, if that interface is not the best return path to the source, the switch discards the packet. If the incoming interface is the best return path to the source, the switch forwards the packet.



**NOTE:** On J-EX4200 switches, you can only enable unicast RPF globally, on all switch interfaces. You cannot enable unicast RPF on a per-interface basis.

Before you begin:

- On a J-EX8200 switch, ensure that the selected switch interface is symmetrically routed before you enable unicast RPF. A symmetrically routed interface is an interface that uses the same route in both directions between the source and the destination.

Do not enable unicast RPF on asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination.

- On a J-EX4200 switch, ensure that *all* switch interfaces are symmetrically routed before you enable unicast RPF on an interface. When you enable unicast RPF on any interface, it is enabled globally on all switch interfaces. Do not enable unicast RPF on asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination.

To enable unicast RPF, configure it explicitly on a selected customer-edge interface:

[edit interfaces]

user@switch# **set ge-1/0/10 unit 0 family inet rpf-check**



**BEST PRACTICE:** On J-EX4200 switches, unicast RPF is enabled globally on *all* switch interfaces, regardless of whether you configure it explicitly on only one interface or only on some interfaces.

On J-EX4200 switches, we recommend that you enable unicast RPF explicitly on either all interfaces or only one interface. To avoid possible confusion, do not enable it on only some interfaces:

- Enabling unicast RPF explicitly on only one interface makes it easier if you choose to disable it in the future because you must explicitly disable unicast RPF on every interface on which you explicitly enabled it. If you explicitly enable unicast RPF on two interfaces and you disable it on only one interface, unicast RPF is still implicitly enabled globally on the switch. The drawback to this approach is that the switch displays the flag that indicates that unicast RPF is enabled only on interfaces on which unicast RPF is explicitly enabled, so even though unicast RPF is enabled on all interfaces, this status is not displayed.
- Enabling unicast RPF explicitly on all interfaces makes it easier to know whether unicast RPF is enabled on the switch because every interface shows the correct status. (Only interfaces on which you explicitly enable unicast RPF display the flag that indicates that unicast RPF is enabled.) The drawback to this approach is that if you want to disable unicast RPF, you must explicitly disable it on every interface. If unicast RPF is enabled on any interface, it is implicitly enabled on all interfaces.

---

#### Related Documentation

- Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033
- Verifying Unicast RPF Status on page 1099
- Disabling Unicast RPF (CLI Procedure) on page 1091
- Troubleshooting Unicast RPF on page 1105
- Understanding Unicast RPF for J-EX Series Switches on page 1008

## Disabling Unicast RPF (CLI Procedure)

Unicast reverse-path forwarding (RPF) can help protect your LAN from denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks on untrusted interfaces. Unicast RPF filters traffic with source addresses that do not use the incoming interface as the best return path back to the source. If the network configuration changes so that an interface that has unicast RPF enabled becomes a trusted interface or becomes asymmetrically routed (the interface that receives a packet is not the best return path to the packet's source), disable unicast RPF.

To disable unicast RPF on a J-EX4200 switch, you must delete it from every interface on which you explicitly configured it. If you do not disable unicast RPF on every interface on which you explicitly enabled it, it remains implicitly enabled on all interfaces. If you attempt to delete unicast RPF from an interface on which it was not explicitly enabled, the message **warning: statement not found** displays. If you do not disable unicast RPF on every interface on which you explicitly enabled it, unicast RPF remains implicitly enabled on all interfaces of the J-EX4200 switch.

On J-EX8200 switches, the switch does not apply unicast RPF to an interface unless you explicitly enable that interface for unicast RPF.

To disable unicast RPF, delete its configuration from the interface:

[edit interfaces]

```
user@switch# delete ge-1/0/10 unit 0 family inet rpf-check
```



**NOTE:** On J-EX4200 switches, if you do not disable unicast RPF on every interface on which you explicitly enabled it, unicast RPF remains implicitly enabled on all interfaces.

### Related Documentation

- Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033
- Verifying Unicast RPF Status on page 1099
- Configuring Unicast RPF (CLI Procedure) on page 1089
- Understanding Unicast RPF for J-EX Series Switches on page 1008

## Configuring IP Directed Broadcast (CLI Procedure)

You can use IP directed broadcast on a J-EX Series switch to facilitate remote network management by sending broadcast packets to hosts on a specified subnet without broadcasting to the entire network. IP directed broadcast packets are broadcast on only the target subnet. The rest of the network treats IP directed broadcast packets as unicast packets and forwards them accordingly.

Before you begin to configure IP directed broadcast:

- Ensure that the subnet on which you want broadcast packets using IP direct broadcast is not directly connected to the Internet.
- Configure a routed VLAN interface (RVI) for the subnet that will be enabled for IP direct broadcast. See the instructions in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>.



**NOTE:** We recommend that you do not enable IP directed broadcast on subnets that have a direct connection to the Internet because of increased exposure to denial-of-service (DoS) attacks.

To enable IP directed broadcast for a specified subnet:

1. Add the target subnet's logical interfaces to the VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/0.0 family ethernet-switching vlan members v1

user@switch# set ge-0/0/1.0 family ethernet-switching vlan members v1
```

2. Configure the Layer 3 interface on the VLAN that is the target of the IP directed broadcast packets:

```
[edit interfaces]
user@switch# set vlan.1 family inet address 10.1.2.1/24
```

3. Associate a Layer 3 interface with the VLAN:

```
[edit vlans]
user@switch# set v1 l3-interface vlan.1
```

4. Enable the Layer 3 interface for the VLAN to receive IP directed broadcasts:

```
[edit interfaces]
user@switch# set vlan.1 family inet targeted-broadcast
```

#### Related Documentation

- Example: Configuring IP Directed Broadcast on a J-EX Series Switch on page 1037
- Understanding IP Directed Broadcast for J-EX Series Switches on page 1012

## Tracing Operations of an Individual Router or Switch Interface

To trace the operations of individual router or switch interfaces, include the **traceoptions** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
traceoptions {
  flag flag;
}
```



You can specify the following interface tracing flags:

- **all**—Trace all interface operations.
- **event**—Trace all interface events.
- **ipc**—Trace all interface interprocess communication (IPC) messages.
- **media**—Trace all interface media changes.

The interfaces **traceoptions** statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** files.

## Tracing Operations of the Interface Process

To trace the operations of the router or switch interface process, dcd, include the **traceoptions** statement at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
traceoptions {
  file <filename> <files number> <match regular-expression> <size size> <world-readable |
  no-world-readable>;
  flag <flag> <disable>;
  no-remote-trace;
}
```

By default, interface process operations are placed in the file named dcd and three 1-MB files of tracing information are maintained.

You can specify the following flags in the **interfaces traceoptions** statement:

- **change-events**—Log changes that produce configuration events.
- **config-states**—Log the configuration state machine changes.
- **kernel**—Log configuration IPC messages to kernel.
- **kernel-detail**—Log details of configuration messages to kernel.

For general information about tracing, see the tracing and logging information in the *Junos OS System Basics Configuration Guide*.

## Setting the Mode on an SFP+ Uplink Module (CLI Procedure)

SFP+ uplink modules are supported on J-EX4200 switches. You can use these uplink modules either for two SFP+ transceivers or four SFP transceivers. You configure the operating mode on the module to match the type of transceiver you want to use—that is, for SFP+ transceivers, you configure the 10-gigabit operating mode, and for SFP transceivers, you configure the 1-gigabit operating mode.

By default, the SFP+ uplink module operates in the 10-gigabit mode and supports only SFP+ transceivers. If you have not changed the module from the default setting and you want to use SFP+ transceivers, you do not need to configure the operating mode.

To set the operating mode of an SFP+ uplink module:

1. Change the operating mode to the appropriate mode for the transceiver type you want to use by using one of the following commands:

```
[edit]
user@switch# set chassis fpc 0 pic 1 sfpplus pic-mode 1g
```

```
[edit]
user@switch# set chassis fpc 0 pic 1 sfpplus pic-mode 10g
```

2. If the switch is running:
  - The changed operating mode takes effect immediately unless a port on the SFP+ uplink module is a Virtual Chassis port (VCP). If any port on the SFP+ uplink module is a VCP, the changed operating mode does not take effect until the next reboot of the switch.



**NOTE:** During the operating mode change, the Packet Forwarding Engine is restarted. In a Virtual Chassis configuration, this means that the Flexible PIC Concentrator connection with the master is dropped and then reconnected.

---

You can see whether the operating mode has been changed to the new mode you configured by issuing the **show chassis pic fpc-slot *slot-number* pic-slot 1** command.

**Related Documentation**

- For details about the uplink modules and optical interface support for a J-EX4200 switch, see the *Dell PowerConnect J-Series J-EX4200 Ethernet Switch Hardware Guide* at <http://www.support.dell.com/manuals>.

# Verifying Interfaces

- Monitoring Interface Status and Traffic on page 1095
- Verifying the Status of a LAG Interface on page 1096
- Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 1097
- Verifying That Layer 3 Subinterfaces Are Working on page 1098
- Verifying Unicast RPF Status on page 1099
- Verifying IP Directed Broadcast Status on page 1101

## Monitoring Interface Status and Traffic

---

**Purpose** Use the monitoring functionality to view interface status or to monitor interface bandwidth utilization and traffic statistics on the J-EX Series switches.

The J-Web interface monitors interface bandwidth utilization and plots real-time charts to display input and output rates in bytes per second. In addition, the Interface monitoring page displays input and output packet counters and error counters in the form of charts.

Alternatively, you can enter the show commands in the CLI to view interface status and traffic statistics.

**Action** To view general interface information in the J-Web interface such as available interfaces, select **Monitor > Interfaces**. Click any interface to view details about its status.

To set up interface monitoring for J-EX4200 Virtual Chassis and J-EX8200 switches, select a member from the **Port for FPC** list. Details such as the admin status and link status are displayed in the table.



**NOTE:** By default, the details of the first member in the **Port for FPC** drop-down list is displayed.

You have the following options:

- **Start/Stop**—Starts or stops monitoring the selected interface.
- **Show Graph**—Displays input and output packet counters and error counters in the form of charts. Also, click the pop-up icon to view the graph in a separate window.

- **Details**—Displays interface information such as general details, traffic statistics, I/O errors, CoS counters, and Ethernet statistics.
- **Refresh Interval (sec)**—Displays the time interval you have set for page refresh.
- **Clear Statistics**—Clears the statistics for the interface selected from the table.

Using the CLI:

- To view interface status for all the interfaces, enter **show interfaces xe-**.
- To view status and statistics for a specific interface, enter **show interfaces xe-interface-name**.
- To view status and traffic statistics for all interfaces, enter either **show interfaces xe-detail** or **show interfaces xe- extensive**.

**Meaning** In the J-Web interface the charts displayed are:

- Bar charts—Display the input and output error counters.
- Pie charts—Display the number of broadcast, unicast, and multicast packet counters.

For details about output from the CLI commands, see **show interfaces ge-** (Gigabit Ethernet) or **show interfaces xe-** (10-Gigabit Ethernet).

**Related Documentation**

- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042

## Verifying the Status of a LAG Interface

**Purpose** Verify that a LAG (**ae0**) has been created on the switch.

**Action** Enter the following command:

```
user@switch> show interfaces ae0 terse
Interface      Admin  Link Proto      Local      Remote
ae0            up    up
ae0.0          up    up   inet    10.10.10.2/24
```

**Meaning** The output confirms that the **ae0** link is up and shows the **family** and IP address assigned to this link.

**Related Documentation**

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 1082
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777

## Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets

Verify that LACP has been set up correctly and that the bundle members are transmitting LACP protocol packets.

1. Verifying the LACP Setup on page 1097
2. Verifying That LACP Packets Are Being Exchanged on page 1097

### Verifying the LACP Setup

**Purpose** Verify that the LACP has been set up correctly.

**Action** To verify that LACP has been enabled as active on one end:

```
user@switch>show lacp interfaces xe-0/1/0
Aggregated interface: ae0
```

| LACP state:    | Role          | Exp            | Def | Dist      | Co1 | Syn | Aggr | Timeout | Activity |
|----------------|---------------|----------------|-----|-----------|-----|-----|------|---------|----------|
| xe-0/1/0       | Actor         | No             | Yes | No        | No  | No  | Yes  | Fast    | Active   |
| xe-0/1/0       | Partner       | No             | Yes | No        | No  | No  | Yes  | Fast    | Passive  |
| LACP protocol: | Receive State | Transmit State |     | Mux State |     |     |      |         |          |
| xe-0/1/0       | Defaulted     | Fast periodic  |     | Detached  |     |     |      |         |          |

**Meaning** This example shows that LACP has been configured with one side as active and the other as passive. When LACP is enabled, one side must be set as active in order for the bundled link to be up.

### Verifying That LACP Packets Are Being Exchanged

**Purpose** Verify that LACP packets are being exchanged between interfaces.

**Action** Use the `show interfaces aex statistics` command to display LACP BPDU exchange information.

```
show interfaces ae0 statistics
```

```
Physical interface: ae0, Enabled, Physical link is Down
Interface index: 153, SNMP ifIndex: 30
Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
Minimum bandwidth needed: 0
Device flags : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Current address: 02:19:e2:50:45:e0, Hardware address: 02:19:e2:50:45:e0
Last flapped : Never
Statistics last cleared: Never
Input packets : 0
```

```

Output packets: 0
Input errors: 0, Output errors: 0

Logical interface ae0.0 (Index 71) (SNMP ifIndex 34)
Flags: Hardware-Down Device-Down SNMP-Traps Encapsulation: ENET2
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :            0            0            0            0
  Output:            0            0            0            0
Protocol inet,
Flags: None
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255

```

**Meaning** The output here shows that the link is down and that no PDUs are being exchanged (when there is no other traffic flowing on the link).

**Related Documentation**

- Configuring Aggregated Ethernet LACP
- Verifying the Status of a LAG Interface

## Verifying That Layer 3 Subinterfaces Are Working

**Purpose** After configuring Layer 3 subinterfaces, verify they are set up properly and transmitting data.

**Action** 1. Use the **show interfaces** command to determine if you successfully created the subinterfaces and the links are up:

```
user@switch> show interfaces interface-name terse
```

| Interface      | Admin | Link | Proto | Local      | Remote |
|----------------|-------|------|-------|------------|--------|
| ge-0/0/0       | up    | up   |       |            |        |
| ge-0/0/0.0     | up    | up   | inet  | 1.1.1.1/24 |        |
| ge-0/0/0.1     | up    | up   | inet  | 2.1.1.1/24 |        |
| ge-0/0/0.2     | up    | up   | inet  | 3.1.1.1/24 |        |
| ge-0/0/0.3     | up    | up   | inet  | 4.1.1.1/24 |        |
| ge-0/0/0.4     | up    | up   | inet  | 5.1.1.1/24 |        |
| ge-0/0/0.32767 | up    | up   |       |            |        |

2. Use the **ping** command from a device on one subnet to an address on another subnet to determine if packets were transmitted correctly on the subinterface VLANs:

```
user@switch> ping ip-address
```

```

PING 1.1.1.1 (1.1.1.1): 56 data bytes
64 bytes from 1.1.1.1: icmp_seq=0 ttl=64 time=0.157 ms
64 bytes from 1.1.1.1: icmp_seq=1 ttl=64 time=0.238 ms
64 bytes from 1.1.1.1: icmp_seq=2 ttl=64 time=0.255 ms
64 bytes from 1.1.1.1: icmp_seq=3 ttl=64 time=0.128 ms
--- 1.1.1.1 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss

```

**Meaning** The output confirms that the subinterfaces are created and the links are up.

- Related Documentation**
- Configuring a Layer 3 Subinterface (CLI Procedure) on page 1089
  - Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026

## Verifying Unicast RPF Status

**Purpose** Verify that unicast reverse-path forwarding (RPF) is enabled and is working on the interface.

**Action** Use one of the **show interfaces *interface-name*** commands with either the **extensive** or **detail** options to verify that unicast RPF is enabled and working on the switch. The example below displays output from the **show interfaces ge- extensive** command.

```

user@switch> show interfaces ge-1/0/10 extensive
Physical interface: ge-1/0/10, Enabled, Physical link is Down
  Interface index: 139, SNMP ifIndex: 58, Generation: 140
  Link-level type: Ethernet, MTU: 1514, Speed: Auto, MAC-REWRITE Error: None,
  Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled,
  Auto-negotiation: Enabled, Remote fault: Online
  Device flags   : Present Running
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
  Link flags     : None
  CoS queues    : 8 supported, 8 maximum usable queues
  Hold-times    : Up 0 ms, Down 0 ms
  Current address: 00:19:e2:50:95:ab, Hardware address: 00:19:e2:50:95:ab
  Last flapped  : Never
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :                0                0 bps
    Output bytes  :                0                0 bps
    Input packets :                0                0 pps
    Output packets:                0                0 pps
  IPv6 transit statistics:
    Input bytes   :                0
    Output bytes  :                0
    Input packets :                0
    Output packets:                0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
    FIFO errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

    FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
  Egress queues: 8 supported, 4 in use
  Queue counters:      Queued packets  Transmitted packets      Dropped packets

    0 best-effort                0                0                0
    1 assured-forw                0                0                0
    5 expedited-fo                0                0                0
    7 network-cont                0                0                0

  Active alarms  : LINK

```

Active defects : LINK

| MAC statistics:    | Receive | Transmit |
|--------------------|---------|----------|
| Total octets       | 0       | 0        |
| Total packets      | 0       | 0        |
| Unicast packets    | 0       | 0        |
| Broadcast packets  | 0       | 0        |
| Multicast packets  | 0       | 0        |
| CRC/Align errors   | 0       | 0        |
| FIFO errors        | 0       | 0        |
| MAC control frames | 0       | 0        |
| MAC pause frames   | 0       | 0        |
| Oversized frames   | 0       | 0        |
| Jabber frames      | 0       | 0        |
| Fragment frames    | 0       | 0        |
| VLAN tagged frames | 0       | 0        |
| Code violations    | 0       | 0        |

| Filter statistics:        |   |   |
|---------------------------|---|---|
| Input packet count        | 0 |   |
| Input packet rejects      | 0 |   |
| Input DA rejects          | 0 |   |
| Input SA rejects          | 0 |   |
| Output packet count       |   | 0 |
| Output packet pad count   |   | 0 |
| Output packet error count |   | 0 |

CAM destination filters: 0, CAM source filters: 0

Autonegotiation information:

Negotiation status: Incomplete

Packet Forwarding Engine configuration:

Destination slot: 1

Logical interface ge-1/0/10.0 (Index 69) (SNMP ifIndex 59) (Generation 135)

Flags: Device-Down SNMP-Traps 0x0 Encapsulation: ENET2

Traffic statistics:

|                 |   |  |
|-----------------|---|--|
| Input bytes :   | 0 |  |
| Output bytes :  | 0 |  |
| Input packets:  | 0 |  |
| Output packets: | 0 |  |

IPv6 transit statistics:

|                 |   |  |
|-----------------|---|--|
| Input bytes :   | 0 |  |
| Output bytes :  | 0 |  |
| Input packets:  | 0 |  |
| Output packets: | 0 |  |

Local statistics:

|                 |   |  |
|-----------------|---|--|
| Input bytes :   | 0 |  |
| Output bytes :  | 0 |  |
| Input packets:  | 0 |  |
| Output packets: | 0 |  |

Transit statistics:

|                 |   |       |
|-----------------|---|-------|
| Input bytes :   | 0 | 0 bps |
| Output bytes :  | 0 | 0 bps |
| Input packets:  | 0 | 0 pps |
| Output packets: | 0 | 0 pps |

IPv6 transit statistics:

|                 |   |  |
|-----------------|---|--|
| Input bytes :   | 0 |  |
| Output bytes :  | 0 |  |
| Input packets:  | 0 |  |
| Output packets: | 0 |  |

Protocol inet, Generation: 144, Route table: 0



Flags: uRPF

Addresses, Flags: Is-Preferred Is-Primary

**Meaning** The `show interfaces ge-1/0/10 extensive` command (and the `show interfaces ge-1/0/10 detail` command) displays in-depth information about the interface. The **Flags:** output field near the bottom of the display reports the unicast RPF status. If unicast RPF has not been enabled, the **uRPF** flag is not displayed.

On J-EX4200 switches, unicast RPF is implicitly enabled on *all* switch interfaces, including aggregated Ethernet interfaces (also referred to as link aggregation groups or LAGs) and routed VLAN interfaces (RVIs) when you enable unicast RPF on a single interface. However, the unicast RPF status is shown as enabled only on interfaces for which you have explicitly configured unicast RPF. Thus, the **uRPF** flag is not displayed on interfaces for which you have not explicitly configured unicast RPF even though unicast RPF is implicitly enabled on all interfaces on J-EX4200 switches.

- Related Documentation**
- [show interfaces xe- on page 1228](#)
  - [Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033](#)
  - [Configuring Unicast RPF \(CLI Procedure\) on page 1089](#)
  - [Disabling Unicast RPF \(CLI Procedure\) on page 1091](#)
  - [Troubleshooting Unicast RPF on page 1105](#)

## Verifying IP Directed Broadcast Status

---

**Purpose** Verify that IP directed broadcast is enabled and is working on the subnet.

**Action** Use the `show vlans extensive` command to verify that IP directed broadcast is enabled and working on the subnet as shown in the following example.

- Related Documentation**
- [Configuring IP Directed Broadcast \(CLI Procedure\) on page 1091](#)
  - [Example: Configuring IP Directed Broadcast on a J-EX Series Switch on page 1037](#)



# Troubleshooting Interfaces

- Troubleshooting Network Interfaces on J-EX4200 Switches on page 1103
- Troubleshooting an Aggregated Ethernet Interface on page 1104
- Troubleshooting Interface Configuration and Cable Faults on page 1104
- Troubleshooting Unicast RPF on page 1105
- Troubleshooting Virtual Chassis Port Connectivity on a J-EX4200 Switch on page 1106
- Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) on page 1106

## Troubleshooting Network Interfaces on J-EX4200 Switches

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This topic provides troubleshooting information for specific problems related to interfaces on J-EX4200 switches.

- The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down on page 1103

### The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down

**Problem** The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module installed in a J-EX4200 switch is down.

When you check the status with the CLI command **show interfaces ge-** or with the J-Web user interface, the disabled port is not listed.

**Cause** By default, the SFP+ uplink module operates in the 10-gigabit mode and supports only SFP+ transceivers. The operating mode for the module is incorrectly set.

**Solution** Either SFP+ or SFP transceivers can be installed in SFP+ uplink modules. You must configure the operating mode of the SFP+ uplink module to match the type of transceiver you want to use. For SFP+ transceivers, configure the 10-gigabit operating mode and for SFP transceivers, configure the 1-gigabit operating mode. See “Setting the Mode on an SFP+ Uplink Module (CLI Procedure)” on page 1093.

**Related Documentation**

- Troubleshooting Virtual Chassis Port Connectivity on a J-EX4200 Switch on page 1106
- Monitoring Interface Status and Traffic on page 1095

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\) on page 1045](#)
- [Removing a Transceiver from a J-EX Series Switch](#)
- [Uplink Modules in J-EX4200 Switches](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)

## Troubleshooting an Aggregated Ethernet Interface

---

**Problem** The `show interfaces terse` command shows that the LAG is down.

**Solution** Check the following:

- Verify that there is no configuration mismatch.
- Verify that all member ports are up.
- Verify that a LAG is part of family ethernet-switching (Layer 2 LAG) or family inet (Layer 3 LAG).
- Verify that the LAG member is connected to the correct LAG at the other end.
- Verify that the LAG members belong to the same switch (or the same Virtual Chassis).

**Related Documentation**

- [Verifying the Status of a LAG Interface on page 1096](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783](#)

## Troubleshooting Interface Configuration and Cable Faults

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Troubleshooting interface configuration and connectivity on the J-EX Series switch:

1. [Interface Configuration or Connectivity Is Not Working on page 1104](#)

### Interface Configuration or Connectivity Is Not Working

**Problem** You encounter errors when you attempt to configure an interface on the switch, or the interface is exhibiting connectivity problems.

**Solution** Use the port troubleshooter feature in the J-Web interface to identify and rectify port configuration and connectivity related problems.

To use the J-Web interface port troubleshooter:

1. Select the option **Troubleshoot** from the main menu.
2. Click **Troubleshoot Port**. The Port Troubleshooting wizard is displayed. Click **Next**.
3. Select the ports to troubleshoot.
4. Select the test cases to be executed on the selected port. Click **Next**.

When the selected test cases are executed, the final result and the recommended action is displayed.

If there is a cable fault, the port troubleshooter displays details and the recommended action. For example, the cable must be replaced.

If the port configuration needs to be modified, the port troubleshooter displays details and the recommended action.

#### Related Documentation

- Monitoring Interface Status and Traffic on page 1095
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
- Connecting and Configuring a J-EX Series Switch (CLI Procedure) on page 185
- Connecting and Configuring a J-EX Series Switch (J-Web Procedure) on page 187

## Troubleshooting Unicast RPF

Troubleshooting issues for unicast reverse-path forwarding (RPF) on J-EX Series switches include:

1. Legitimate Packets Are Discarded on page 1105

### Legitimate Packets Are Discarded

**Problem** The switch filters valid packets from legitimate sources, which results in the switch's discarding packets that should be forwarded.

**Solution** The interface or interfaces on which legitimate packets are discarded are asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination, so the interface that receives a packet is not the same interface the switch uses to reply to the packet's source.

Unicast RPF works properly only on symmetrically routed interfaces. A symmetrically routed interface is an interface that uses the same route in both directions between the source and the destination. Unicast RPF filters packets by checking the forwarding table for the best return path to the source of an incoming packet. If the best return path uses the same interface as the interface that received the packet, the switch forwards the packet. If the best return path uses a different interface than the interface that received the packet, the switch discards the packet.



**NOTE:** On J-EX4200 switches, unicast RPF works properly only if all switch interfaces—including aggregated Ethernet interfaces (also referred to as link aggregation groups or LAGs) and routed VLAN interfaces (RVIs)—are symmetrically routed, because unicast RPF is enabled globally on all switch interfaces.

- Related Documentation**
- Verifying Unicast RPF Status on page 1099
  - Understanding Unicast RPF for J-EX Series Switches on page 1008

## Troubleshooting Virtual Chassis Port Connectivity on a J-EX4200 Switch

This topic provides troubleshooting information for specific problems related to uplink module ports on J-EX4200 switches.

1. Virtual Chassis port (VCP) connection does not work on page 1106

### Virtual Chassis port (VCP) connection does not work

**Problem** The Virtual Chassis port (VCP) connection configured in a J-EX4200 switch does not work.

A port of the uplink module is set as a VCP.

**Cause** The uplink module installed in the switch was replaced.

**Solution** Set a port in the uplink module as a VCP. See “Setting an Uplink Module Port on a J-EX4200 Switch as a Virtual Chassis Port (CLI Procedure)” on page 846.

- Related Documentation**
- Monitoring Interface Status and Traffic on page 1095
  - Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
  - Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045
  - Installing an Uplink Module in a J-EX4200 Switch
  - Removing a Transceiver from a J-EX Series Switch
  - Uplink Modules in J-EX4200 Switches
  - Understanding Virtual Chassis Hardware Configuration on a J-EX4200 Switch

## Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure)

**Problem** A 10/100/1000Base-T Ethernet interface has connectivity problems that you suspect might be caused by a faulty cable.

**Solution** Use the time domain reflectometry (TDR) test to determine whether a twisted-pair Ethernet cable is faulty.

The TDR test:

- Detects and reports faults for each twisted pair in an Ethernet cable. Faults detected include open circuits, short circuits, and impedance mismatches.
- Reports the distance to fault to within 1 meter.
- Detects and reports pair swaps, pair polarity reversals, and excessive pair skew.

The TDR test is supported on the following switches and interfaces:

- J-EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- J-EX8200 switches—Interfaces on the 48-port RJ-45 line card.



**NOTE:** We recommend running the TDR test on an interface when there is no traffic on the interface.

To diagnose a cable problem by running the TDR test:

1. Run the **request diagnostics tdr** command.

```
user@switch> request diagnostics tdr start interface ge-0/0/10
```

```
Interface TDR detail:
```

```
Test status                : Test successfully executed ge-0/0/10
```

2. View the results of the TDR test with the **show diagnostics tdr** command.

```
user@switch> show diagnostics tdr interface ge-0/0/10
```

```
Interface TDR detail:
```

```
Interface name             : ge-0/0/10
Test status                 : Passed
Link status                 : Down
MDI pair                   : 1-2
  Cable status              : Normal
  Distance fault            : 0 Meters
  Polarity swap             : N/A
  Skew time                 : N/A
MDI pair                   : 3-6
  Cable status              : Normal
  Distance fault            : 0 Meters
  Polarity swap             : N/A
  Skew time                 : N/A
MDI pair                   : 4-5
  Cable status              : Open
  Distance fault            : 1 Meters
  Polarity swap             : N/A
  Skew time                 : N/A
MDI pair                   : 7-8
  Cable status              : Normal
  Distance fault            : 0 Meters
  Polarity swap             : N/A
  Skew time                 : N/A
Channel pair                : 1
Pair swap                   : N/A
```

```

Channel pair           : 2
Pair swap             : N/A
Downshift             : N/A

```

3. Examine the **Cable status** field for the four MDI pairs to determine if the cable has a fault. In the preceding example, the twisted pair on pins 4 and 5 is broken or cut at approximately one meter from the **ge-0/0/10** port connection.



**NOTE:** The **Test Status** field indicates the status of the TDR test, not the cable. The value **Passed** means the test completed—it does not mean that the cable has no faults.

The following is additional information about the TDR test:

- The TDR test can take some seconds to complete. If the test is still running when you execute the **show diagnostics tdr** command, the **Test status** field displays **Started**. For example:

```
user@switch> show diagnostics tdr interface ge-0/0/22
```

```

Interface TDR detail:
Interface name           : ge-0/0/22
Test status             : Started

```

- You can terminate a running TDR test before it completes by using the **request diagnostics tdr abort interface interface-name** command. The test terminates with no results, and the results from any previous test are cleared.
- You can display summary information about the last TDR test results for all interfaces on the switch that support the TDR test by not specifying an interface name with the **show diagnostics tdr** command. For example:

```

user@switch> show diagnostics tdr
Interface  Test status  Link status  Cable status  Max distance fault
ge-0/0/0   Passed       UP           OK            0
ge-0/0/1   Not Started  N/A         N/A           N/A
ge-0/0/2   Passed       UP           OK            0
ge-0/0/3   Not Started  N/A         N/A           N/A
ge-0/0/4   Passed       UP           OK            0
ge-0/0/5   Passed       UP           OK            0
ge-0/0/6   Passed       UP           OK            0
ge-0/0/7   Not Started  N/A         N/A           N/A
ge-0/0/8   Passed       Down        OK            0
ge-0/0/9   Not Started  N/A         N/A           N/A
ge-0/0/10  Passed       Down        Fault         1
ge-0/0/11  Passed       UP           OK            0
ge-0/0/12  Not Started  N/A         N/A           N/A
ge-0/0/13  Not Started  N/A         N/A           N/A
ge-0/0/14  Not Started  N/A         N/A           N/A
ge-0/0/15  Not Started  N/A         N/A           N/A
ge-0/0/16  Not Started  N/A         N/A           N/A
ge-0/0/17  Not Started  N/A         N/A           N/A
ge-0/0/18  Not Started  N/A         N/A           N/A
ge-0/0/19  Passed       Down        OK            0
ge-0/0/20  Not Started  N/A         N/A           N/A
ge-0/0/21  Not Started  N/A         N/A           N/A

```



|           |             |     |     |     |
|-----------|-------------|-----|-----|-----|
| ge-0/0/22 | Passed      | UP  | OK  | 0   |
| ge-0/0/23 | Not Started | N/A | N/A | N/A |

- Related Documentation**
- Troubleshooting Interface Configuration and Cable Faults on page 1104
  - `request diagnostics tdr` on page 1188
  - `show diagnostics tdr` on page 1190



# Configuration Statements for Interfaces

- [\[edit chassis\]](#) Configuration Statement Hierarchy on page 1111
- [\[edit interfaces\]](#) Configuration Statement Hierarchy on page 1112

## [\[edit chassis\]](#) Configuration Statement Hierarchy

---

```

chassis {
  aggregated-devices {
    ethernet {
      device-count number;
    }
  }
  auto-image-upgrade;
  fpc slot {
    pic pic-number {
      sfplusplus {
        pic-modemode;
      }
    }
    power-budget-priority priority;
  }
  lcd-menu fpc slot-number {
    menu-item (menu-name | menu-option);
  }
  nssu {
    upgrade-group group-name {
      fpcs (slot-number | [list-of-slot-numbers]);
      member member-id {
        fpcs (slot-number | [list-of-slot-numbers]);
      }
    }
  }
  psu {
    redundancy {
      n-plus-n;
    }
  }
  redundancy {
    graceful-switchover;
  }
}

```

- Related Documentation**
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
  - Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94
  - Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
  - Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856
  - Configuring Power Supply Redundancy (CLI Procedure) on page 952
  - Configuring the Power Priority of Line Cards (CLI Procedure) on page 953
  - Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951

## [\[edit interfaces\] Configuration Statement Hierarchy](#)

---

```
interfaces {
  aex {
    accounting-profile name;
    aggregated-ether-options {
      (flow-control | no-flow-control);
      lacp {
        (active | passive);
        admin-key key;
        periodic interval;
        system-id mac-address;
      }
      (link-protection | no-link-protection);
      link-speed speed;
      (loopback | no-loopback);
      minimum-links number;
    }
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
      flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
      accounting-profile name;
      bandwidth rate;
      description text;
      disable;
      family family-name {...}
      proxy-arp (restricted | unrestricted);
      (traps | no-traps);
      vlan-id vlan-id-number;
    }
    vlan-tagging;
```

```

}
ge-fpc/pic/port {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
    speed (auto-negotiation | speed);
  }
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  mtu bytes;
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
  }
  vlan-tagging;
}
interface-range name {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
    speed (auto-negotiation | speed);
  }
}

```

```
(gratuitous-arp-reply | no-gratuitous-arp-reply);
member interface-name;
member-range starting-interface name to ending-interface name;
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...}
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
vlan-tagging;
}
lo0 {
  accounting-profile name;
  description text;
  disable;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    (traps | no-traps);
  }
}
me0 {
  accounting-profile name;
  description text;
  disable;
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    (traps | no-traps);
    vlan-id vlan-id-number;
```

```

    }
    vlan-tagging;
}
vlan {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
    }
}
traceoptions {
    file <filename> <files number> <match regular-expression> <size size>
        <world-readable | no-world-readable>;
    flag flag <disable>;
    no-remote-trace;
}
vme {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}
xe-fpc/pic/port {
    accounting-profile name;
    description text;
    disable;

```

```
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
    }
  }
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...}
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
vlan-tagging;
}
```

**Related  
Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Aggregated Ethernet Interfaces \(CLI Procedure\) on page 1081](#)
- [Configuring a Layer 3 Subinterface \(CLI Procedure\) on page 1089](#)
- [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#)
- [Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\) on page 852](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)
- [Junos OS Network Interfaces Configuration Guide](#)



---

## 802.3ad

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>802.3ad {     aex;     (backup   primary);     lacp {         force-up;     } }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces interface-range <i>name</i> ether-options]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Configure membership in a link aggregation group (LAG).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <ul style="list-style-type: none"> <li>• <b>aex</b>—Name of the LAG.</li> <li>• <b>backup</b>—Designate the interface as the backup interface for link-protection mode.</li> <li>• <b>primary</b>—Designate the interface as the primary interface for link-protection mode.</li> </ul> <p>The remaining statements are described separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783</li> <li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li> <li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li> <li>• Understanding Aggregated Ethernet Interfaces and LACP on page 1003</li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## accounting-profile

---

|                                 |                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | accounting-profile <i>name</i> ;                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ]                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                            |
| <b>Description</b>              | Enable collection of accounting data for the specified physical or logical interface or interface range.                                                                                               |
| <b>Options</b>                  | <i>name</i> —Name of the accounting profile.                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Applying an Accounting Profile to the Physical Interface on page 1075</li><li>• Applying an Accounting Profile to the Logical Interface on page 1076</li></ul> |

## address

```

Syntax  address address {
    arp ip-address (mac | multicast-mac) mac-address <publish>;
    broadcast address;
    destination address;
    destination-profile name;
    eui-64;
    master-only;
    multipoint-destination address dlcidlcid-identifier;
    multipoint-destination address {
        epd-threshold cells;
        inverse-arp;
        oam-liveness {
            up-count cells;
            down-count cells;
        }
        oam-period (disable | seconds);
        shaping {
            (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
             length);
            queue-length number;
        }
        vci vpi-identifier.vci-identifier;
    }
    primary;
    preferred;
    (vrrp-group | vrrp-inet6-group) group-number {
        (accept-data | no-accept-data);
        advertise-interval seconds;
        authentication-type authentication;
        authentication-key key;
        fast-interval milliseconds;
        (preempt | no-preempt) {
            hold-time seconds;
        }
        priority-number number;
        track {
            priority-cost seconds;
            priority-hold-time interface-name {
                interface priority;
                bandwidth-threshold bits-per-second {
                    priority;
                }
            }
            route ip-address/mask routing-instance instance-name priority-cost cost;
        }
        virtual-address [ addresses ];
    }
}

```

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number* family *family*],  
 [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*  
 family *family*]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure the interface address.

**Options** *address*—Address of the interface.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

- Related Documentation**
- Configuring the Protocol Family
  - negotiate-address
  - unnumbered-address (Ethernet)
  - *Junos OS System Basics Configuration Guide*

---

## aggregated-devices

---

**Syntax**

```
aggregated-devices {  
  ethernet {  
    device-count number;  
  }  
}
```

**Hierarchy Level** [edit chassis]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure properties for aggregated devices on the switch.

The remaining statements are explained separately.

**Default** Aggregated devices are disabled.

**Required Privilege Level** interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

- Related Documentation**
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777
  - Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
  - Understanding Aggregated Ethernet Interfaces and LACP on page 1003
  - *Junos OS Network Interfaces Configuration Guide*

## aggregated-ether-options

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>aggregated-ether-options {   (flow-control   no-flow-control);   lACP {     (active   passive);     admin-key <i>key</i>;     periodic <i>interval</i>;     system-id <i>mac-address</i>;   }   (link-protection   no-link-protection);   link-speed <i>speed</i>;   (loopback   no-loopback);   minimum-links <i>number</i>; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces aex]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Configure the aggregated Ethernet properties of a specific aggregated Ethernet interface.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783</li> <li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li> <li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li> <li>• Understanding Aggregated Ethernet Interfaces and LACP on page 1003</li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## arp

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | arp <i>ip-address</i> (mac   multicast-mac) <i>mac-address</i> <publish>;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | For Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, configure Address Resolution Protocol (ARP) table entries, mapping IP addresses to MAC addresses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>ip-address</b>—IP address to map to the MAC address. The IP address specified must be part of the subnet defined in the enclosing <b>address</b> statement.</p> <p><b>mac mac-address</b>—MAC address to map to the IP address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>multicast-mac mac-address</b>—Multicast MAC address to map to the IP address. Specify the multicast MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>publish</b>—(Optional) Have the router or switch reply to ARP requests for the specified IP address. If you omit this option, the router or switch uses the entry to reach the destination but does not reply to ARP requests.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Static ARP Table Entries on page 1078</li> <li>Configuring Static ARP Entries</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |


## auto-negotiation

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|                                 |                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (auto-negotiation   no-auto-negotiation);                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> gigheter-options],<br>[edit interfaces <i>ge-pim/0/0</i> switch-options switch-port <i>port-number</i> ]                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                               |
| <b>Description</b>              | Explicitly enable autonegotiation only. <ul style="list-style-type: none"> <li>• <b>auto-negotiation</b>—Enables autonegotiation. This is the default.</li> <li>• <b>no-auto-negotiation</b>—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure the link mode and speed.</li> </ul> |
| <b>Default</b>                  | Autonegotiation is automatically enabled. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Gigabit Ethernet Autonegotiation Overview</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> </ul>                                                             |

## bandwidth

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bandwidth rate;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Configure an informational-only bandwidth value for an interface. This statement is valid for all logical interface types except multilink and aggregated interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                 | <p> <b>NOTE:</b> We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the <code>bandwidth</code> statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:</p> $\text{cost} = \text{reference-bandwidth} / \text{bandwidth},$ <p>where <code>bandwidth</code> is the physical interface speed. However, if you specify a value for <code>bandwidth</code> using the <code>bandwidth</code> statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.</p> |
| <b>Options</b>                  | <b>rate</b> —Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b> ; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.                                                                                                                                                                                                                                                                                             |
|                                 | <b>Range:</b> Not limited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the Interface Bandwidth on page 1061</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



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## broadcast

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|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>broadcast address;</code>                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                              |
| <b>Description</b>              | Set the broadcast address on the network or subnet. On a subnet you cannot specify a host address of 0, nor can you specify a broadcast address.                                                                                                                                         |
| <b>Default</b>                  | The default broadcast address has a host portion of all ones.                                                                                                                                                                                                                            |
| <b>Options</b>                  | <i>address</i> —Broadcast address. The address must have a host portion of either all ones or all zeros. You cannot specify the addresses <code>0.0.0.0</code> or <code>255.255.255.255</code> .                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring the Interface Address on page 1059</li></ul>                                                                                                                                                                                           |

## chassis

```

Syntax  chassis {
        aggregated-devices {
            ethernet {
                device-count number;
            }
        }
        auto-image-upgrade;
        fpc slot {
            pic pic-number {
                sfplus {
                    pic-modemode;
                }
            }
            power-budget-priority priority;
        }
        lcd-menu fpc slot-number {
            menu-item (menu-name | menu-option);
        }
        nssu {
            upgrade-group group-name {
                fpcs (slot-number | [list-of-slot-numbers]);
                member member-id {
                    fpcs (slot-number | [list-of-slot-numbers]);
                }
            }
        }
        psu {
            redundancy {
                n-plus-n;
            }
        }
        redundancy {
            graceful-switchover;
        }
    }

```

**Hierarchy Level** [edit]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure chassis-specific properties for the switch.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
- Upgrading Software Using Automatic Software Download on J-EX Series Switches on page 94

- Configuring the LCD Panel on J-EX Series Switches (CLI Procedure) on page 190
- Configuring Graceful Routing Engine Switchover in a J-EX4200 or J-EX4500 Virtual Chassis (CLI Procedure) on page 856
- Configuring Power Supply Redundancy (CLI Procedure) on page 952
- Configuring the Power Priority of Line Cards (CLI Procedure) on page 953
- Configuring Line-card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure) on page 951

## description

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>description text;</code>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Provide a textual description of the interface or the logical unit. Any descriptive text you include is displayed in the output of the <b>show interfaces</b> commands, and is also exposed in the <b>ifAlias</b> Management Information Base (MIB) object. It has no effect on the operation of the interface on the router or switch.<br><br>The textual description can also be included in the extended DHCP relay option 82 Agent Circuit ID suboption. |
| <b>Options</b>                  | <b>text</b> —Text to describe the interface. If the text includes spaces, enclose the entire text in quotation marks.                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Adding an Interface Description to the Configuration on page 1055</li> <li>• Adding a Logical Unit Description to the Configuration on page 1056</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> <li>• Enabling and Disabling Insertion of Option 82 Information</li> </ul>                                                                                                    |




## device-count

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>device-count</code> <i>number</i> ;                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit chassis aggregated-devices ethernet]                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Configure the number of aggregated Ethernet logical devices available to the switch.                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b>number</b> —Maximum number of aggregated Ethernet logical interfaces on the switch.<br><b>Range:</b> 1 through 64 for standalone J-EX4200 and J-EX4500 switches and for J-EX4200 and J-EX4500 Virtual Chassis<br><b>Range:</b> 1 through 255 for standalone J-EX8200 switches                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li><li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li><li>• <i>Junos OS Network Interfaces Configuration Guide</i></li></ul> |

## disable (Interface)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | disable;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Disable a physical or a logical interface, effectively unconfiguring it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                 | <p> <b>CAUTION:</b> Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.</p> <p>.....</p> <p> <b>NOTE:</b> When you use the disable statement at the edit interfaces hierarchy level, the laser will be turned off when the interface is disabled.</p> <p>.....</p> <p> <b>WARNING:</b> Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.</p> <p>.....</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Disabling a Physical Interface on page 1057</li> <li>Disabling a Logical Interface on page 1058</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## ether-options

**Syntax** Gigabit Ethernet interfaces:

```
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
    }
  }
  (auto-negotiation | no-auto-negotiation);
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
  speed (speed | auto-negotiation);
}
```

10-Gigabit Ethernet interfaces:

```
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
    }
  }
  (flow-control | no-flow-control);
  (loopback | no-loopback);
}
```

**Hierarchy Level** [edit interfaces *interface-name*],  
[edit interfaces interface-range *name*]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure Ethernet properties for a Gigabit Ethernet interface or a 10-Gigabit Ethernet interface on a J-EX Series switch.

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045
- Understanding Aggregated Ethernet Interfaces and LACP on page 1003
- J-EX Series Switches Interfaces Overview on page 999
- *Junos OS Network Interfaces Configuration Guide*

## ethernet

---

|                                 |                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | ethernet {<br>device-count <i>number</i> ;<br>}                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit chassis aggregated-devices]                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                               |
| <b>Description</b>              | Configure properties for Ethernet aggregated devices on the switch.<br><br>The remaining statement is explained separately.                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## eui-64

---

|                                 |                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | eui-64;                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> family inet6 address <i>address</i> ]                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                   |
| <b>Description</b>              | For interfaces that carry IP version 6 (IPv6) traffic, automatically generate the host number portion of interface addresses. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the Interface Address on page 1059</li> </ul>                              |

## family (for J-EX Series switches)

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                    | family ccc on page 1132<br>family ethernet-switching on page 1132<br>family inet on page 1132<br>family inet6 on page 1132<br>family iso on page 1133<br>family mpls on page 1133                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>family ccc</b>                | family ccc;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>family ethernet-switching</b> | family ethernet-switching {<br>filter {<br>input <i>filter-name</i> ;<br>output <i>filter-name</i> ;<br>}<br>native-vlan-id <i>vlan-id</i> ;<br>port-mode <i>mode</i> ;<br>reflective-relay;<br>vlan {<br>members [ (all   <i>names</i>   <i>vlan-ids</i> ) ];<br>}<br>}                                                                                                                                                                                                                                                                                                                                                                  |
| <b>family inet</b>               | family inet {<br>address <i>address</i> {<br>arp <i>ip-address</i> (mac   multicast-mac) <i>mac-address</i> <publish>;<br>broadcast;<br>preferred;<br>primary;<br>vrrp-group <i>group-id</i> {<br>advertise-interval <i>milliseconds</i> ;<br>preempt   no-preempt {<br>hold-time <i>seconds</i> ;<br>}<br>priority <i>number</i> ;<br>virtual-address [ <i>addresses</i> ];<br>virtual-link-local-address <i>ip-address</i> ;<br>}<br>}<br>filter {<br>input <i>filter-name</i> ;<br>output <i>filter-name</i> ;<br>}<br>mtu <i>bytes</i> ;<br>no-redirects;<br>no-neighbor-learn;<br>primary;<br>rpf-check;<br>targeted-broadcast;<br>} |
| <b>family inet6</b>              | family inet6 {<br>address <i>address</i> {                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



```

eui-64;
ndp ip-address (mac | multicast-mac) mac-address <publish>;
preferred;
primary;
vrrp-inet6-group group-id {
  inet6-advertise-interval milliseconds;
  preempt | preempt {
    hold-time seconds;
  }
  priority number;
  virtual-inet6-address [addresses];
  virtual-link-local-address ipv6-address;
}
}
(dad-disable | no-dad-disable);
filter {
  input filter-name;
  output filter-name;
}
mtu bytes;
no-neighbor-learn;
rpf-check;
}

```

```

family iso family iso {
  address interface-address;
  mtu bytes;
}

```

```

family mpls family mpls {
  mtu bytes;
}

```

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number*],  
[edit interfaces interface-range *name* unit *logical-unit-number*]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure protocol family information for the logical interface on the switch.

**Default** Access interfaces on J-EX4200 and J-EX4500 switches are set to **family ethernet-switching** by default. If you are going to change the family setting for an interface, you might have to delete this default setting or any user-configured family setting before you change the setting to another family type.

J-EX8200 switch interfaces do not have a default family setting.

You must configure a logical interface to be able to use the physical device.

**Options** See Table 163 on page 1134 for protocol families available on the switch interfaces. Different protocol families support different subsets of the interfaces types on the switch.

Interface types on the switch are:

- Aggregated Ethernet (**ae**)
- Gigabit Ethernet (**ge**)
- Interface-range configuration (**interface-range**)
- Loopback (**lo0**)
- Management Ethernet (**me0**)
- Routed VLAN interface (RVI) (**vlan**)
- Virtual management Ethernet (**vme**)
- 10-Gigabit Ethernet (**xe**)

If you are using an interface range, the supported protocol families are the ones supported by the interface types that compose the range.

Not all interface types support all **family** substatements. Check your switch CLI for supported substatements for a particular protocol family configuration.

**Table 163: Protocol Families and Supported Interface Types**

| Family                    | Description                                | Supported Interface Types |    |     |     |      |     |    |
|---------------------------|--------------------------------------------|---------------------------|----|-----|-----|------|-----|----|
|                           |                                            | ae                        | ge | lo0 | me0 | vlan | vme | xe |
| <b>ccc</b>                | Circuit cross-connect protocol family      | ✓                         | ✓  |     |     |      |     | ✓  |
| <b>ethernet-switching</b> | Ethernet switching protocol family         | ✓                         | ✓  |     | ✓   |      |     | ✓  |
| <b>inet</b>               | IPv4 protocol family                       | ✓                         | ✓  | ✓   | ✓   | ✓    | ✓   | ✓  |
| <b>inet6</b>              | IPv6 protocol family                       | ✓                         | ✓  | ✓   | ✓   | ✓    | ✓   | ✓  |
| <b>iso</b>                | Junos OS protocol family for IS-IS traffic | ✓                         | ✓  | ✓   | ✓   | ✓    | ✓   | ✓  |
| <b>mpls</b>               | MPLS protocol family                       | ✓                         | ✓  | ✓   | ✓   |      | ✓   | ✓  |

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
 interface-control—To add this statement to the configuration.

**Related  
Documentation**

- Example: Configuring MPLS on J-EX Series Switches
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081
- Configuring Routed VLAN Interfaces (CLI Procedure)
- *Junos OS Network Interfaces Configuration Guide*

## filter

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>filter {   group <i>filter-group-number</i>;   input <i>filter-name</i>;   input-list [ <i>filter-names</i> ];   output <i>filter-name</i>;   output-list [ <i>filter-names</i> ]; }</pre>                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ]                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure them under the <b>family ethernet-switching</b> , <b>inet</b> , <b>inet6</b> , <b>mpls</b> , or <b>vpls</b> only.                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>group <i>filter-group-number</i></b>—Define an interface to be part of a filter group. The default filter group number is 0.<br/><b>Range:</b> 0 through 255</p> <p><b>input <i>filter-name</i></b>—Name of one filter to evaluate when packets are received on the interface.</p> <p><b>output <i>filter-name</i></b>—Name of one filter to evaluate when packets are transmitted on the interface.</p> <p>The remaining statements are explained separately.</p>                                                    |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Applying a Filter to an Interface</li> <li>Configuring Firewall Filters (CLI Procedure)</li> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> <li>Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on J-EX Series Switches</li> <li><i>Junos OS Services Interfaces Configuration Guide</i></li> <li><i>Junos OS Policy Framework Configuration Guide</i></li> <li><i>Junos OS System Basics Configuration Guide</i></li> </ul> |

## flow-control

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (flow-control   no-flow-control);                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> aggregated-ether-options],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> fastether-options],<br>[edit interfaces <i>interface-name</i> ggether-options],<br>[edit interfaces <i>interface-name</i> multiservice-options],<br>[edit interfaces interface-range <i>name</i> aggregated-ether-options],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | For aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, explicitly enable flow control, which regulates the flow of packets from the router or switch to the remote side of the connection. Enabling flow control is useful when the remote device is a Gigabit Ethernet switch. Flow control is not supported on the 4-port Fast Ethernet PIC.                                                                                            |
| <b>Default</b>                  | Flow control is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Flow Control on page 1058</li> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> </ul>                                                                                                                                                                                                                                                                                            |

## force-up

---

|                                 |                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | force-up;                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ether-options 802.3ad lacp]                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Set the state of the interface as UP when the peer has limited LACP capability.                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> <li>Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045</li> <li>Understanding Aggregated Ethernet Interfaces and LACP on page 1003</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## gratuitous-arp-reply

---

|                                 |                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (gratuitous-arp-reply   no-gratuitous-arp-reply);                                                                         |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                               |
| <b>Description</b>              | For Ethernet interfaces, enable updating of the ARP cache for replies received in response to gratuitous ARP requests.    |
| <b>Default</b>                  | Updating of the ARP cache is disabled on all Ethernet interfaces.                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring Gratuitous ARP on page 1078</li><li>no-gratuitous-arp-request</li></ul> |

## interface-range

```

Syntax interface-range name {
    accounting-profile name;
    description text;
    disable;
    ether-options {
        802.3ad {
            aex;
            (backup | primary);
            lacp {
                force-up;
            }
        }
        (auto-negotiation | no-auto-negotiation);
        (flow-control | no-flow-control);
        link-mode mode;
        (loopback | no-loopback);
        speed (auto-negotiation | speed);
    }
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    member interface-name;
    member-range starting-interface name to ending-interface name;
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}

```

**Hierarchy Level** [edit interfaces]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Group interfaces that share a common configuration profile.



**NOTE:** You can use interface ranges only for Gigabit and 10-Gigabit Ethernet interfaces.

**Options** *name*—Name of the interface range.



**NOTE:** You can use regular expressions and wildcards to specify the interfaces in the **member** configuration. Do not use wildcards for interface types.

The remaining statements are explained separately.

**Required Privilege Level** *interface*—To view this statement in the configuration.  
*interface-control*—To add this statement to the configuration.

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Understanding Interface Ranges on J-EX Series Switches on page 1005](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)
- [Junos OS Network Interfaces Configuration Guide](#)



## interfaces (for J-EX Series switches)

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>        | <p>interfaces ae on page 1141</p> <p>interfaces ge on page 1141</p> <p>interfaces interface-range on page 1143</p> <p>interfaces lo0 on page 1143</p> <p>interfaces me0 on page 1144</p> <p>interfaces traceoptions on page 1144</p> <p>interfaces vlan on page 1144</p> <p>interfaces vme on page 1145</p> <p>interfaces xe on page 1146</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>interfaces ae</b> | <pre> aex {   accounting-profile <i>name</i>;   aggregated-ether-options {     (flow-control   no-flow-control);     lacp {       (active   passive);       admin-key <i>key</i>;       periodic <i>interval</i>;       system-id <i>mac-address</i>;     }     (link-protection   no-link-protection);     link-speed <i>speed</i>;     (loopback   no-loopback);     minimum-links <i>number</i>;   }   description <i>text</i>;   disable;   (gratuitous-arp-reply   no-gratuitous-arp-reply);   mtu <i>bytes</i>;   no-gratuitous-arp-request;   traceoptions {     flag <i>flag</i>;   }   (traps   no-traps);   unit <i>logical-unit-number</i> {     accounting-profile <i>name</i>;     bandwidth <i>rate</i>;     description <i>text</i>;     disable;     family <i>family-name</i> {...}     proxy-arp (restricted   unrestricted);     (traps   no-traps);     vlan-id <i>vlan-id-number</i>;   }   vlan-tagging; } </pre> |
| <b>interfaces ge</b> | <pre> ge-<i>fpc/pic/port</i> {   accounting-profile <i>name</i>;   description <i>text</i>;   disable;   ether-options {     802.3ad { </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

```
    aex;
    (backup | primary);
    lacp {
        force-up;
    }
}
(auto-negotiation | no-auto-negotiation);
(flow-control | no-flow-control);
link-mode mode;
(loopback | no-loopback);
speed (auto-negotiation | speed);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
    flag flag;
}
(traps | no-traps);
unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
}
vlan-tagging;
}
```

```

interfaces interface-range name {
interface-range   accounting-profile name;
                   description text;
                   disable;
                   ether-options {
                     802.3ad {
                       aex;
                       (backup | primary);
                       lacp {
                         force-up;
                       }
                     }
                   }
                   (auto-negotiation | no-auto-negotiation);
                   (flow-control | no-flow-control);
                   link-mode mode;
                   (loopback | no-loopback);
                   speed (auto-negotiation | speed);
                   }
                   (gratuitous-arp-reply | no-gratuitous-arp-reply);
                   member interface-name;
                   member-range starting-interface name to ending-interface name;
                   mtu bytes;
                   unit logical-unit-number {
                     accounting-profile name;
                     bandwidth rate;
                     description text;
                     disable;
                     family family-name {...}
                     proxy-arp (restricted | unrestricted);
                     (traps | no-traps);
                     vlan-id vlan-id-number;
                   }
                   vlan-tagging;
                   }

interfaces lo0 lo0 {
                   accounting-profile name;
                   description text;
                   disable;
                   traceoptions {
                     flag flag;
                   }
                   (traps | no-traps);
                   unit logical-unit-number {
                     accounting-profile name;
                     bandwidth rate;
                     description text;
                     disable;
                     family family-name {...}
                     (traps | no-traps);
                   }
                   }

```

```
interfaces me0 me0 {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}

interfaces traceoptions traceoptions {
    file <filename> <files number> <match regular-expression> <size size> <world-readable |
    no-world-readable>;
    flag flag <disable>;
    no-remote-trace;
}

interfaces vlan vlan {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
    }
}
```

```
interfaces vme vme {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}
```

```
interfaces xe xe-fpc/pic/port {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
  }
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  mtu bytes;
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
  }
  vlan-tagging;
}
```

**Hierarchy Level** [edit]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure interfaces on J-EX Series switches.

**Options** See Table 164 on page 1147 for the interface types and protocol-family options supported on the switch. Different protocol families support different subsets of the interface types on the switch. See the **family** statement for syntax of the protocol families supported for switch interfaces.

Not all interface types support all **family** substatements. Check your switch CLI for supported substatements for a particular protocol family configuration.

**Table 164: Interface Types and Their Supported Protocol Families**

| Interface Type         | Description                                                                        | Supported Protocol Families                                                                       |                    |      |       |     |      |
|------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------|------|-------|-----|------|
|                        |                                                                                    | ccc                                                                                               | ethernet-switching | inet | inet6 | iso | mpls |
| <b>ae</b>              | Aggregated Ethernet interface (also referred to as a link aggregation group [LAG]) | ✓                                                                                                 | ✓                  | ✓    | ✓     | ✓   | ✓    |
| <b>ge</b>              | Gigabit Ethernet interface                                                         | ✓                                                                                                 | ✓                  | ✓    | ✓     | ✓   | ✓    |
| <b>lo0</b>             | Loopback interface                                                                 |                                                                                                   |                    | ✓    | ✓     | ✓   | ✓    |
| <b>me0</b>             | Management Ethernet interface                                                      |                                                                                                   | ✓                  | ✓    | ✓     | ✓   | ✓    |
| <b>vlan</b>            | Routed VLAN interface (RVI)                                                        |                                                                                                   |                    | ✓    | ✓     | ✓   |      |
| <b>vme</b>             | Virtual management Ethernet interface                                              |                                                                                                   |                    | ✓    | ✓     | ✓   | ✓    |
| <b>xe</b>              | 10-Gigabit Ethernet interface                                                      | ✓                                                                                                 | ✓                  | ✓    | ✓     | ✓   | ✓    |
| <b>interface-range</b> | Interface-range configuration                                                      | Supported protocol families are the ones supported by the interface types that compose the range. |                    |      |       |     |      |

The remaining statements are explained separately.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Aggregated Ethernet Interfaces \(CLI Procedure\) on page 1081](#)
- [Configuring a Layer 3 Subinterface \(CLI Procedure\) on page 1089](#)
- [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#)
- [Configuring the Virtual Management Ethernet Interface for Global Management of a J-EX4200 or J-EX4500 Virtual Chassis \(CLI Procedure\) on page 852](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)
- [Junos OS Network Interfaces Configuration Guide](#)

## lacp (802.3ad)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>lacp {<br/>    force-up;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ether-options 802.3ad]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Configure the Link Aggregation Control Protocol (LACP) parameters for interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li><li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783</li><li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li><li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li><li>• Understanding Aggregated Ethernet Interfaces and LACP on page 1003</li><li>• <i>Junos OS Network Interfaces Configuration Guide</i></li></ul> |




## lacp (Aggregated Ethernet)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>lacp {   (active   passive);   admin-key <i>key</i>;   link-protection {     disable;     (revertive  non-revertive);   }   periodic <i>interval</i>;   system-id <i>mac-address</i>;   system-priority <i>priority</i>; }</pre>                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options]                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For aggregated Ethernet interfaces only, configure Link Aggregation Control Protocol (LACP).                                                                                                                                                                                                                                                                           |
| <b>Default</b>                  | If you do not specify <b>LACP</b> as either active or passive, LACP remains passive.                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <ul style="list-style-type: none"> <li>• <b>active</b>—Initiate transmission of LACP packets.</li> <li>• <b>passive</b>—Respond to LACP packets.</li> </ul> <p>The remaining statements are explained separately.</p>                                                                                                                                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Configuring Aggregated Ethernet LACP</li> <li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783</li> </ul> |

## link-mode

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-mode <i>mode</i> (automatic   full-duplex   half-duplex);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces ge- <i>pim</i> /0/0 switch-options switch-port <i>port-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Set the device's link connection characteristic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><i>mode</i>—Link characteristics:</p> <ul style="list-style-type: none"> <li>• <b>automatic</b>—Link mode is negotiated. This is the default for J-EX Series switches.</li> <li>• <b>full-duplex</b>—Connection is full duplex.</li> <li>• <b>half-duplex</b>—Connection is half duplex.</li> </ul> <p><b>Default:</b> Fast Ethernet interfaces can operate in either full-duplex or half-duplex mode.</p> <hr/> <p> <b>NOTE:</b> On J-EX Series switches, if no-auto-negotiation is specified in [edit interfaces <i>interface-name</i> ether-options], you can select only full-duplex or half-duplex. If auto-negotiation is specified, you can select any mode.</p> <hr/> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Configuring the Link Characteristics on Ethernet Interfaces</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## link-protection

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-protection {<br>disable;<br>(revertive  non-revertive);<br>}                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options]<br>[edit interfaces aex <b>aggregated-ether-options</b> <i>lcp</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | For aggregated Ethernet interfaces only, configure link protection. In addition to enabling link protection, a primary and a secondary (backup) link must be configured to specify what links egress traffic should traverse. To configure primary and secondary links on the switch, include the <b>primary</b> and <b>backup</b> statements at the [edit interfaces <i>ge-fpc/pic/port ether-options 802.3ad aex</i> ] hierarchy level or at the [edit interfaces <i>xe-fpc/pic/port ether-options 802.3ad aex</i> ] hierarchy level. |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Aggregated Ethernet Link Protection on page 1086</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                          |

## link-speed (Aggregated Ethernet)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-speed <i>speed</i> ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options],<br>[edit interfaces interface-range <i>name</i> aggregated-ether-options],<br>[edit interfaces interface-range <i>name</i> aggregated-sonet-options]                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | For aggregated Ethernet interfaces only, set the required link speed.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><i>speed</i>—For aggregated Ethernet links, you can specify <i>speed</i> in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p>Aggregated Ethernet links on J-EX Series switches can be configured to operate at one of the following speed values:</p> <ul style="list-style-type: none"><li>• 10m</li><li>• 100m</li><li>• 1g</li><li>• 10g</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Configuring Aggregated Ethernet Link Speed on page 1087</li><li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li><li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li></ul>                                                                                                          |

## loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)

|                            |                                                                                                                                                                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | (loopback   no-loopback);                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> aggregated-ether-options],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> fastether-options],<br>[edit interfaces <i>interface-name</i> gigheter-options],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                           |
| <b>Description</b>         | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.                                                                                                                                                                                        |



**NOTE:** By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Ethernet Loopback Capability on page 1077</li> </ul>                 |

## member

|                                 |                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | member <i>interface-name</i> ;                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces interface-range <i>interface-range-name</i> ]                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Specify the name of the member interface belonging to an interface range on the J-EX Series switch.                                                                                                                                                                                                                               |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface.                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li> <li>Understanding Interface Ranges on J-EX Series Switches on page 1005</li> <li>J-EX Series Switches Interfaces Overview on page 999</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## members

**Syntax** `members [ (all | names | vlan-ids) ];`

**Hierarchy Level** `[edit interfaces interface-name unit logical-unit-number family ethernet-switching vlan]`

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** For trunk interfaces, configure the VLANs that can carry traffic.



**TIP:** To display a list of all configured VLANs on the system, including VLANs that are configured but not committed, type ? after `vlan` or `vlangs` in your configuration mode command line. Note that only one VLAN is displayed for a VLAN range.



**NOTE:** The number of VLANs supported per switch varies for each model. Use the configuration-mode command `set vlans id vlan-id ?` to determine the maximum number of VLANs allowed on a switch. You cannot exceed this VLAN limit because each VLAN is assigned an ID number when it is created. You can, however, exceed the recommended VLAN member maximum. To determine the maximum number of VLAN members allowed on a switch, multiply the VLAN maximum for the switch times 8 ( $\text{vmember limit} = \text{vlan max} * 8$ ).

If a switch configuration exceeds the recommended VLAN member maximum, you see a warning message when you commit the configuration. If you ignore the warning and commit such a configuration, the configuration succeeds but you run the risk of crashing the Ethernet switching process (`eswd`) due to memory allocation failure.

**Options** `all`—Specifies that this trunk interface is a member of all the VLANs that are configured on this switch. When a new VLAN is configured on the switch, this trunk interface automatically becomes a member of the VLAN.



**NOTE:** Since VLAN members are limited, specifying `all` could cause the number of VLAN members to exceed the limit at some point.

`names`—Name of one or more VLANs. VLAN IDs are applied automatically in this case.



**NOTE:** `all` cannot be a VLAN name.

**vlan-ids**—Numeric identifier of one or more VLANs. For a series of tagged VLANs, specify a range; for example, **10-20** or **10-20 23 27-30**.



**NOTE:** Each configured VLAN must have a specified VLAN ID to successfully commit the configuration; otherwise, the configuration commit fails.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [show ethernet-switching interfaces on page 1195](#)
- [show vlans](#)
- [Example: Setting Up Basic Bridging and a VLAN for a J-EX Series Switch](#)
- [Example: Connecting an Access Switch to a Distribution Switch](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\) on page 1045](#)
- [Configuring VLANs for J-EX Series Switches \(CLI Procedure\)](#)
- [Creating a Series of Tagged VLANs \(CLI Procedure\)](#)
- [Understanding Bridging and VLANs on J-EX Series Switches](#)
- [Junos OS Network Interfaces Configuration Guide](#)

## member-range

**Syntax** member-range *starting-interface-name* to *ending-interface-name*;

**Hierarchy Level** [edit interfaces interface-range *interface-range-name*]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Specify the names of the first and last members of a sequence of interfaces belonging to an interface range.

**Options** **Range:** *Starting interface-name* to *ending interface-name*—The name of the first member and the name of the last member in the interface sequence.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\) on page 1042](#)
- [Understanding Interface Ranges on J-EX Series Switches on page 1005](#)
- [J-EX Series Switches Interfaces Overview on page 999](#)
- [Junos OS Network Interfaces Configuration Guide](#)



## minimum-links

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | minimum-links <i>number</i> ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options],<br>[edit interfaces aex aggregated-sonet-options],<br>[edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>range</i> aggregated-ether-options],<br>[edit interfaces interface-range <i>range</i> aggregated-sonet-options],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | For aggregated Ethernet, multilink, link services, and voice services interfaces only, set the minimum number of links that must be up for the bundle to be labeled up.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <i>number</i> —Number of links.<br><b>Range:</b> 1 through 8 (1 through 12 for J-EX8200 switches)<br><b>Default:</b> 1                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Aggregated Ethernet Minimum Links on page 1088</a></li><li>• <a href="#">Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</a></li><li>• <a href="#">Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</a></li><li>• <a href="#">Junos OS Services Interfaces Configuration Guide</a></li></ul>                        |



## mtu

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>mtu bytes;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit interfaces interface-range <i>name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b> | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>         | <p>Specify the maximum transmission unit (MTU) size for the media or protocol. The default MTU size depends on the device type. Changing the media MTU or protocol MTU causes an interface to be deleted and added again.</p> <p>On J-EX Series switches, keep the following points in mind if you are configuring MTU size for jumbo frames on these special types of interfaces:</p> <ul style="list-style-type: none"> <li>• <b>For LAG interfaces</b>—Configuring the jumbo MTU size on a link aggregation group (LAG) interface (<code>aex</code>) automatically configures the jumbo MTU size on the member links.</li> <li>• <b>For RVIs</b>—Jumbo frames of up to 9216 bytes are supported on the routed VLAN interface (RVI), which is named <code>vlan</code>. The RVI functions as a logical router. To route jumbo data packets on the RVI, you must configure the jumbo MTU size on the member physical interfaces of the RVI and not on the RVI itself (the <code>vlan</code> interface). However, for jumbo control packets—for example, to ping the RVI with a packet size of 6000 bytes or more—you must explicitly configure the jumbo MTU size on the interface named <code>vlan</code> (the RVI).</li> </ul> |
|                            | <p> <b>CAUTION:</b> For J-EX Series switches, setting or deleting the jumbo MTU size on the RVI (the <code>vlan</code> interface) while the switch is transmitting packets might result in dropped packets.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                            | <p> <b>NOTE:</b> Not all devices allow you to set an MTU value, and some devices have restrictions on the range of allowable MTU values. You cannot configure an MTU for management Ethernet (<code>fxp0</code>, or <code>em0</code>, or <code>me0</code>) interfaces or for loopback, multilink, and multicast tunnel devices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                            | <p>For more information on configuring MTU for specific interfaces and router or switch combinations, see “Configuring the Media MTU” on page 1062.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>             | <p><b>bytes</b>—MTU size.</p> <p><b>Range:</b> 256 through 9192 bytes</p> <p><b>Default:</b> 1500 bytes (INET, INET6, and ISO families), 1448 bytes (MPLS), 1514 bytes (J-EX Series interfaces)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

- Related Documentation**
- Configuring the Media MTU on page 1062
  - Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
  - “Configuring Routed VLAN Interfaces (CLI Procedure)” in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>
  - Setting the Protocol MTU on page 1065

## native-vlan-id

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**Syntax** native-vlan-id *vlan-id*;

**Hierarchy Level** [edit interfaces *interface-name* unit 0 family ethernet-switching]

**Release Information** Statement introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Configure the VLAN identifier to associate with untagged packets received on the interface.

**Options** *vlan-id*—Numeric identifier of the VLAN.  
**Range:** 0 through 4095

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

- Related Documentation**
- show vlans
  - **show ethernet-switching interfaces on page 1195**
  - Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
  - Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045
  - “Understanding Bridging and VLANs on J-EX Series Switches” in the *Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2* at <http://www.support.dell.com/manuals>
  - *Junos OS Network Interfaces Configuration Guide*

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## no-redirects

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|                                 |                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | no-redirects;                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ]                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                         |
| <b>Description</b>              | <p>Do not send protocol redirect messages on the interface.</p> <p>To disable the sending of protocol redirect messages for the entire router or switch, include the <b>no-redirects</b> statement at the <b>[edit system]</b> hierarchy level.</p> |
| <b>Default</b>                  | Interfaces send protocol redirect messages.                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Disabling the Transmission of Redirect Messages on an Interface on page 1079</li><li><i>Junos OS System Basics Configuration Guide</i></li></ul>                                                              |

## periodic

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|                                 |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>periodic interval;</code>                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options lacp],<br>[edit interfaces interface-range <i>name</i> aggregated-ether-options lacp]                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | For aggregated Ethernet interfaces only, configure the interval for periodic transmission of LACP packets.                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <i>interval</i> —Interval for periodic transmission of LACP packets. <ul style="list-style-type: none"><li>• <b>fast</b>—Transmit packets every second.</li><li>• <b>slow</b>—Transmit packets every 30 seconds.</li></ul> <b>Default:</b> <b>fast</b>                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Configuring Aggregated Ethernet LACP</li><li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li><li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li></ul> |

## pic

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|                                 |                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pic <i>pic-number</i> {<br/>    sfpplus {<br/>        pic-mode <i>mode</i>;<br/>    }<br/>}</code>                                                                             |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot]                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                          |
| <b>Description</b>              | Enable the specified port of the SFP+ uplink module to perform in the operating mode specified by <b>pic-mode</b> . The port is indicated by a Physical Interface Card (PIC) number. |
| <b>Options</b>                  | <b>pic-number</b> —Number of the PIC. For uplink ports in J-EX4200 switches, the PIC number is always 1.<br><br>The remaining statements are explained separately.                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 1093</li> </ul>                                                             |

## pic-mode

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|                                 |                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>pic-mode <i>mode</i>;</code>                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic <i>pic-number</i> sfpplus ]                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                               |
| <b>Description</b>              | Configure the operating mode for the specified port on the SFP+ uplink module on a J-EX4200 switch.                                                                                       |
| <b>Options</b>                  | <b>mode</b> —Operating mode of the SFP+ uplink module: <ul style="list-style-type: none"> <li><b>1G</b>—1-gigabit operating mode</li> <li><b>10G</b>—10-gigabit operating mode</li> </ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 1093</li> </ul>                                                                  |

## port-mode

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>port-mode mode;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family ethernet-switching]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure whether an interface on the switch operates in access, tagged-access, or trunk mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>                  | All switch interfaces are in access mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><i>mode</i>—Operating mode for an interface can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>access</b>—In this mode, the interface can be in a single VLAN only. Access interfaces typically connect to single network devices such as PCs, printers, IP telephones, and IP cameras.</li> <li>• <b>tagged-access</b>—In this mode, the interface can accept tagged packets from one access device. Tagged-access interfaces typically connect to servers running Virtual machines using VEPA technology.</li> <li>• <b>trunk</b>—In this mode, the interface can be in multiple VLANs and accept tagged packets from multiple devices. Trunk interfaces typically connect to other switches and to routers on the LAN.</li> </ul>                                                                                                                                                                                                                  |
|                                 | <p> <b>NOTE:</b> The number of VLANs supported per switch varies for each model. Use the configuration-mode command <code>set vlans id vlan-id ?</code> to determine the maximum number of VLANs allowed on a switch. You cannot exceed this VLAN limit because each VLAN is assigned an ID number when it is created. You can, however, exceed the recommended VLAN member maximum. To determine the maximum number of VLAN members allowed on a switch, multiply the VLAN maximum for the switch times 8 (vmember limit = vlan max * 8).</p> <p>If a switch configuration exceeds the recommended VLAN member maximum, you see a warning message when you commit the configuration. If you ignore the warning and commit such a configuration, the configuration succeeds but you run the risk of crashing the Ethernet switching process (<i>eswd</i>) due to memory allocation failure.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• “Example: Connecting an Access Switch to a Distribution Switch” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

- Example: Configuring Reflective Relay for Use with VEPA Technology
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042
- Configuring VLANs for J-EX Series Switches (CLI Procedure)
- *Junos OS Network Interfaces Configuration Guide*

## preferred

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|                                 |                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | preferred;                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                              |
| <b>Description</b>              | Configure this address to be the preferred address on the interface. If you configure more than one address on the same subnet, the preferred source address is chosen by default as the source address when you originate packets to destinations on the subnet.                        |
| <b>Default</b>                  | The lowest-numbered address on the subnet is the preferred address.                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Configuring the Interface Address on page 1059</li> </ul>                                                                                                                                                                                       |

## primary (Address on Interface)

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|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | primary;                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br>family <i>family</i> address <i>address</i> ]        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure this address to be the primary address of the protocol on the interface. If the logical unit has more than one address, the primary address is used by default as the source address when packets originate from the interface and the destination address does not indicate the subnet. |
| <b>Default</b>                  | For unicast traffic, the primary address is the lowest non-127 preferred address on the unit.                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring the Interface Address on page 1059</li></ul>                                                                                                                                                                                                     |



## proxy-arp


|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | proxy-arp (restricted   unrestricted);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | For Ethernet interfaces only, configure the router or switch to respond to any ARP request, as long as the router or switch has an active route to the ARP request's target address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>                  | Proxy ARP is not enabled. The router or switch responds to an ARP request only if the destination IP address is its own.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <ul style="list-style-type: none"> <li>• <b>none</b>—The switch responds to any ARP request for a local or remote address if the switch has a route to the target IP address.</li> <li>• <b>restricted</b>—(Optional) The switch responds to ARP requests in which the physical networks of the source and target are different and does not respond if the source and target IP addresses are in the same subnet. The switch must also have a route to the target IP address.</li> <li>• <b>unrestricted</b>—(Optional) The switch responds to any ARP request for a local or remote address if the switch has a route to the target IP address.</li> </ul> |
|                                 | <b>Default:</b> unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Configuring Unrestricted Proxy ARP on page 1080</li> <li>• “Configuring Proxy ARP (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> <li>• “Example: Configuring Proxy ARP on a J-EX Series Switch” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> </ul>                                 |

## rpf-check

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|                                 |                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | rpf-check;                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6]                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>On J-EX4200 switches, enable a reverse-path forwarding (RPF) check on unicast traffic (except ECMP packets) on <i>all</i> ingress interfaces.</p> <p>On J-EX8200 switches, enable an RPF check on unicast traffic, including ECMP packets, on the selected ingress interface.</p>                                          |
| <b>Default</b>                  | Unicast RPF is disabled on all interfaces.                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Example: Configuring Unicast RPF on a J-EX Series Switch on page 1033</li><li>• Configuring Unicast RPF (CLI Procedure) on page 1089</li><li>• Disabling Unicast RPF (CLI Procedure) on page 1091</li><li>• Understanding Unicast RPF for J-EX Series Switches on page 1008</li></ul> |

## sfpplus

|                                 |                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>sfpplus {   pic-modemode; }</pre>                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic <i>pic-number</i> ]                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | <p>Configure the operating mode for the specified port on the SFP+ uplink module on the J-EX4200 switch.</p> <p>The remaining statement is explained separately.</p>                                                                                                                                                                                                                  |
| <b>Default</b>                  | By default, the SFP+ uplink module operates in the 10-gigabit mode and supports SFP+ transceivers.                                                                                                                                                                                                                                                                                    |
|                                 | <p> <b>NOTE:</b> The SFP+ uplink module provides two ports for 10-gigabit small form-factor pluggable (SFP+) transceivers when configured to operate in 10-gigabit mode or four ports for 1-gigabit small form-factor pluggable (SFP) transceivers when configured to operate in 1-gigabit mode.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 1093</li> </ul>                                                                                                                                                                                                                                                              |

## speed

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>speed (auto-negotiation   <i>speed</i>) ;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> ether-options]</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Configure the interface's speed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>                  | If the <b>auto-negotiation</b> statement at the <code>[edit interfaces <i>interface-name</i> ether-options]</code> hierarchy level is enabled, the <b>auto-negotiation</b> option is enabled by default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <ul style="list-style-type: none"><li>• <b>auto-negotiation</b>—Automatically negotiate the speed based on the speed of the other end of the link. This option is available only when the <b>auto-negotiation</b> statement at the <code>[edit interfaces <i>interface-name</i> ether-options]</code> hierarchy level is enabled.</li><li>• <b>speed</b>—Specify the interface speed. If the <b>auto-negotiation</b> statement at the <code>[edit interfaces <i>interface-name</i> ether-options]</code> hierarchy level is disabled, you must specify a specific value. This value sets the speed that is used on the link. If the <b>auto-negotiation</b> statement is enabled, you might want to configure a specific speed value to advertise the desired speed to the remote end.<ul style="list-style-type: none"><li>• <b>10m</b>—10 Mbps</li><li>• <b>100m</b>—100 Mbps</li><li>• <b>1g</b>—1 Gbps</li></ul></li></ul> |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li><li>• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045</li><li>• <i>Junos OS Network Interfaces Configuration Guide</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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## targeted-broadcast

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|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | targeted-broadcast;                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit interfacesge- <i>chassis/slot/port</i> unit <i>logical-unit-number</i> family inet]                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                    |
| <b>Description</b>              | Enable IP directed broadcast on a specified subnet.                                                                                                                                                                                                                                            |
| <b>Default</b>                  | IP directed broadcast is disabled.                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Example: Configuring IP Directed Broadcast on a J-EX Series Switch on page 1037</li><li>• Configuring IP Directed Broadcast (CLI Procedure) on page 1091</li><li>• Understanding IP Directed Broadcast for J-EX Series Switches on page 1012</li></ul> |

## traceoptions (Individual Interfaces)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> traceoptions {   file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;   flag <i>flag</i>;   match; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b> | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>         | <p>Define tracing operations for individual interfaces.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>The interfaces <b>traceoptions</b> statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system <b>syslog</b> file in the directory <b>/var/log</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>             | <p><b>file <i>name</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.<b>dcd</b>.</p> <p><b>match</b>—(Optional) Regular expression for lines to be traced.</p> <p><b>no-world-readable</b>—(Optional) Prevent any user from reading the log file.</p> <p><b>world-readable</b>—(Optional) Allow any user to read the log file.</p> <p><b>size <i>size</i></b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options.</p> <ul style="list-style-type: none"> <li>• <b>all</b>—All interface tracing operations</li> <li>• <b>event</b>—Interface events</li> <li>• <b>ipc</b>—Interface interprocess communication (IPC) messages</li> </ul> |

- **media**—Interface media changes
- **q921**—Trace ISDN Q.921 frames
- **q931**—Trace ISDN Q.931 frames

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation** • Tracing Operations of an Individual Router or Switch Interface on page 1092

## traceoptions (Interface Process)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {   file &lt;filename&gt; &lt;files number&gt; &lt;match regular-expression&gt; &lt;size size&gt; &lt;world-readable       no-world-readable&gt;;   flag flag &lt;disable&gt;;   no-remote-trace; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | [edit interfaces]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b> | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>         | Define tracing operations for the interface process (dcd).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>dcd</b>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>all</b></li> <li>• <b>change-events</b>—Log changes that produce configuration events</li> <li>• <b>config-states</b>—Log the configuration state machine changes</li> <li>• <b>kernel</b>—Log configuration IPC messages to kernel</li> <li>• <b>kernel-detail</b>—Log details of configuration messages to kernel</li> </ul> <p><b>no-world-readable</b>—(Optional) Disallow any user to read the log file.</p> <p><b>size size</b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed</p> |



**trace-file.0.** When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**Syntax:** **xk** to specify kilobytes, **xm** to specify megabytes, or **xg** to specify gigabytes

**Range:** 10 KB through the maximum file size supported on your router

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

**match regex**—(Optional) Refine the output to include only those lines that match the given regular expression.

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Tracing Operations of the Interface Process on page 1093</li> </ul>              |

## traps

|                                 |                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (traps   no-traps);                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                      |
| <b>Description</b>              | Enable or disable the sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Enabling or Disabling SNMP Notifications on Physical Interfaces on page 1080</li> <li>Enabling or Disabling SNMP Notifications on Logical Interfaces on page 1080</li> </ul>                                                                              |

## unit

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|                                 |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>unit <i>logical-unit-number</i> {<br/>    accounting-profile <i>name</i>;<br/>    bandwidth <i>rate</i>;<br/>    description <i>text</i>;<br/>    disable;<br/>    family <i>family-name</i> {...}<br/>    proxy-arp (restricted   unrestricted);<br/>    (traps   no-traps);<br/>    vlan-id <i>vlan-id-number</i>;<br/>}</pre>    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces interface-range <i>name</i> ]                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.                                                                                                                                                                                                      |
| <b>Options</b>                  | <b><i>logical-unit-number</i></b> —Number of the logical unit.<br><b>Range:</b> 0 through 16,384<br><br>The remaining statements are explained separately.                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</li><li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li><li>• J-EX Series Switches Interfaces Overview on page 999</li><li>• <i>Junos OS Network Interfaces Configuration Guide</i></li></ul> |

## vlan

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>vlan {   members [ (all   names   vlan-ids) ]; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family ethernet-switching]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Bind an 802.1Q VLAN tag ID to a logical interface.</p> <p>The remaining statement is explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <b>show ethernet-switching interfaces on page 1195</b></li> <li>• “Example: Setting Up Bridging with Multiple VLANs for J-EX Series Switches” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> <li>• “Configuring Routed VLAN Interfaces (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> <li>• “Understanding Bridging and VLANs on J-EX Series Switches” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |

## vlan-id

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|                            |                                                                             |
|----------------------------|-----------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>vlan-id <i>vlan-id-number</i>;</code>                                 |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]    |
| <b>Release Information</b> | Statement introduced before Junos OS Release 10.2 for J-EX Series switches. |
| <b>Description</b>         | Bind an 802.1Q VLAN tag ID to a logical interface.                          |



**NOTE:** The VLAN tag ID cannot be configured on logical interface unit 0. The logical unit number must be 1 or higher.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | <p><i>vlan-id-number</i>—A valid VLAN identifier.</p> <p><b>Range:</b> 1 through 4094</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">vlan-tagging on page 1177</a></li> <li>• <a href="#">Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026</a></li> <li>• <a href="#">Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 1042</a></li> <li>• <a href="#">Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 1045</a></li> <li>• <a href="#">Configuring a Layer 3 Subinterface (CLI Procedure) on page 1089</a></li> <li>• <a href="#">Junos OS Network Interfaces Configuration Guide</a></li> </ul> |

---

## vlan-tagging

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | vlan-tagging;                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>              | For Fast Ethernet and Gigabit Ethernet interfaces and aggregated Ethernet interfaces configured for VPLS, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface.                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• 802.1Q VLANs Overview on page 1013</li><li>• <b>vlan-id on page 1176</b></li><li>• Configuring a Layer 3 Subinterface (CLI Procedure) on page 1089</li><li>• Configuring Tagged Aggregated Ethernet Interfaces on page 1088</li><li>• Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 1026</li></ul> |



CHAPTER 56

# Operational Commands for Interfaces

## clear ipv6 neighbors

---

|                                 |                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear ipv6 neighbors<br><all   host <i>hostname</i> >                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                        |
| <b>Description</b>              | Clear IPv6 neighbor cache information.                                                                                                                                                                           |
| <b>Options</b>                  | none—Clear all IPv6 neighbor cache information.<br><br>all—(Optional) Clear all IPv6 neighbor cache information.<br><br>host <i>hostname</i> —(Optional) Clear the information for the specified IPv6 neighbors. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show ipv6 neighbors on page 1241</a></li></ul>                                                                                                               |
| <b>List of Sample Output</b>    | <a href="#">clear ipv6 neighbors on page 1180</a>                                                                                                                                                                |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                            |

### Sample Output

clear ipv6 neighbors    user@host> clear ipv6 neighbors



## monitor interface

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                 | monitor interface<br><interface-name   traffic <detail>>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>    | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>            | Display real-time statistics about interfaces, updating the statistics every second. Check for and display common interface failures, such as loopbacks detected and increases in framing errors.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                | <p>none—Display real-time statistics for all interfaces.</p> <p>interface-name—(Optional) Display real-time statistics for the specified interface.</p> <p>traffic—(Optional) Display traffic data for all active interfaces.</p> <p>detail—(Optional) With traffic option only, display detailed output.</p>                                                                                                                                                                                                                                                                       |
| <b>Additional Information</b> | The output of this command shows how much each field has changed since you started the command or since you cleared the counters by using the <code>c</code> key. For a description of the statistical information provided in the output of this command, see the <b>show interfaces extensive</b> command for a particular interface type in the <i>Junos OS Interfaces Command Reference</i> . To control the output of the <b>monitor interface interface-name</b> command while it is running, use the keys listed in Table 165 on page 1181. The keys are not case-sensitive. |

**Table 165: Output Control Keys for the monitor interface interface-name Command**

| Key      | Action                                                                                                                                                                                                                     |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c        | Clears (returns to zero) the delta counters since <b>monitor interface</b> was started. This does not clear the accumulative counter. To clear the accumulative counter, use the <b>clear interfaces interval</b> command. |
| f        | Freezes the display, halting the display of updated statistics and delta counters.                                                                                                                                         |
| i        | Displays information about a different interface. The command prompts you for the name of a specific interface.                                                                                                            |
| n        | Displays information about the next interface. The <b>monitor interface</b> command displays the physical or logical interfaces in the same order as the <b>show interfaces terse</b> command.                             |
| q or Esc | Quits the command and returns to the command prompt.                                                                                                                                                                       |
| t        | Thaws the display, resuming the update of the statistics and delta counters.                                                                                                                                               |

To control the output of the **monitor interface traffic** command while it is running, use the keys listed in Table 166 on page 1182. The keys are not case-sensitive.

**Table 166: Output Control Keys for the monitor interface traffic Command**

| Key      | Action                                                                                                               |
|----------|----------------------------------------------------------------------------------------------------------------------|
| b        | Displays the statistics in units of bytes and bytes per second (bps).                                                |
| c        | Clears (return to 0) the delta counters in the <b>Current Delta</b> column. The statistics counters are not cleared. |
| d        | Displays the <b>Current Delta</b> column (instead of the rate column) in bps or packets per second (pps).            |
| p        | Displays the statistics in units of packets and packets per second (pps).                                            |
| q or Esc | Quits the command and returns to the command prompt.                                                                 |
| r        | Displays the rate column (instead of the <b>Current Delta</b> column) in bps and pps.                                |

**Required Privilege Level** trace

**List of Sample Output** [monitor interface \(Physical\) on page 1183](#)  
[monitor interface \(OTN Interface\) on page 1185](#)  
[monitor interface \(Logical\) on page 1186](#)  
[monitor interface traffic on page 1186](#)  
[monitor interface traffic detail on page 1187](#)

**Output Fields** Table 167 on page 1182 describes the output fields for the **monitor interface** command. Output fields are listed in the approximate order in which they appear.

**Table 167: monitor interface Output Fields**

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                            | Level of Output |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>routerl</b>     | Hostname of the router.                                                                                                                                                                                                                                                                                                                      | All levels      |
| <b>Seconds</b>     | How long the monitor interface command has been running or how long since you last cleared the counters.                                                                                                                                                                                                                                     | All levels      |
| <b>Time</b>        | Current time (UTC).                                                                                                                                                                                                                                                                                                                          | All levels      |
| <b>Delay x/y/z</b> | Time difference between when the statistics were displayed and the actual clock time. <ul style="list-style-type: none"> <li>• x—Time taken for the last polling (in milliseconds).</li> <li>• y—Minimum time taken across all pollings (in milliseconds).</li> <li>• z—Maximum time taken across all pollings (in milliseconds).</li> </ul> | All levels      |
| <b>Interface</b>   | Short description of the interface, including its name, status, and encapsulation.                                                                                                                                                                                                                                                           | All levels      |
| <b>Link</b>        | State of the link: <b>Up</b> , <b>Down</b> , or <b>Test</b> .                                                                                                                                                                                                                                                                                | All levels      |

Table 167: monitor interface Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Current delta</b>      | Cumulative number for the counter in question since the time shown in the Seconds field, which is the time since you started the command or last cleared the counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels      |
| <b>Local Statistics</b>   | (Logical interfaces only) Number and rate of bytes and packets destined to the router or switch through the specified interface. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.: <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>             | All levels      |
| <b>Remote Statistics</b>  | (Logical interfaces only) Statistics for traffic transiting the router or switch. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.: <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                            | All levels      |
| <b>Traffic statistics</b> | Total number of bytes and packets received and transmitted on the interface. These statistics are the sum of the local and remote statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | All levels      |
| <b>Description</b>        | With the <b>traffic</b> option, displays the interface description configured at the [edit interfaces <i>interface-name</i> ] hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>   |

## Sample Output

```

monitor interface user@host> monitor interface so-0/0/0
(Physical) router1 Seconds: 19 Time: 15:46:29

Interface: so-0/0/0, Enabled, Link is Up
Encapsulation: PPP, Keepalives, Speed: 0C48
Traffic statistics:
  Input packets: 6045 (0 pps) Current Delta [11]
  Input bytes: 6290065 (0 bps) [13882]
  Output packets: 10376 (0 pps) [10]
  Output bytes: 10365540 (0 bps) [9418]
Encapsulation statistics:

```

```

Input keepalives:          1901          [2]
Output keepalives:        1901          [2]
NCP state: Opened
LCP state: Opened
Error statistics:
Input errors:              0           [0]
Input drops:               0           [0]
Input framing errors:     0           [0]
Policed discards:         0           [0]
L3 incompletes:           0           [0]
L2 channel errors:        0           [0]
L2 mismatch timeouts:     0           [0]
Carrier transitions:       1           [0]
Output errors:            0           [0]
Output drops:              0           [0]
Aged packets:             0           [0]
Active alarms : None
Active defects: None
SONET error counts/seconds:
LOS count                  1           [0]
LOF count                  1           [0]
SEF count                  1           [0]
ES-S                      0           [0]
SES-S                      0           [0]
SONET statistics:
BIP-B1                    458871      [0]
BIP-B2                    460072      [0]
REI-L                     465610      [0]
BIP-B3                    458978      [0]
REI-P                     458773      [0]

```

```

Received SONET overhead:
  F1      : 0x00  J0      : 0x00  K1      : 0x00
  K2      : 0x00  S1      : 0x00  C2      : 0x00
  C2(cmp) : 0x00  F2      : 0x00  Z3      : 0x00
  Z4      : 0x00  S1(cmp) : 0x00
Transmitted SONET overhead:
  F1      : 0x00  J0      : 0x01  K1      : 0x00
  K2      : 0x00  S1      : 0x00  C2      : 0xcf
  F2      : 0x00  Z3      : 0x00  Z4      : 0x00

```

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

**monitor interface  
(OTN Interface)**

```

user@host> monitor interface ge-7/0/0

Interface: ge-7/0/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 10000mbps
Traffic statistics:
  Input bytes:                0 (0 bps)
  Output bytes:               0 (0 bps)
  Input packets:              0 (0 pps)
  Output packets:             0 (0 pps)
Error statistics:
  Input errors:                0
  Input drops:                 0
  Input framing errors:        0
  Policed discards:           0
  L3 incompletes:              0
  L2 channel errors:           0
  L2 mismatch timeouts:       0
  Carrier transitions:         5
  Output errors:               0
  Output drops:                0
  Aged packets:                0
Active alarms : None
Active defects: None
Input MAC/Filter statistics:
  Unicast packets              0
  Broadcast packets            0
  Multicast packets            0
  Oversized frames             0
  Packet reject count          0
  DA rejects                   0
  SA rejects                   0
Output MAC/Filter Statistics:
  Unicast packets              0
  Broadcast packets            0
  Multicast packets            0
  Packet pad count             0
  Packet error count           0
OTN Link 0
  OTN Alarms: OTU_BDI, OTU_TTIM, ODU_BDI
  OTN Defects: OTU_BDI, OTU_TTIM, ODU_BDI, ODU_TTIM
  OTN OC - Seconds
    LOS                        2
    LOF                        9
  OTN OTU - FEC Statistics
    Corr err ratio              N/A
    Corr bytes                  0
    Uncorr words                0
  OTN OTU - Counters

```

```

BIP                0
BBE                0
ES                 0
SES                0
UAS                422
OTN ODU - Counters
BIP                0
BBE                0
ES                 0
SES                0
UAS                422
OTN ODU - Received Overhead  APSPCC 0-3:          0
    
```

```

monitor interface user@host> monitor interface so-1/0/0.0
(Logical)          host name                Seconds: 16                Time: 15:33:39
  Delay: 0/0/1

Interface: so-1/0/0.0, Enabled, Link is Down
Flags: Hardware-Down Point-To-Point SNMP-Traps
Encapsulation: PPP
Local statistics:
Input bytes:                0                Current delta [0]
Output bytes:               0                [0]
Input packets:              0                [0]
Output packets:             0                [0]
Remote statistics:
Input bytes:                0 (0 bps)           [0]
Output bytes:               0 (0 bps)           [0]
Input packets:              0 (0 pps)           [0]
Output packets:             0 (0 pps)           [0]
Traffic statistics:
Destination address: 192.168.8.193, Local: 192.168.8.21

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'
    
```

```

monitor interface user@host> monitor interface traffic
traffic           host name                Seconds: 15                Time: 12:31:09

Interface  Link  Input packets  (pps)  Output packets  (pps)
so-1/0/0   Down  0              (0)    0              (0)
so-1/1/0   Down  0              (0)    0              (0)
so-1/1/1   Down  0              (0)    0              (0)
so-1/1/2   Down  0              (0)    0              (0)
so-1/1/3   Down  0              (0)    0              (0)
t3-1/2/0   Down  0              (0)    0              (0)
t3-1/2/1   Down  0              (0)    0              (0)
t3-1/2/2   Down  0              (0)    0              (0)
t3-1/2/3   Down  0              (0)    0              (0)
so-2/0/0   Up    211035         (1)    36778          (0)
so-2/0/1   Up    192753         (1)    36782          (0)
so-2/0/2   Up    211020         (1)    36779          (0)
so-2/0/3   Up    211029         (1)    36776          (0)
so-2/1/0   Up    189378         (1)    36349          (0)
so-2/1/1   Down  0              (0)    18747          (0)
so-2/1/2   Down  0              (0)    16078          (0)
so-2/1/3   Up    0              (0)    80338          (0)
at-2/3/0   Up    0              (0)    0              (0)
at-2/3/1   Down  0              (0)    0              (0)
    
```

Bytes=b, Clear=c, Delta=d, Packets=p, Quit=q or ESC, Rate=r, Up=^U, Down=^D

```
monitor interface user@host> monitor interface traffic detail
traffic detail host name          Seconds: 15          Time: 12:31:09

Interface    Link  Input packets  (pps)  Output packets  (pps)  Description
-----
t1-0/1/1:0  Up    19769          (0)    0                (0)    To-OSAKA-1
...
Bytes=b, Clear=c, Delta=d, Packets=p, Quit=q or ESC, Rate=r, Up=^U, Down=^D
```

## request diagnostics tdr

---

**Syntax** request diagnostics tdr (abort | start) interface *interface-name*

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Start a time domain reflectometry (TDR) diagnostic test on the specified interface. This test characterizes and locates faults on twisted-pair Ethernet cables. For example, it can detect a broken twisted pair and provide the approximate distance to the break. It can also detect polarity swaps, pair swaps, and excessive skew.

The TDR test is supported on the following switches and interfaces:

- J-EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- J-EX8200 switches—Interfaces on the 48-port RJ-45 line card.



**NOTE:** We recommend running the TDR test when there is no traffic on the interface under test.

You view the results of the TDR test with the **show diagnostics tdr** command.

**Options** **abort**—Stop the TDR test currently in progress on the specified interface. No results are reported, and previous results, if any, are cleared.

**interface-name**—The name of the interface.

**start**—Start a TDR test on the specified interface.

**Required Privilege Level** maintenance

**Related Documentation**

- **show diagnostics tdr** on page 1190
- Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) on page 1106

**List of Sample Output** **request diagnostics tdr start interface ge-0/0/19** on page 1189

**Output Fields** Table 168 on page 1189 lists the output fields for the **request diagnostics tdr** command. Output fields are listed in the approximate order in which they appear.



Table 168: request diagnostics tdr Output Fields

| Field Name  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Status | <p>Information about the status of the TDR test request:</p> <ul style="list-style-type: none"> <li>• <b>Admin Down <i>interface-name</i></b>—The interface is administratively down. The TDR test cannot run on interfaces that are administratively down.</li> <li>• <b>Interface <i>interface-name</i> not found</b>—The interface does not exist.</li> <li>• <b>Test successfully executed <i>interface-name</i></b>—The test has successfully started on the interface. You can view the test results with the <b>show diagnostics tdr</b> command.</li> <li>• <b>VCT not supported on <i>interface-name</i></b>—The TDR test is not supported on the interface.</li> </ul> |

### Sample Output

```

request diagnostics tdr start interface ge-0/0/19
user@switch> request diagnostics tdr start interface ge-0/0/19
Interface TDR detail:
Test status                : Test successfully executed ge-0/0/19

```

## show diagnostics tdr

**Syntax** `show diagnostics tdr`  
`<interface interface-name>`

**Release Information** Command introduced before Junos OS Release 10.2 for J-EX Series switches.

**Description** Display the results of a time domain reflectometry (TDR) diagnostic test run on an interface. A TDR test characterizes and locates faults on twisted-pair Ethernet cables. For example, it can detect a broken twisted pair and provide the approximate distance to the break. It can also detect polarity swaps, pair swaps, and excessive skew.

The TDR test is supported on the following switches and interfaces:

- J-EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- J-EX8200 switches—Interfaces on the 48-port RJ-45 line card.

Use the **request diagnostics tdr** command to request a TDR test on a specified interface. Use the **show diagnostic tdr** command to display the last TDR test results for a specified interface or the last TDR test results for all network interfaces on the switch that support the TDR test.

**Options** `none`—Show summarized last results for all interfaces on the switch that support the TDR test.

**interface *interface-name***—Show detailed last results for the specified interface or a range of interfaces. Specify a range of interfaces by entering the beginning and ending interface in the range, separated by a dash—for example, **ge-0/0/15-ge-0/0/20**.

**Required Privilege Level** view

**Related Documentation**

- [request diagnostics tdr on page 1188](#)
- [Diagnosing a Faulty Twisted-Pair Cable \(CLI Procedure\) on page 1106](#)

**List of Sample Output**

- [show diagnostics tdr interface ge-0/0/19 \(Normal Cable\) on page 1192](#)
- [show diagnostics tdr interface ge-2/0/2 \(Faulty Cable\) on page 1193](#)
- [show diagnostics tdr \(All Supported Interfaces\) on page 1193](#)

**Output Fields** Table 169 on page 1190 lists the output fields for the **show diagnostics tdr** command. Output fields are listed in the approximate order in which they appear.

**Table 169: show diagnostics tdr Output Fields**

| Field Name                         | Field Description                                                |
|------------------------------------|------------------------------------------------------------------|
| <b>Interface name or Interface</b> | Name of interface for which TDR test results are being reported. |

Table 169: show diagnostics tdr Output Fields (*continued*)

| Field Name                                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test status</b>                              | <p>Status of TDR test:</p> <ul style="list-style-type: none"> <li>• <b>Aborted</b>—Test was terminated by operator before it was complete.</li> <li>• <b>Failed</b>—Test was not completed successfully.</li> <li>• <b>Interface <i>interface-name</i> not found</b>—Specified interface does not exist.</li> <li>• <b>Not Started</b>—No TDR test results are available for the interface.</li> <li>• <b>Passed</b>—Test completed successfully. The cable, however, might still have a fault—see the <b>Cable status</b> field for information on the cable.</li> <li>• <b>Started</b>—Test is currently running and not yet complete.</li> <li>• <b>VCT not supported on <i>interface-name</i></b>—TDR test is not supported on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                          |
| <b>Link status</b>                              | Operating status of link: <b>UP</b> or <b>Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>MDI pair</b>                                 | Twisted pair for which test results are being reported, identified by pin numbers. (Displayed only when the <b>interface</b> option is used.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Cable status</b>                             | <p>When detailed information is displayed, status for a twisted pair:</p> <ul style="list-style-type: none"> <li>• <b>Failed</b>—TDR test failed on the cable pair.</li> <li>• <b>Impedance Mismatch</b>—Impedance on the twisted pair is not correct. Possible reasons for an impedance mismatch include: <ul style="list-style-type: none"> <li>• The twisted pair is not connected properly.</li> <li>• The twisted pair is damaged.</li> <li>• The connector is faulty.</li> </ul> </li> <li>• <b>Normal</b>—No cable fault detected for the twisted pair.</li> <li>• <b>Open</b>—Lack of continuity between the pins at each end of the twisted-pair.</li> <li>• <b>Short on Pair-<i>n</i></b>—A short-circuit was detected on the twisted pair.</li> </ul> <p>When summary information for all interfaces is displayed, status for the cable as a whole:</p> <ul style="list-style-type: none"> <li>• <b>Fault</b>—A fault was detected on one or more of the twisted-pairs.</li> <li>• <b>OK</b>—No fault was detected on any of the twisted pairs.</li> </ul> |
| <b>Distance fault or<br/>Max distance fault</b> | <p>Distance to the fault in whole meters. If there is no fault, this value is 0.</p> <p>When summary information for all interfaces is displayed, this value is the distance to the most distant fault if there is more than one twisted pair with a fault.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 169: show diagnostics tdr Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Polarity swap</b> | <p>Indicates the polarity status of the twisted pair:</p> <ul style="list-style-type: none"> <li>• <b>Normal</b>—Polarity is normal. Each conductor in the twisted pair has been connected the same pins at the both ends of the connection. For example, a conductor connected to pin 1 at the near end of the connection is connected to pin 1 at the far end.</li> <li>• <b>Reversed</b>—Polarity has been reversed. For the twisted pair, the conductors have switched which pins they are connected to at the near and far ends of the connection. For example, the conductor connected to pin 1 at the near end is connected to pin 2 at the far end.</li> </ul> <p>(Not available on J-EX8200 switches.) (Displayed only when the <b>interface</b> option is used)</p> |
| <b>Skew time</b>     | <p>Difference in nanoseconds between the propagation delay on this twisted pair and the twisted pair with the shortest propagation delay. (Not available on J-EX8200 switches.) (Displayed only when the <b>interface</b> option is used.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Channel Pair</b>  | <p>Number of the 10/100BASE-T transmit/receive pair being reported on.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Pair Swap</b>     | <p>Indicates whether or not the twisted pairs are swapped:</p> <ul style="list-style-type: none"> <li>• <b>MDI</b>—The pairs are not swapped (straight-through cable).</li> <li>• <b>MDIX</b>—The pairs are swapped (cross-over cable).</li> </ul> <p>(Displayed only when the <b>interface</b> option is used.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Downshift</b>     | <p>Indicates whether the connection speed is being downshifted:</p> <ul style="list-style-type: none"> <li>• <b>No Downshift</b>—No downshifting of connection speed.</li> <li>• <b>Downshift occurs</b>—Connection speed is downshifted to 10 or 100 Mbs. This occurs if the cable is a two-pair cable rather than the four-pair cable required by Gigabit Ethernet.</li> </ul> <p>(Displayed only when the <b>interface</b> option is used.)</p>                                                                                                                                                                                                                                                                                                                            |

## Sample Output

```

show diagnostics tdr interface ge-0/0/19
interface ge-0/0/19
  (Normal Cable)
user@switch> show diagnostics tdr interface ge-0/0/19
Interface TDR detail:
Interface name      : ge-0/0/19
Test status        : Passed
Link status        : UP
MDI pair           : 1-2
  Cable status      : Normal
  Distance fault    : 0 Meters
  Polarity swap     : Normal
  Skew time         : 0 ns
MDI pair           : 3-6
  Cable status      : Normal
  Distance fault    : 0 Meters

```

```

Polartiy swap           : Normal
Skew time               : 8 ns
MDI pair                : 4-5
Cable status           : Normal
Distance fault         : 0 Meters
Polartiy swap           : Normal
Skew time               : 8 ns
MDI pair                : 7-8
Cable status           : Normal
Distance fault         : 0 Meters
Polartiy swap           : Normal
Skew time               : 8 ns
Channel pair           : 1
Pair swap               : MDI
Channel pair           : 2
Pair swap               : MDI
Downshift               : No Downshift

```

## Sample Output

```

user@switch> show diagnostics tdr interface ge-2/0/2
Interface TDR detail:
Interface name          : ge-2/0/2
Test status             : Passed
Link status             : Down
MDI Pair                : 1-2
  Cable status          : 1-2
  Distance fault        : 2 Meters
  Polartiy swap         : N/A
  Skew time             : N/A
MDI Pair                : 3-6
  Cable status          : Impedance Mismatch
  Distance fault        : 3 Meters
  Polartiy swap         : N/A
  Skew time             : N/A
MDI Pair                : 4-5
  Cable status          : Impedance Mismatch
  Distance fault        : 3 Meters
  Polartiy swap         : N/A
  Skew time             : N/A
MDI Pair                : 7-8
  Cable status          : Short on Pair-2
  Distance fault        : 3 Meters
  Polartiy swap         : N/A
  Skew time             : N/A
Channel pair           : 1
Pair swap               : N/A
Channel pair           : 2
Pair swap               : N/A
Downshift               : N/A

```

## Sample Output

```

user@switch> show diagnostics tdr
show diagnostics tdr
(All Supported Interfaces)

```

| Interface | Test status | Link status | Cable status | Max distance fault |
|-----------|-------------|-------------|--------------|--------------------|
| ge-0/0/0  | Not Started | N/A         | N/A          | N/A                |
| ge-0/0/1  | Not Started | N/A         | N/A          | N/A                |
| ge-0/0/2  | Started     | N/A         | N/A          | N/A                |
| ge-0/0/3  | Started     | N/A         | N/A          | N/A                |
| ge-0/0/4  | Passed      | UP          | OK           | 0                  |
| ge-0/0/5  | Passed      | UP          | Fault        | 173                |

|           |        |      |       |   |
|-----------|--------|------|-------|---|
| ge-0/0/6  | Passed | UP   | OK    | 0 |
| ge-0/0/7  | Passed | UP   | OK    | 0 |
| ge-0/0/8  | Passed | UP   | OK    | 0 |
| ge-0/0/9  | Passed | UP   | OK    | 0 |
| ge-0/0/10 | Passed | UP   | OK    | 0 |
| ge-0/0/11 | Passed | UP   | OK    | 0 |
| ge-0/0/12 | Passed | UP   | OK    | 0 |
| ge-0/0/13 | Passed | UP   | OK    | 0 |
| ge-0/0/14 | Passed | UP   | OK    | 0 |
| ge-0/0/15 | Passed | UP   | OK    | 0 |
| ge-0/0/16 | Passed | UP   | OK    | 0 |
| ge-0/0/17 | Passed | UP   | OK    | 0 |
| ge-0/0/18 | Passed | UP   | OK    | 0 |
| ge-0/0/19 | Passed | UP   | OK    | 0 |
| ge-0/0/20 | Passed | Down | Fault | 0 |
| ge-0/0/21 | Passed | Down | Fault | 5 |
| ge-0/0/22 | Passed | UP   | OK    | 0 |
| ge-0/0/23 | Passed | UP   | OK    | 0 |

## show ethernet-switching interfaces

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ethernet-switching interfaces<br><brief   detail   summary><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.<br>In Junos OS Release 11.1 for J-EX Series switches, the <b>detail</b> view was updated to include reflective relay information.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Display information about Ethernet switching interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | none—Display brief information for Ethernet switching interfaces.<br><br>brief   detail   summary—(Optional) Display the specified level of output.<br><br>interface <i>interface-name</i> —(Optional) Display Ethernet switching information for a specific interface.                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>show ethernet-switching mac-learning-log</li> <li>show ethernet-switching table</li> <li>“Configuring Autorecovery From the Disabled State on Secure or Storm Control Interfaces (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> </ul>                                                                                                                                                               |
| <b>List of Sample Output</b>    | <p>show ethernet-switching interfaces on page 1197</p> <p>show ethernet-switching interfaces ge-0/0/15 brief on page 1197</p> <p>show ethernet-switching interfaces ge-0/0/2 detail (Blocked by RTG rtggroup) on page 1197</p> <p>show ethernet-switching interfaces ge-0/0/15 detail (Blocked by STP) on page 1197</p> <p>show ethernet-switching interfaces ge-0/0/17 detail (Disabled by bpdu-control) on page 1198</p> <p>show ethernet-switching interfaces detail (C-VLAN to S-VLAN Mapping) on page 1198</p> <p>show ethernet-switching interfaces detail (reflective relay is configured) on page 1198</p> |
| <b>Output Fields</b>            | Table 170 on page 1195 lists the output fields for the <b>show ethernet-switching interfaces</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 170: show ethernet-switching interfaces Output Fields

| Field Name | Field Description                | Level of Output              |
|------------|----------------------------------|------------------------------|
| Interface  | Name of a switching interface.   | none, brief, detail, summary |
| Index      | VLAN index internal to Junos OS. | detail                       |

Table 170: show ethernet-switching interfaces Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output                      |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>State</b>                         | Interface state. Values are <b>up</b> and <b>down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | none, <b>brief</b> , <b>detail</b>   |
| <b>Port mode</b>                     | <b>Access mode</b> is the port mode default and works with a single VLAN. Port mode can also be <b>trunk</b> , which accepts tagged packets from multiple VLANs on other switches. The third port mode value is <b>tagged-access</b> which accepts tagged packets from access devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail</b>                        |
| <b>Reflective Relay Status</b>       | Reflective relay allows packets to use the same interface for both upstream and downstream traffic. When reflective relay has been configured, the status displayed is always <b>enabled</b> . When reflective relay is not configured, this entry does not appear in the command output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail</b>                        |
| <b>Ethertype for the interface</b>   | EtherType is a two-octet field in an Ethernet frame used to indicate which protocol is encapsulated in the payload of an incoming Ethernet packet. Both 802.1Q packets and Q in Q packets use this field. The output displayed for this particular field indicates the interface's ethertype which is used to match the ethertype of incoming 802.1Q packets and Q in Q packets. The indicated ethertype field is also added to the interface's outgoing 802.1Q and Q in Q packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail</b>                        |
| <b>VLAN membership</b>               | Names of VLANs that belong to this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | none, <b>brief</b> , <b>detail</b> , |
| <b>Tag</b>                           | Number of the 802.1Q-tag.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | none, <b>brief</b> , <b>detail</b> , |
| <b>Tagging</b>                       | Specifies whether the interface forwards 802.1Q <b>tagged</b> or <b>untagged</b> traffic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | none, <b>brief</b> , <b>detail</b> , |
| <b>Blocking</b>                      | The forwarding state of the interface: <ul style="list-style-type: none"> <li>• <b>unblocked</b>—Traffic is forwarded on the interface.</li> <li>• <b>blocked</b>—Traffic is not being forwarded on the interface.</li> <li>• <b>Disabled by bpd control</b>—The interface is disabled due to receiving BPDUs on a protected interface. If the <b>disable-timeout</b> statement has been included in the BPDU configuration, the interface automatically returns to service after the timer expires.</li> <li>• <b>blocked by RTG</b>—The specified redundant trunk group is disabled.</li> <li>• <b>blocked by STP</b>—The interface is disabled due to a spanning tree protocol error.</li> <li>• <b>MAC limit exceeded</b>—The interface is temporarily disabled due to a MAC limiting error. The disabled interface is automatically restored to service when the disable timeout expires.</li> <li>• <b>MAC move limit exceeded</b>—The interface is temporarily disabled due to a MAC move limiting error. The disabled interface is automatically restored to service when the disable timeout expires.</li> <li>• <b>Storm control in effect</b>—The interface is temporarily disabled due to a storm control error. The disabled interface is automatically restored to service when the disable timeout expires.</li> </ul> | none, <b>brief</b> , <b>detail</b> , |
| <b>Number of MACs learned on IFL</b> | Number of MAC addresses learned by this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>                        |



Table 170: show ethernet-switching interfaces Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| mapping    | <p>When mapping is configured, the status is one of the following C-VLAN to S-VLAN mapping types:</p> <ul style="list-style-type: none"> <li><b>dot1q-tunneled</b>—The interface maps all traffic to the S-VLAN (all-in-one bundling).</li> <li><b>native</b>—The interface maps untagged and priority tagged packets to the S-VLAN.</li> <li><b>push</b>—The interface maps packets to a firewall filter to an S-VLAN.</li> <li><b>policy-mapped</b>—The interface maps packets to a specifically defined S-VLAN.</li> <li><b>integer</b>—The interface maps packets to the specified S-VLAN.</li> </ul> <p>When mapping is not configured, this entry does not appear in the command output.</p> | detail          |

## Sample Output

```

show user@switch> show ethernet-switching interfaces
ethernet-switching
interfaces
      Interface   State  VLAN members      Tag  Tagging  Blocking
      ae0.0       up     default
      ge-0/0/2.0  up     vlan300           300  untagged blocked by RTG (rtggroup)
      ge-0/0/3.0  up     default           blocked by STP
      ge-0/0/4.0  down   default           MAC limit exceeded
      ge-0/0/5.0  down   default           MAC move limit exceeded
      ge-0/0/6.0  down   default           Storm control in effect
      ge-0/0/7.0  down   default           unblocked
      ge-0/0/13.0 up     default           untagged unblocked
      ge-0/0/14.0 up     vlan100           100  tagged  unblocked
      ge-0/0/14.0 up     vlan200           200  tagged  unblocked
      ge-0/0/15.0 up     vlan100           100  tagged  blocked by STP
      ge-0/0/15.0 up     vlan200           200  tagged  blocked by STP
      ge-0/0/16.0 down   default           untagged unblocked
      ge-0/0/17.0 down   vlan100           100  tagged  Disabled by bpdu-control
      ge-0/0/17.0 down   vlan200           200  tagged  Disabled by bpdu-control

show user@switch> show ethernet-switching interfaces ge-0/0/15 brief
ethernet-switching
interfaces ge-0/0/15
brief
      Interface  State  VLAN members      Tag  Tagging  Blocking
      ge-0/0/15.0 up     vlan100           100  tagged  blocked by STP
      ge-0/0/15.0 up     vlan200           200  tagged  blocked by STP

show user@switch> show ethernet-switching interfaces ge-0/0/2 detail
ethernet-switching
interfaces ge-0/0/2
detail (Blocked by RTG
rtggroup)
      Interface: ge-0/0/2.0, Index: 65, State: up, Port mode: Access
      VLAN membership:
      vlan300, 802.1Q Tag: 300, untagged, msti-id: 0, blocked by RTG(rtgroup)
      Number of MACs learned on IFL: 0

show user@switch> show ethernet-switching interfaces ge-0/0/15 detail
ethernet-switching

```

**interfaces ge-0/0/15**

**detail (Blocked by STP)**

Interface: ge-0/0/15.0, Index: 70, State: up, Port mode: Trunk  
 VLAN membership:  
   vlan100, 802.1Q Tag: 100, tagged, msti-id: 0, blocked by STP  
   vlan200, 802.1Q Tag: 200, tagged, msti-id: 0, blocked by STP  
 Number of MACs learned on IFL: 0

**show  
 ethernet-switching  
 interfaces ge-0/0/17  
 detail (Disabled by  
 bpdu-control)**

user@switch> **show ethernet-switching interfaces ge-0/0/17 detail**  
 Interface: ge-0/0/17.0, Index: 71, State: down, Port mode: Trunk  
 VLAN membership:  
   vlan100, 802.1Q Tag: 100, tagged, msti-id: 1, Disabled by bpdu-control  
   vlan200, 802.1Q Tag: 200, tagged, msti-id: 2, Disabled by bpdu-control  
 Number of MACs learned on IFL: 0

**show  
 ethernet-switching  
 interfaces detail  
 (C-VLAN to S-VLAN  
 Mapping)**

user@switch>**show ethernet-switching interfaces ge-0/0/6.0 detail**  
 Interface: ge-0/0/6.0, Index: 73, State: up, Port mode: Access  
 VLAN membership:  
   map, 802.1Q Tag: 134, Mapped Tag: native, push, dot1q-tunneled, unblocked  
   map, 802.1Q Tag: 134, Mapped Tag: 20, push, dot1q-tunneled, unblocked

**show  
 ethernet-switching  
 interfaces detail  
 (reflective relay is  
 configured)**

user@switch1> **show ethernet-switching interfaces ge-7/0/2 detail**  
 Interface: ge-7/0/2, Index: 66, State: down, Port mode: Tagged-access  
 Reflective Relay Status: Enabled  
 Ether type for the interface: 0x8100  
 VLAN membership:  
   VLAN\_Purple VLAN\_Orange VLAN\_Blue, 802.1Q Tag: 450, tagged, unblocked  
 Number of MACs learned on IFL: 0

## show interfaces diagnostics optics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces diagnostics optics <i>interface-name</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>Display diagnostics data and alarms for Gigabit Ethernet optical transceivers (SFP or SFP+) installed in J-EX Series switches. The information provided by this command is known as digital optical monitoring (DOM) information.</p> <p>Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transponder vendors. Generally, a high alarm or low alarm indicates that the optics module is not operating properly. This information can be used to diagnose why a transceiver is not working.</p> |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface associated with the port in which the transceiver is installed: <code>ge-<i>fpc/pic/port</i></code> or <code>xe-<i>fpc/pic/port</i></code> .                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Monitoring Interface Status and Traffic on page 1095</li> <li>For instructions for installing and removing a transceiver, see the Dell PowerConnect J-Series Ethernet Switch hardware guides at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a>.</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul>                                                                                                                                      |
| <b>List of Sample Output</b>    | <p><code>show interfaces diagnostics optics ge-0/1/0 (SFP Transceiver)</code> on page 1202</p> <p><code>show interfaces diagnostics optics xe-0/1/0 (SFP+ Transceiver)</code> on page 1202</p>                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | Table 171 on page 1199 lists the output fields for the <code>show interfaces diagnostics optics</code> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                       |

Table 171: show interfaces diagnostics optics Output Fields

| Field Name         | Field Description                                                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical interface | Displays the name of the physical interface.                                                                                                                       |
| Laser bias current | Displays the magnitude of the laser bias power setting current, in milliamperes. The laser bias provides direct modulation of laser diodes and modulates currents. |
| Laser output power | Displays the laser output power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).                                                                         |
| Module temperature | Displays the temperature, in Celsius and Fahrenheit.                                                                                                               |
| Module voltage     | Displays the voltage, in Volts.                                                                                                                                    |

Table 171: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                              | Field Description                                                                                             |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Receiver signal average optical power   | Displays the receiver signal average optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm). |
| Laser bias current high alarm           | Displays whether the laser bias power setting high alarm is <b>On</b> or <b>Off</b> .                         |
| Laser bias current low alarm            | Displays whether the laser bias power setting low alarm is <b>On</b> or <b>Off</b> .                          |
| Laser bias current high warning         | Displays whether the laser bias power setting high warning is <b>On</b> or <b>Off</b> .                       |
| Laser bias current low warning          | Displays whether the laser bias power setting low warning is <b>On</b> or <b>Off</b> .                        |
| Laser output power high alarm           | Displays whether the laser output power high alarm is <b>On</b> or <b>Off</b> .                               |
| Laser output power low alarm            | Displays whether the laser output power low alarm is <b>On</b> or <b>Off</b> .                                |
| Laser output power high warning         | Displays whether the laser output power high warning is <b>On</b> or <b>Off</b> .                             |
| Laser output power low warning          | Displays whether the laser output power low warning is <b>On</b> or <b>Off</b> .                              |
| Module temperature high alarm           | Displays whether the module temperature high alarm is <b>On</b> or <b>Off</b> .                               |
| Module temperature low alarm            | Displays whether the module temperature low alarm is <b>On</b> or <b>Off</b> .                                |
| Module temperature high warning         | Displays whether the module temperature high warning is <b>On</b> or <b>Off</b> .                             |
| Module temperature low warning          | Displays whether the module temperature low warning is <b>On</b> or <b>Off</b> .                              |
| Module voltage high alarm               | Displays whether the module voltage high alarm is <b>On</b> or <b>Off</b> .                                   |
| Module voltage low alarm                | Displays whether the module voltage low alarm is <b>On</b> or <b>Off</b> .                                    |
| Module voltage high warning             | Displays whether the module voltage high warning is <b>On</b> or <b>Off</b> .                                 |
| Module voltage low warning              | Displays whether the module voltage low warning is <b>On</b> or <b>Off</b> .                                  |
| Laser rx power high alarm               | Displays whether the receive laser power high alarm is <b>On</b> or <b>Off</b> .                              |
| Laser rx power low alarm                | Displays whether the receive laser power low alarm is <b>On</b> or <b>Off</b> .                               |
| Laser rx power high warning             | Displays whether the receive laser power high warning is <b>On</b> or <b>Off</b> .                            |
| Laser rx power low warning              | Displays whether the receive laser power low warning is <b>On</b> or <b>Off</b> .                             |
| Laser bias current high alarm threshold | Displays the vendor-specified threshold for the laser bias current high alarm.                                |

Table 171: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                   | Field Description                                                                             |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Tx laser fault alarm</b><br>(Not available for SFP and SFP+ transceivers) | Laser fault condition. Displays whether the Tx laser fault alarm is <b>On</b> or <b>Off</b> . |
| <b>Laser bias current low alarm threshold</b>                                | Displays the vendor-specified threshold for the laser bias current low alarm.                 |
| <b>Laser bias current high warning threshold</b>                             | Displays the vendor-specified threshold for the laser bias current high warning.              |
| <b>Laser bias current low warning threshold</b>                              | Displays the vendor-specified threshold for the laser bias current low warning.               |
| <b>Laser output power high alarm threshold</b>                               | Displays the vendor-specified threshold for the laser output power high alarm.                |
| <b>Laser output power low alarm threshold</b>                                | Displays the vendor-specified threshold for the laser output power low alarm.                 |
| <b>Laser output power high warning threshold</b>                             | Displays the vendor-specified threshold for the laser output power high warning.              |
| <b>Laser output power low warning threshold</b>                              | Displays the vendor-specified threshold for the laser output power low warning.               |
| <b>Module temperature high alarm threshold</b>                               | Displays the vendor-specified threshold for the module temperature high alarm.                |
| <b>Module temperature low alarm threshold</b>                                | Displays the vendor-specified threshold for the module temperature low alarm.                 |
| <b>Module temperature high warning threshold</b>                             | Displays the vendor-specified threshold for the module temperature high warning.              |
| <b>Module temperature low warning threshold</b>                              | Displays the vendor-specified threshold for the module temperature low warning.               |
| <b>Module voltage high alarm threshold</b>                                   | Displays the vendor-specified threshold for the module voltage high alarm.                    |
| <b>Module voltage low alarm threshold</b>                                    | Displays the vendor-specified threshold for the module voltage low alarm.                     |
| <b>Module voltage high warning threshold</b>                                 | Displays the vendor-specified threshold for the module voltage high warning.                  |
| <b>Module voltage low warning threshold</b>                                  | Displays the vendor-specified threshold for the module voltage low warning.                   |
| <b>Laser rx power high alarm threshold</b>                                   | Displays the vendor-specified threshold for the laser rx power high alarm.                    |
| <b>Laser rx power low alarm threshold</b>                                    | Displays the vendor-specified threshold for the laser rx power low alarm.                     |
| <b>Laser rx power high warning threshold</b>                                 | Displays the vendor-specified threshold for the laser rx power high warning.                  |
| <b>Laser rx power low warning threshold</b>                                  | Displays the vendor-specified threshold for the laser rx power low warning.                   |

## Sample Output

```

show interfaces      user@host> show interfaces diagnostics optics ge-0/1/0
diagnostics optics  Physical interface: ge-0/1/0
ge-0/1/0           Laser bias current           : 5.444 mA
(SFP Transceiver) Laser output power          : 0.3130 mW / -5.04 dBm
                    Module temperature       : 36 degrees C / 97 degrees F
                    Module voltage          : 3.2120 V
                    Receiver signal average optical power : 0.3840 mW / -4.16 dBm
                    Laser bias current high alarm      : Off
                    Laser bias current low alarm      : Off
                    Laser bias current high warning   : Off
                    Laser bias current low warning    : Off
                    Laser output power high alarm     : Off
                    Laser output power low alarm     : Off
                    Laser output power high warning   : Off
                    Laser output power low warning    : Off
                    Module temperature high alarm     : Off
                    Module temperature low alarm     : Off
                    Module temperature high warning   : Off
                    Module temperature low warning    : Off
                    Module voltage high alarm        : Off
                    Module voltage low alarm        : Off
                    Module voltage high warning      : Off
                    Module voltage low warning       : Off
                    Laser rx power high alarm        : Off
                    Laser rx power low alarm        : Off
                    Laser rx power high warning      : Off
                    Laser rx power low warning       : Off
                    Laser bias current high alarm threshold : 15.000 mA
                    Laser bias current low alarm threshold : 1.000 mA
                    Laser bias current high warning threshold : 12.000 mA
                    Laser bias current low warning threshold : 2.000 mA
                    Laser output power high alarm threshold : 0.6300 mW / -2.01 dBm
                    Laser output power low alarm threshold : 0.0660 mW / -11.80 dBm
                    Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
                    Laser output power low warning threshold : 0.0780 mW / -11.08 dBm
                    Module temperature high alarm threshold : 109 degrees C / 228 degrees F
                    Module temperature low alarm threshold : -29 degrees C / -20 degrees F
                    Module temperature high warning threshold : 103 degrees C / 217 degrees F
                    Module temperature low warning threshold : -13 degrees C / 9 degrees F
                    Module voltage high alarm threshold : 3.900 V
                    Module voltage low alarm threshold : 2.700 V
                    Module voltage high warning threshold : 3.700 V
                    Module voltage low warning threshold : 2.900 V
                    Laser rx power high alarm threshold : 1.2589 mW / 1.00 dBm
                    Laser rx power low alarm threshold : 0.0100 mW / -20.00 dBm
                    Laser rx power high warning threshold : 0.7939 mW / -1.00 dBm
                    Laser rx power low warning threshold : 0.0157 mW / -18.04 dBm

```

## Sample Output

```

show interfaces      user@host> show interfaces diagnostics optics xe-0/1/0
diagnostics optics  Physical interface: xe-0/1/0
xe-0/1/0           Laser bias current           : 4.968 mA
(SFP+ Transceiver) Laser output power          : 0.4940 mW / -3.06 dBm
                    Module temperature       : 27 degrees C / 81 degrees F
                    Module voltage          : 3.2310 V
                    Receiver signal average optical power : 0.0000
                    Laser bias current high alarm      : Off

```

```
Laser bias current low alarm           : Off
Laser bias current high warning        : Off
Laser bias current low warning         : Off
Laser output power high alarm          : Off
Laser output power low alarm          : Off
Laser output power high warning       : Off
Laser output power low warning        : Off
Module temperature high alarm          : Off
Module temperature low alarm          : Off
Module temperature high warning       : Off
Module temperature low warning        : Off
Module voltage high alarm              : Off
Module voltage low alarm               : Off
Module voltage high warning           : Off
Module voltage low warning             : Off
Laser rx power high alarm              : Off
Laser rx power low alarm               : On
Laser rx power high warning            : Off
Laser rx power low warning             : On
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold  : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold  : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold     : 3.630 V
Module voltage low alarm threshold      : 2.970 V
Module voltage high warning threshold   : 3.465 V
Module voltage low warning threshold    : 3.135 V
Laser rx power high alarm threshold     : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold      : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold   : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold    : 0.1023 mW / -9.90 dBm
```

## show interfaces ge-

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces ge-<i>fpc/pic/port</i></code><br><brief   detail   extensive   terse><br><descriptions><br><media><br><snmp-index <i>snmp-index</i> ><br><statistics>                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display status information about the specified Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><i>ge-fpc/pic/port</i>—Display standard information about the specified Gigabit Ethernet interface.</p> <p>brief   detail   extensive   terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>media—(Optional) Display media-specific information about network interfaces.</p> <p>snmp-index <i>snmp-index</i> —(Optional) Display information for the specified SNMP index of the interface.</p> <p>statistics—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Monitoring Interface Status and Traffic on page 1095</li> <li>Troubleshooting Network Interfaces on J-EX4200 Switches on page 1103</li> <li>Troubleshooting an Aggregated Ethernet Interface on page 1104</li> <li><i>Junos OS Network Interfaces Configuration Guide</i></li> </ul>                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>    | <p><code>show interfaces ge-0/0/0</code> on page 1211</p> <p><code>show interfaces ge-0/0/0 brief</code> on page 1211</p> <p><code>show interfaces ge-0/0/0 detail</code> on page 1211</p> <p><code>show interfaces ge-0/0/4 extensive</code> on page 1212</p>                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 172 on page 1204 lists the output fields for the <code>show interfaces ge-</code> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                               |

Table 172: show interfaces ge- Output Fields

| Field Name                | Field Description               | Level of Output |
|---------------------------|---------------------------------|-----------------|
| <b>Physical Interface</b> |                                 |                 |
| Physical interface        | Name of the physical interface. | All levels      |



Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                     | Level of Output               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Enabled</b>          | State of the interface: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                           | All levels                    |
| <b>Interface index</b>  | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                   | <b>detail extensive none</b>  |
| <b>SNMP ifIndex</b>     | SNMP index number for the physical interface.                                                                                                                                                                         | <b>detail extensive none</b>  |
| <b>Generation</b>       | Unique number for use by Dell technical support only.                                                                                                                                                                 | <b>detail extensive</b>       |
| <b>Description</b>      | Optional user-specified description.                                                                                                                                                                                  | <b>brief detail extensive</b> |
| <b>Link-level type</b>  | Encapsulation being used on the physical interface.                                                                                                                                                                   | All levels                    |
| <b>MTU</b>              | Maximum transmission unit size on the physical interface. Default is 1514.                                                                                                                                            | All levels                    |
| <b>Speed</b>            | Speed of the interface: <b>Auto</b> if autonegotiation of speed is enabled; speed in megabits per second if the interface speed is explicitly configured.                                                             | All levels                    |
| <b>Duplex</b>           | Link mode of interface: <b>Auto</b> if autonegotiation of link mode is enabled; <b>Full-Duplex</b> or <b>Half-Duplex</b> if the link mode is explicitly configured.                                                   | All levels                    |
| <b>Loopback</b>         | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                                                                        | All levels                    |
| <b>Source filtering</b> | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                          | All levels                    |
| <b>Flow control</b>     | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                              | All levels                    |
| <b>Auto-negotiation</b> | Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                           | All levels                    |
| <b>Remote-fault</b>     | Remote fault status: <ul style="list-style-type: none"> <li>• <b>Online</b>—Autonegotiation is manually configured as online.</li> <li>• <b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul> | All levels                    |
| <b>Device flags</b>     | Information about the physical device.                                                                                                                                                                                | All levels                    |
| <b>Interface flags</b>  | Information about the interface.                                                                                                                                                                                      | All levels                    |
| <b>Link flags</b>       | Information about the link.                                                                                                                                                                                           | All levels                    |
| <b>CoS queues</b>       | Number of CoS queues configured.                                                                                                                                                                                      | <b>detail extensive none</b>  |
| <b>Hold-times</b>       | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                   | <b>detail extensive</b>       |
| <b>Current address</b>  | Configured MAC address.                                                                                                                                                                                               | <b>detail extensive none</b>  |
| <b>Hardware address</b> | MAC address of the hardware.                                                                                                                                                                                          | <b>detail extensive none</b>  |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p><b>NOTE:</b> The bandwidth bps counter is not enabled on the switch.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 sanity checks of the headers. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                    | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the switch interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Egress queues</b>                    | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Queue counters (Egress )</b>         | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Active alarms and Active defects</b> | <p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the switch configuration, an alarm can ring the red or yellow alarm bell on the switch or turn on the red or yellow alarm LED on the front of the switch. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>MAC statistics</b>    | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type.</li> <li>• <b>Unicast packets, Broadcast packets, and Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of frames that exceed 1518 octets.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate “Data reception error” or “invalid data symbol error.”</li> </ul> | <b>extensive</b> |
| <b>Filter Statistics</b> | Receive and Transmit statistics reported by the PIC's MAC address filter subsystem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b> |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information            | <p>Information about link autonegotiation:</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Complete</b>—The autonegotiation process between the local and remote Ethernet interfaces was successful.</li> <li>• <b>Incomplete</b>—Remote Ethernet interface has the speed or link mode configured or does not perform autonegotiation.</li> <li>• <b>No autonegotiation</b>—Local Ethernet interface has autonegotiation disabled and the link mode and speed are manually configured.</li> </ul> </li> <li>• <b>Link partner</b>—Information from the link partner: <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>. If the link mode of the remote device cannot be determined, value is <b>Unknown</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports <b>PAUSE</b> on both receive and transmit or <b>PAUSE</b> only on receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> <li>• <b>Link partner speed</b>—Speed of the link partner.</li> </ul> </li> <li>• <b>Local resolution</b>—Resolution of the autonegotiation process on the local interface: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Type of flow control that is used by local interface. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports <b>PAUSE</b> on both receive and transmit or <b>PAUSE</b> only on receive).</li> <li>• <b>Link mode</b>—Link mode of local interface: either <b>Full-duplex</b> or <b>Half-duplex</b>. Displayed when <b>Negotiation status</b> is <b>Incomplete</b>.</li> <li>• <b>Local link speed</b>—Speed of the local interface. Displayed when <b>Negotiation status</b> is <b>Incomplete</b>.</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul> <p><b>NOTE:</b> On standalone J-EX4200 or standalone J-EX4500 switches, the FPC slot number refers to the switch itself and is always 0. On a J-EX4200 Virtual Chassis or J-EX4500 Virtual Chassis, the FPC slot number refers to the member ID. On a standalone J-EX8200 switch, the FPC slot number refers to the line card slot number on the switch.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | extensive       |
| <b>Logical Interface</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |
| Logical interface                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels      |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output              |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Index</b>                   | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>            | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Generation</b>              | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Flags</b>                   | Information about the logical interface.                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Protocol</b>                | Protocol family.                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>IPv6 transit statistics</b> | If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface.                                                                                                                                                                                                                                                                                           | <b>extensive</b>             |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to and from the switch.                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b>             |
| <b>Transit statistics</b>      | Number and rate of bytes and packets transiting the switch.                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>             |
| <b>Generation</b>              | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Route Table</b>             | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Input Filters</b>           | Names of any input filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Output Filters</b>          | Names of any output filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Flags</b>                   | Information about protocol family flags.<br><br>If unicast reverse-path forwarding (RPF) is explicitly configured on the specified interface, the uRPF flag is displayed. If unicast RPF was configured on a different interface (and therefore is enabled on all switch interfaces) but was not explicitly configured on the specified interface, the uRPF flag is not displayed even though unicast RPF is enabled. | <b>detail extensive</b>      |
| <b><i>protocol-family</i></b>  | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                              | <b>brief</b>                 |
| <b>Flags</b>                   | Information about the address flags.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Destination</b>             | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Local</b>                   | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Broadcast</b>               | Broadcast address of the logical interlace.                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |

Table 172: show interfaces ge- Output Fields (*continued*)

| Field Name | Field Description                                     | Level of Output  |
|------------|-------------------------------------------------------|------------------|
| Generation | Unique number for use by Dell technical support only. | detail extensive |

## Sample Output

```

show interfaces ge-0/0/0 user@switch> show interfaces ge-0/0/0
Physical interface: ge-0/0/0, Enabled, Physical link is Down
Interface index: 129, SNMP ifIndex: 21
Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled
Remote fault: Online
Device flags : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:19:e2:50:3f:41, Hardware address: 00:19:e2:50:3f:41
Last flapped : 2008-01-16 11:40:53 UTC (4d 02:30 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
Ingress rate at Packet Forwarding Engine : 0 bps (0 pps)
Ingress drop rate at Packet Forwarding Engine : 0 bps (0 pps)
Active alarms : None
Active defects : None

Logical interface ge-0/0/0.0 (Index 65) (SNMP ifIndex 22)
Flags: SNMP-Traps
Encapsulation: ENET2
Input packets : 0
Output packets: 0
Protocol eth-switch
Flags: None

show interfaces ge-0/0/0 brief user@switch> show interfaces ge-0/0/0 brief
Physical interface: ge-0/0/0, Enabled, Physical link is Down
Description: voice priority and tcp and icmp traffic rate-limiting filter at i
ngress port
Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Link flags : None

Logical interface ge-0/0/0.0
Flags: Device-Down SNMP-Traps Encapsulation: ENET2
eth-switch

show interfaces ge-0/0/0 detail user@switch> show interfaces ge-0/0/0 detail
Physical interface: ge-0/0/0, Enabled, Physical link is Up
Interface index: 193, SNMP ifIndex: 206, Generation: 196
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0

```

```

Link flags      : None
CoS queues     : 8 supported, 8 maximum usable queues
Hold-times    : Up 0 ms, Down 0 ms
Current address: 00:1f:12:30:ff:40, Hardware address: 00:1f:12:30:ff:40
Last flapped  : 2009-05-05 06:03:05 UTC (00:22:13 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   :                0                0 bps
Output bytes  :                0                0 bps
Input packets:                0                0 pps
Output packets:              0                0 pps
IPv6 transit statistics:
Input bytes   :                0
Output bytes  :                0
Input packets:                0
Output packets:              0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets  Dropped packets

  0 best-effort                0                0                0
  1 assured-forw              0                0                0
  5 expedited-fo              0                0                0
  7 network-cont              0                0                0

Active alarms : None
Active defects: None
    
```

```

Logical interface ge-0/0/0.0 (Index 65) (SNMP ifIndex 235) (Generation 130)
Flags: SNMP-Traps Encapsulation: ENET2
Bandwidth: 0
Traffic statistics:
Input bytes   :                0
Output bytes  :                0
Input packets:                0
Output packets:              0
Local statistics:
Input bytes   :                0
Output bytes  :                0
Input packets:                0
Output packets:              0
Transit statistics:
Input bytes   :                0                0 bps
Output bytes  :                0                0 bps
Input packets:                0                0 pps
Output packets:              0                0 pps
Protocol eth-switch, Generation: 146, Route table: 0
Flags: Is-Primary
Input Filters: f1,
Output Filters: f2,,,
    
```

**show interfaces  
ge-0/0/4 extensive**

```

user@switch> show interfaces ge-0/0/4 extensive
Physical interface: ge-0/0/4, Enabled, Physical link is Up
Interface index: 165, SNMP ifIndex: 152, Generation: 168
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Enabled, Auto-negotiation: Enabled, Remote fault: Online
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x0
    
```



```

Link flags      : None
CoS queues     : 8 supported, 8 maximum usable queues
Hold-times    : Up 0 ms, Down 0 ms
Current address: 00:1f:12:33:65:44, Hardware address: 00:1f:12:33:65:44
Last flapped  : 2008-09-17 11:02:25 UTC (16:32:54 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   :                0                0 bps
Output bytes  :            2989761            984 bps
Input packets :                0                0 pps
Output packets:            24307                1 pps
IPv6 transit statistics:
Input bytes   :                0
Output bytes  :                0
Input packets :                0
Output packets:                0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 best-effort                0                0                0
1 assured-forw                0                0                0
5 expedited-fo                0                0                0
7 network-cont                0                24307            0

Active alarms : None
Active defects : None
MAC statistics:
Total octets      Receive      Transmit
Total packets    0            2989761
Unicast packets  0            0
Broadcast packets 0            0
Multicast packets 0            24307
CRC/Align errors 0            0
FIFO errors      0            0
MAC control frames 0            0
MAC pause frames 0            0
Oversized frames 0
Jabber frames    0
Fragment frames  0
Code violations  0
Autonegotiation information:
Negotiation status: Complete
Link partner:
Link mode: Full-duplex, Flow control: None, Remote fault: OK,
Link partner Speed: 1000 Mbps
Local resolution:
Flow control: None, Remote fault: Link OK
Packet Forwarding Engine configuration:
Destination slot: 0
Direction : Output

```

| CoS transmit queue<br>Limit | Bandwidth |           | Buffer Priority |      |     |
|-----------------------------|-----------|-----------|-----------------|------|-----|
|                             | %         | bps       | %               | usec |     |
| 0 best-effort<br>none       | 95        | 950000000 | 95              | NA   | low |
| 7 network-control<br>none   | 5         | 50000000  | 5               | NA   | low |

Logical interface ge-0/0/4.0 (Index 82) (SNMP ifIndex 184) (Generation 147)

Flags: SNMP-Traps Encapsulation: ENET2

Traffic statistics:

Input bytes : 0  
 Output bytes : 4107883  
 Input packets: 0  
 Output packets: 24307

IPv6 transit statistics:

Input bytes : 0  
 Output bytes : 0  
 Input packets: 0  
 Output packets: 0

Local statistics:

Input bytes : 0  
 Output bytes : 4107883  
 Input packets: 0  
 Output packets: 24307

Transit statistics:

Input bytes : 0 0 bps  
 Output bytes : 0 0 bps  
 Input packets: 0 0 pps  
 Output packets: 0 0 pps

IPv6 transit statistics:

Input bytes : 0  
 Output bytes : 0  
 Input packets: 0  
 Output packets: 0

Protocol eth-switch, Generation: 159, Route table: 0

Flags: None

Input Filters: f2,

Output Filters: f1,,,

## show interfaces me0

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show interfaces me0<br><brief   detail   extensive   terse><br><descriptions><br><media><br><routing-instance><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display status information about the management Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p>none—Display standard information about the management Ethernet interface.</p> <p>brief   detail   extensive   terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>media—(Optional) Display media-specific information about network interfaces.</p> <p>routing-instance—(Optional) Display the name of the routing instance.</p> <p>statistics—(Optional) Display static interface statistics.</p>                                                                                                                    |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• “Example: Configuring a Firewall Filter on a Management Interface on a J-EX Series Switch” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> <li>• “Configuring Firewall Filters (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li> </ul> |
| <b>List of Sample Output</b>    | <p>show interfaces me0 on page 1219</p> <p>show interfaces me0 brief on page 1219</p> <p>show interfaces me0 detail on page 1220</p> <p>show interfaces me0 extensive on page 1220</p>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>            | Table 173 on page 1215 lists the output fields for the <b>show interfaces me0</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table 173: show interfaces me0 Output Fields**

| Field Name         | Field Description               | Level of Output |
|--------------------|---------------------------------|-----------------|
| Physical Interface |                                 |                 |
| Physical interface | Name of the physical interface. | All levels      |

Table 173: show interfaces me0 Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                   | Level of Output               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Enabled</b>                | State of the interface: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                         | All levels                    |
| <b>Interface index</b>        | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                                                                 | <b>detail extensive none</b>  |
| <b>SNMP ifIndex</b>           | SNMP index number for the physical interface.                                                                                                                                                                                                                       | <b>detail extensive none</b>  |
| <b>Generation</b>             | Unique number for use by Dell technical support only.                                                                                                                                                                                                               | <b>detail extensive</b>       |
| <b>Description</b>            | Optional user-specified description.                                                                                                                                                                                                                                | <b>brief detail extensive</b> |
| <b>Type</b>                   | Information about the type of functional interface.                                                                                                                                                                                                                 | All levels                    |
| <b>Link-level type</b>        | Encapsulation being used on the physical interface.                                                                                                                                                                                                                 | All levels                    |
| <b>MTU</b>                    | Maximum transmission unit size on the physical interface. The default is 1514.                                                                                                                                                                                      | All levels                    |
| <b>Clocking</b>               | Interface that acts as a clock source. This field is not supported on J-EX Series switches and the default value is always <b>Unspecified</b> .                                                                                                                     | <b>detail extensive</b>       |
| <b>Speed</b>                  | Speed at which the interface is running.                                                                                                                                                                                                                            | All levels                    |
| <b>Device flags</b>           | Information about the physical device.                                                                                                                                                                                                                              | All levels                    |
| <b>Interface flags</b>        | Information about the interface.                                                                                                                                                                                                                                    | All levels                    |
| <b>Link type</b>              | Information about whether the link is duplex and whether the negotiation is manual or automatic.                                                                                                                                                                    | <b>detail extensive none</b>  |
| <b>Physical info</b>          | Information about the device dependent physical interface selector. This field is applied only when a clocking option is specified. This field is not supported on J-EX Series switches and the default value is always <b>Unspecified</b> .                        | <b>detail extensive</b>       |
| <b>Hold-times</b>             | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                 | <b>detail extensive</b>       |
| <b>Current address</b>        | Configured MAC address.                                                                                                                                                                                                                                             | <b>detail extensive none</b>  |
| <b>Hardware address</b>       | MAC address of the hardware.                                                                                                                                                                                                                                        | <b>detail extensive none</b>  |
| <b>Alternate link address</b> | Information about alternate hardware address.                                                                                                                                                                                                                       | <b>detail extensive</b>       |
| <b>Last flapped</b>           | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (weeksw:daysdhour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3w:3d 22:58 ago)</b> . | <b>detail extensive none</b>  |

Table 173: show interfaces me0 Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Statistics last cleared</b> | Time when the statistics for the interface was last set to zero. The format is <b>Last flapped: year-month-day hour:minute:second timezone (weeksw:daysdhour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3w:3d 22:58 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received and transmitted on the physical interface.<br><br>Following are fields in <b>Traffic statistics</b> : <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>IPv6 transit statistics</b> | Number and rate of bytes and IPv6 packets received and transmitted on the physical interface.<br><br>Following are fields in <b>IPv6 transit statistics</b> : <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Input errors</b>            | Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and frame checksum (FCS) errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid FCS.</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of packets that exceed the size for the medium. For example, if the medium is Ethernet, the <b>Giant</b> field shows the count of packets with size greater than 1518 bytes.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 173: show interfaces me0 Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output              |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>           | Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly. It increases only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increment quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
| <b>Logical interface</b>       | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Index</b>                   | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>            | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Generation</b>              | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Flags</b>                   | Information about the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>IPv6 transit statistics</b> | If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to and exiting from the switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>             |
| <b>Protocol</b>                | Protocol family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Generation</b>              | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Route Table</b>             | Routing table in which the logical interface address is located. For example, 0 refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Flags</b>                   | Information about protocol family flags.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Input Filter</b>            | Ingress filter name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>extensive</b>             |
| <b>Output Filter</b>           | Egress filter name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>             |

Table 173: show interfaces me0 Output Fields (*continued*)

| Field Name  | Field Description                                     | Level of Output       |
|-------------|-------------------------------------------------------|-----------------------|
| Addresses   | Information about the management interface addresses. | detail extensive none |
| Flags       | Information about the address flags.                  | detail extensive none |
| Destination | IP address of the remote side of the connection.      | detail extensive none |
| Local       | IP address of the logical interface.                  | detail extensive none |
| Broadcast   | Broadcast address of the logical interface.           | detail extensive none |
| Generation  | Unique number for use by Dell technical support only. | detail extensive      |

## Sample Output

```

show interfaces me0 user@switch> show interfaces me0
Physical interface: me0, Enabled, Physical link is Up
Interface index: 1, SNMP ifIndex: 33
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Current address: 00:1f:12:35:3c:bf, Hardware address: 00:1f:12:35:3c:bf
Last flapped : 2010-07-31 23:45:50 PDT (5d 00:32 ago)
Input packets : 1661830
Output packets: 3200

Logical interface me0.0 (Index 3) (SNMP ifIndex 34)
Flags: SNMP-Traps Encapsulation: ENET2
Input packets : 1661830
Output packets: 3200
Protocol inet
Flags: Is-Primary
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.204.32/20, Local: 10.204.33.103,
Broadcast: 10.204.47.255
Protocol inet6
Flags: Is-Primary
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::21f:12ff:fe35:3cbf

show interfaces me0 user@switch> show interfaces me0 brief
brief Physical interface: me0, Enabled, Physical link is Up
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
Speed: 1000mbps
Device flags : Present Running
Interface flags: SNMP-Traps

Logical interface me0.0
Flags: SNMP-Traps Encapsulation: ENET2
inet 10.204.33.103/20

```

```
inet6 fe80::21f:12ff:fe35:3cbf/64
```

**show interfaces me0  
detail**

```
user@switch> show interfaces me0 detail
Physical interface: me0, Enabled, Physical link is Up
  Interface index: 1, SNMP ifIndex: 33, Generation: 1
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
  Speed: 1000mbps
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Physical info  : Unspecified
  Hold-times    : Up 0 ms, Down 0 ms
  Current address: 00:1f:12:35:3c:bf, Hardware address: 00:1f:12:35:3c:bf
  Alternate link address: Unspecified
  Last flapped  : 2010-07-31 23:45:50 PDT (5d 00:37 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :          366663167
    Output bytes  :           498590
    Input packets :          1664031
    Output packets:           3259
  IPv6 transit statistics:
    Input bytes   :              0
    Output bytes  :              0
    Input packets :              0
    Output packets:              0

Logical interface me0.0 (Index 3) (SNMP ifIndex 34) (Generation 1)
  Flags: SNMP-Traps Encapsulation: ENET2
  Traffic statistics:
    Input bytes   :          366665637
    Output bytes  :           500569
    Input packets :          1664048
    Output packets:           3275
  IPv6 transit statistics:
    Input bytes   :              0
    Output bytes  :              0
    Input packets :              0
    Output packets:              0
  Local statistics:
    Input bytes   :          366665637
    Output bytes  :           500569
    Input packets :          1664048
    Output packets:           3275
  Protocol inet, Generation: 1, Route table: 0
    Flags: Is-Primary
    Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.204.32/20, Local: 10.204.33.103, Broadcast: 10.204.47.255,
  Generation: 1
  Protocol inet6, Generation: 2, Route table: 0
    Flags: Is-Primary
    Addresses, Flags: Is-Preferred
    Destination: fe80::/64, Local: fe80::21f:12ff:fe35:3cbf
  Generation: 2
```

**show interfaces me0  
extensive**

```
user@switch> show interfaces me0 extensive
Physical interface: me0, Enabled, Physical link is Up
  Interface index: 1, SNMP ifIndex: 33, Generation: 1
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
  Speed: 100mbps
```



```
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1f:12:38:58:bf, Hardware address: 00:1f:12:38:58:bf
Alternate link address: Unspecified
Last flapped : 2010-08-15 06:27:33 UTC (03:06:22 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0

Logical interface me0.0 (Index 3) (SNMP ifIndex 34) (Generation 1)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
Local statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
Protocol inet, Generation: 1, Route table: 0
Flags: Is-Primary
Input Filters: mgmt_filter,
Addresses, Flags: Is-Default Is-Preferred Is-Primary
Destination: 10.204.96/20, Local: 10.204.96.234,
Broadcast: 10.204.111.255, Generation: 1
```

## show interfaces queue

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces queue &lt;both-ingress-egress&gt; &lt;egress&gt; &lt;forwarding-class forwarding-class&gt; &lt;ingress&gt; &lt;interface-name interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display class-of-service (CoS) queue information for physical interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p>none—Show detailed CoS queue statistics for all physical interfaces.</p> <p>both-ingress-egress—(Optional) Show both ingress and egress queue statistics. (Ingress statistics are not available for all interfaces.)</p> <p>egress—(Optional) Show egress queue statistics only.</p> <p>forwarding-class <i>forwarding-class</i>—(Optional) Show queue statistics only for the specified forwarding class.</p> <p>ingress—(Optional) Show ingress queue statistics only. (Ingress statistics are not available for all interfaces.)</p> <p>interface-name <i>interface-name</i>—(Optional) Show queue statistics for the specified interface.</p>                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• Monitoring Interface Status and Traffic on page 1095</li><li>• “Monitoring Interfaces That Have CoS Components” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li><li>• “Defining CoS Schedulers (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li><li>• “Configuring CoS Traffic Classification for Ingress Queuing on 40-port SFP+ Line Cards (CLI Procedure)” in the <i>Dell PowerConnect J-Series Ethernet Switch Complete Software Guide for Junos OS: Volume 2</i> at <a href="http://www.support.dell.com/manuals">http://www.support.dell.com/manuals</a></li></ul> |
| <b>List of Sample Output</b>    | <p><code>show interfaces queue ge-0/0/0</code> on page 1224</p> <p><code>show interfaces queue xe-6/0/39 (40-port SFP+ Line Card in a J-EX8200 Switch)</code> on page 1225</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>            | Table 174 on page 1223 lists the output fields for the <code>show interfaces queue</code> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 174: show interfaces queue Output Fields

| Field Name                                                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Physical Interface and Forwarding Class Information</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Physical interface                                               | Name of the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Enabled                                                          | State of the interface. Possible values are: <ul style="list-style-type: none"> <li>• <b>Administratively down, Physical link is Down</b>—The interface is turned off, and the physical link is inoperable.</li> <li>• <b>Administratively down, Physical link is Up</b>—The interface is turned off, but the physical link is operational and can pass packets when it is enabled.</li> <li>• <b>Enabled, Physical link is Down</b>—The interface is turned on, but the physical link is inoperable and cannot pass packets.</li> <li>• <b>Enabled, Physical link is Up</b>—The interface is turned on, and the physical link is operational and can pass packets.</li> </ul> |
| Interface index                                                  | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| SNMP ifIndex                                                     | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description                                                      | User-configured interface description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Forwarding classes                                               | Number of forwarding classes supported and in use for the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Ingress Queues Information (not shown for all interfaces)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Ingress queues                                                   | Number of input queues supported and in use on the specified interface. For an interface on an oversubscribed line card such as the 40-port SFP+ line card, the ingress queue handles low priority traffic on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Transmitted                                                      | Transmission statistics for the queue: <ul style="list-style-type: none"> <li>• <b>Packets</b>—Number of packets transmitted by this queue.</li> <li>• <b>Bytes</b>—Number of bytes transmitted by this queue.</li> <li>• <b>Tail-dropped packets</b>—Number of packets dropped because the queue buffers were full.</li> </ul>                                                                                                                                                                                                                                                                                                                                                |
| PFE chassis queues                                               | For an interface on an oversubscribed line card such as the 40-port SFP+ line card, the number of Packet Forwarding Engine chassis queues supported and in use for the port group to which the interface belongs. The Packet Forwarding Engine chassis queue for a port group handles high priority traffic from all the interfaces in the port group.                                                                                                                                                                                                                                                                                                                         |
| <b>Egress Queues Information</b>                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Egress queues                                                    | Number of output queues supported and in use on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Queue                                                            | CoS queue number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Queued                                                           | This counter is not supported on J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 174: show interfaces queue Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Transmitted</b>                             | <p>Number of packets and bytes transmitted by this queue. Information on transmitted packets and bytes can include:</p> <ul style="list-style-type: none"> <li>• <b>Packets</b>—Number of packets transmitted.</li> <li>• <b>Bytes</b>—Number of bytes transmitted.</li> <li>• <b>Tail-dropped packets</b>—Number of arriving packets dropped because output queue buffers were full.</li> <li>• <b>RED-dropped packets</b>—Number of packets dropped because of random early detection (RED). <ul style="list-style-type: none"> <li>• <b>Low</b>—Number of low loss priority packets dropped because of RED.</li> <li>• <b>High</b>—Number of high loss priority packets dropped because of RED.</li> </ul> </li> <li>• <b>RED-dropped bytes</b>—Number of bytes dropped because of random early detection (RED). <ul style="list-style-type: none"> <li>• <b>Low</b>—Number of low loss priority bytes dropped because of RED.</li> <li>• <b>High</b>—Number of high loss priority bytes dropped because of RED.</li> </ul> </li> </ul> |
| <b>Packet Forwarding Engine Chassis Queues</b> | <p>For an interface on an oversubscribed line card such as the 40-port SFP+ line card, the number of Packet Forwarding Engine chassis queues supported and in use for the port group to which the interface belongs. The queue statistics reflect the traffic flowing on all the interfaces in the port group.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Sample Output

```

show interfaces queue user@switch> show interfaces queue ge-0/0/0
ge-0/0/0 Physical interface: ge-0/0/0, Enabled, Physical link is Down
          Interface index: 130, SNMP ifIndex: 501
          Forwarding classes: 16 supported, 4 in use
          Egress queues: 8 supported, 4 in use
          Queue: 0, Forwarding classes: best-effort
          Queued:
          Transmitted:
            Packets      :                0
            Bytes        :                0
            Tail-dropped packets :        0
          Queue: 1, Forwarding classes: assured-forwarding
          Queued:
          Transmitted:
            Packets      :                0
            Bytes        :                0
            Tail-dropped packets :        0
          Queue: 5, Forwarding classes: expedited-forwarding
          Queued:
          Transmitted:
            Packets      :                0
            Bytes        :                0
            Tail-dropped packets :        0
          Queue: 7, Forwarding classes: network-control
          Queued:
          Transmitted:
            Packets      :                0

```

```

Bytes : 0
Tail-dropped packets : 0

show interfaces queue user@switch> show interfaces queue xe-6/0/39
xe-6/0/39 (40-port SFP+ Line Card in a J-EX8200 Switch)
Physical interface: xe-6/0/39, Enabled, Physical link is Up
Interface index: 291, SNMP ifIndex: 1641
Forwarding classes: 16 supported, 7 in use
Ingress queues: 1 supported, 1 in use
  Transmitted:
    Packets : 337069086018
    Bytes : 43144843010304
    Tail-dropped packets : 8003867575
PFE chassis queues: 1 supported, 1 in use
  Transmitted:
    Packets : 0
    Bytes : 0
    Tail-dropped packets : 0
Forwarding classes: 16 supported, 7 in use
Egress queues: 8 supported, 7 in use
Queue: 0, Forwarding classes: best-effort
  Queued:
  Transmitted:
    Packets : 334481399932
    Bytes : 44151544791024
    Tail-dropped packets : 0
Queue: 1, Forwarding classes: assured-forwarding
  Queued:
  Transmitted:
    Packets : 0
    Bytes : 0
    Tail-dropped packets : 0
Queue: 2, Forwarding classes: mcast-be
  Queued:
  Transmitted:
    Packets : 274948977
    Bytes : 36293264964
    Tail-dropped packets : 0
Queue: 4, Forwarding classes: mcast-ef
  Queued:
  Transmitted:
    Packets : 0
    Bytes : 0
    Tail-dropped packets : 0
Queue: 5, Forwarding classes: expedited-forwarding
  Queued:
  Transmitted:
    Packets : 0
    Bytes : 0
    Tail-dropped packets : 0
Queue: 6, Forwarding classes: mcast-af
  Queued:
  Transmitted:
    Packets : 0
    Bytes : 0
    Tail-dropped packets : 0
Queue: 7, Forwarding classes: network-control
  Queued:
  Transmitted:
    Packets : 46714
    Bytes : 6901326

```

```

Tail-dropped packets :                0

Packet Forwarding Engine Chassis Queues:
Queues: 8 supported, 7 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Transmitted:
Packets           :           739338141426
Bytes             :           94635282101928
Tail-dropped packets :                0
RED-dropped packets :           5606426444
  Low             :           5606426444
  High            :                0
RED-dropped bytes :           683262846464
  Low             :           683262846464
  High            :                0
Queue: 1, Forwarding classes: assured-forwarding
Queued:
Transmitted:
Packets           :                0
Bytes             :                0
Tail-dropped packets :                0
RED-dropped packets :                0
  Low             :                0
  High            :                0
RED-dropped bytes :                0
  Low             :                0
  High            :                0
Queue: 2, Forwarding classes: mcast-be
Queued:
Transmitted:
Packets           :                0
Bytes             :                0
Tail-dropped packets :                0
RED-dropped packets :                0
  Low             :                0
  High            :                0
RED-dropped bytes :                0
  Low             :                0
  High            :                0
Queue: 4, Forwarding classes: mcast-ef
Queued:
Transmitted:
Packets           :                0
Bytes             :                0
Tail-dropped packets :                0
RED-dropped packets :                0
  Low             :                0
  High            :                0
RED-dropped bytes :                0
  Low             :                0
  High            :                0
Queue: 5, Forwarding classes: expedited-forwarding
Queued:
Transmitted:
Packets           :                0
Bytes             :                0
Tail-dropped packets :                0
RED-dropped packets :                0
  Low             :                0
  High            :                0

```

```
    RED-dropped bytes :           0
      Low              :           0
      High             :           0
Queue: 6, Forwarding classes: mcast-af
Queued:
Transmitted:
  Packets              :           0
  Bytes                :           0
  Tail-dropped packets :           0
  RED-dropped packets :           0
    Low                :           0
    High               :           0
  RED-dropped bytes   :           0
    Low                :           0
    High               :           0
Queue: 7, Forwarding classes: network-control
Queued:
Transmitted:
  Packets              :          97990
  Bytes                :         14987506
  Tail-dropped packets :           0
  RED-dropped packets :           0
    Low                :           0
    High               :           0
  RED-dropped bytes   :           0
    Low                :           0
    High               :           0
```

## show interfaces xe-

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces xe-<i>fpc/pic/port</i></code><br><brief   detail   extensive   terse><br><descriptions><br><media><br><statistics>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Display status information about the specified 10-Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><code>xe-<i>fpc/pic/port</i></code>—Display standard information about the specified 10-Gigabit Ethernet interface.</p> <p>brief   detail   extensive   terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>media—(Optional) Display media-specific information about network interfaces. For 10-Gigabit Ethernet interfaces, using the <b>media</b> option does not provide you with new or additional information. The output is the same as when the <b>media</b> option is not used.</p> <p>statistics—(Optional) Display static interface statistics. For 10-Gigabit Ethernet interfaces, using the <b>statistics</b> option does not provide you with new or additional information. The output is the same as when the <b>statistics</b> option is not used.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Monitoring Interface Status and Traffic on page 1095</li> <li>• Troubleshooting Network Interfaces on J-EX4200 Switches on page 1103</li> <li>• Troubleshooting an Aggregated Ethernet Interface on page 1104</li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <p><code>show interfaces xe-4/1/0</code> on page 1237</p> <p><code>show interfaces xe-0/1/0 brief</code> on page 1237</p> <p><code>show interfaces xe-4/1/0 detail</code> on page 1237</p> <p><code>show interfaces xe-6/0/39 extensive</code> on page 1238</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Output Fields</b>            | Table 175 on page 1228 lists the output fields for the <b>show interfaces xe-</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 175: show interfaces xe- Output Fields**

| Field Name | Field Description | Level of Output |
|------------|-------------------|-----------------|
|------------|-------------------|-----------------|

### Fields for the Terse Output Level Only



Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output                                                  |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Interface</b>                         | Name of the physical or logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>terse</b>                                                     |
| <b>Admin</b>                             | Administrative state of the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>terse</b>                                                     |
| <b>Link</b>                              | State of the physical link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>terse</b>                                                     |
| <b>Proto</b>                             | Protocol family configured on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>terse</b>                                                     |
| <b>Local</b>                             | Local IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>terse</b>                                                     |
| <b>Remote</b>                            | Remote IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>terse</b>                                                     |
| <b>Fields for the Physical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                  |
| <b>Physical interface</b>                | Name of the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Enabled</b>                           | State of the interface. Can be one of the following: <ul style="list-style-type: none"> <li>• <b>Administratively down, Physical link is Down</b>—The interface is turned off, and the physical link is inoperable and cannot pass packets even when it is enabled.</li> <li>• <b>Administratively down, Physical link is Up</b>—The interface is turned off, but the physical link is operational and can pass packets when it is enabled.</li> <li>• <b>Enabled, Physical link is Down</b>—The interface is turned on, but the physical link is inoperable and cannot pass packets.</li> <li>• <b>Enabled, Physical link is Up</b>—The interface is turned on, and the physical link is operational and can pass packets.</li> </ul> | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Interface index</b>                   | Index number of the physical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b><br><b>extensive</b><br><b>none</b>                 |
| <b>SNMP ifIndex</b>                      | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail</b><br><b>extensive</b><br><b>none</b>                 |
| <b>Generation</b>                        | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b><br><b>extensive</b>                                |
| <b>Description</b>                       | User-configured interface description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Link-level type</b>                   | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name               | Field Description                                                                                                              | Level of Output                                           |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>MTU</b>               | Maximum transmission unit size on the physical interface.                                                                      | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Speed</b>             | Speed at which the interface is running.                                                                                       | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Duplex</b>            | Duplex mode of the interface.                                                                                                  | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>BPDU Error</b>        | Not supported on J-EX Series switches.                                                                                         | <b>detail</b><br><b>extensive</b><br>none                 |
| <b>MAC-REWRITE Error</b> | Not supported on J-EX Series switches.                                                                                         | <b>detail</b><br><b>extensive</b><br>none                 |
| <b>Loopback</b>          | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> . | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Source filtering</b>  | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                   | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Flow control</b>      | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                       | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Device flags</b>      | Information about the physical device.                                                                                         | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Interface flags</b>   | Information about the interface.                                                                                               | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |
| <b>Link flags</b>        | Information about the link.                                                                                                    | <b>brief</b><br><b>detail</b><br><b>extensive</b><br>none |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output             |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| CoS queues              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail<br>extensive<br>none |
| Hold-times              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | detail<br>extensive         |
| Current address         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | detail<br>extensive<br>none |
| Hardware address        | Hardware MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail<br>extensive<br>none |
| Last flapped            | Date, time, and how long ago the interface went from down to up. The format is <i>year-month-day hour:minute:second timezone (weekswdaysd hours:minutes:seconds ago)</i> . For example, 2008-01-16 10:52:40 UTC (3d 22:58 ago).                                                                                                                                                                                                                                                                                                                                             | detail<br>extensive<br>none |
| Input Rate              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | none                        |
| Output Rate             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | none                        |
| Statistics last cleared | Date, time, and how long ago the statistics for the interface were cleared. The format is <i>year-month-day hour:minute:second timezone (weekswdaysd hours:minutes:seconds ago)</i> . For example, 2010-05-17 07:51:28 PDT (00:04:33 ago).                                                                                                                                                                                                                                                                                                                                  | detail<br>extensive         |
| Traffic statistics      | Number and rate of bytes and packets received and transmitted on the physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface and rate in bits per second.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface and rate in bits per second.</li> <li>• <b>Input packets</b>—Number of packets received on the interface and rate in packets per second.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface and rate in packets per second.</li> </ul> | detail<br>extensive         |
| IPv6 transit statistics | If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface: <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                    | detail<br>extensive         |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Input errors</b>  | <p>Input errors on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored if you configure the <b>ignore-l3-incompletes</b> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>                                                                                                                                                                                    | <b>extensive</b> |
| <b>Output errors</b> | <p>Output errors on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Collisions</b>—Number of Ethernet collisions. A 10-Gigabit Ethernet interface supports only full-duplex operation, so for 10-Gigabit Ethernet interfaces, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the switch interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b> |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output                           |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Ingress queues</b>                   | Number of CoS ingress queues supported on the specified interface. Displayed only for an interface on a 40-port SFP+ line card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b><br><b>extensive</b>         |
| <b>Egress queues</b>                    | Number of CoS egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail</b><br><b>extensive</b>         |
| <b>PFE Egress queues</b>                | Number of Packet Forwarding Engine egress queues shared by the interfaces in a port group. Displayed only for an interface on a 40-port SFP+ line card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail</b><br><b>extensive</b>         |
| <b>Queue counters</b>                   | <p>Statistics for queues:</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets. This counter is not supported on EX switches and always contains 0.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                              | <b>detail</b><br><b>extensive</b>         |
| <b>Active alarms and Active defects</b> | <p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the switch configuration, an alarm can ring the red or yellow alarm bell on the switch or turn on the red or yellow alarm LED on the front of the switch. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul> | <b>detail</b><br><b>extensive</b><br>none |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output  |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>MAC statistics</b>                         | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets.</li> <li>• <b>Unicast packets</b>, <b>Broadcast packets</b>, and <b>Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of frames that exceed 1518 octets.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate “Data reception error” or “invalid data symbol error.”</li> </ul> | <b>extensive</b> |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul> <p><b>NOTE:</b> On standalone J-EX4200 or standalone J-EX4500 switches, the FPC slot number refers to the switch itself and is always <b>0</b>. On a J-EX4200 Virtual Chassis or J-EX4500 Virtual Chassis, the FPC slot number refers to the member ID. On a standalone J-EX8200 switch, the FPC slot number refers to the line card slot number on the switch.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>CoS Information</b>               | Scheduler information for the CoS egress queues on the physical interface: <ul style="list-style-type: none"> <li>• <b>Direction</b>—Queue direction, always <b>Output</b>.</li> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth</b>—Information about bandwidth allocated to the queue: <ul style="list-style-type: none"> <li>• <b>%</b>—Bandwidth allocated to the queue as a percentage</li> <li>• <b>bps</b>—Bandwidth allocated to the queue in bps</li> </ul> </li> <li>• <b>Buffer</b>—Information about buffer space allocated to the queue: <ul style="list-style-type: none"> <li>• <b>%</b>—Buffer space allocated to the queue as a percentage.</li> <li>• <b>usec</b>—Buffer space allocated to the queue in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> </ul> </li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>                                                 |
| <b>Fields for Logical Interfaces</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                  |
| <b>Logical interface</b>             | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Index</b>                         | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail</b><br><b>extensive</b><br><b>none</b>                 |
| <b>SNMP ifIndex</b>                  | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail</b><br><b>extensive</b><br><b>none</b>                 |
| <b>Generation</b>                    | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail</b><br><b>extensive</b>                                |
| <b>Description</b>                   | User-configured description of the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Flags</b>                         | Information about the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |
| <b>Encapsulation</b>                 | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>brief</b><br><b>detail</b><br><b>extensive</b><br><b>none</b> |

Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Traffic statistics</b> | Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.                                                                                                                                                                                                                                                                                                            | <b>detail</b><br><b>extensive</b>         |
| <b>Local statistics</b>   | Number and rate of bytes and packets destined to and from the switch.                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b>                          |
| <b>Transit statistics</b> | Number and rate of bytes and packets transiting the switch.                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>                          |
| <b>Protocol</b>           | Protocol family.                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail</b><br><b>extensive</b><br>none |
| <b>Generation</b>         | Unique number for use by Dell technical support only.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail</b><br><b>extensive</b>         |
| <b>Route Table</b>        | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                      | <b>detail</b><br><b>extensive</b><br>none |
| <b>Input Filters</b>      | Names of any input filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail</b><br><b>extensive</b>         |
| <b>Output Filters</b>     | Names of any output filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                | <b>detail</b><br><b>extensive</b>         |
| <b>Flags</b>              | Information about protocol family flags.<br><br>If unicast reverse-path forwarding (RPF) is explicitly configured on the specified interface, the uRPF flag is displayed. If unicast RPF was configured on a different interface (and therefore is enabled on all switch interfaces) but was not explicitly configured on the specified interface, the uRPF flag is not displayed even though unicast RPF is enabled. | <b>detail</b><br><b>extensive</b>         |
| <b>Addresses, Flags</b>   | Information about the address flags.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b><br><b>extensive</b><br>none |
| <i>protocol-family</i>    | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                              | <b>brief</b>                              |
| <b>Flags</b>              | Information about the address flags.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b><br><b>extensive</b><br>none |
| <b>Destination</b>        | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                      | <b>detail</b><br><b>extensive</b><br>none |
| <b>Local</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail</b><br><b>extensive</b><br>none |



Table 175: show interfaces xe- Output Fields (*continued*)

| Field Name | Field Description                                     | Level of Output             |
|------------|-------------------------------------------------------|-----------------------------|
| Broadcast  | Broadcast address of the logical interlace.           | detail<br>extensive<br>none |
| Generation | Unique number for use by Dell technical support only. | detail<br>extensive         |

## Sample Output

```

user@switch show interfaces xe-4/1/0
Physical interface: xe-4/1/0, Enabled, Physical link is Up
Interface index: 387, SNMP ifIndex: 369
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Current address: 00:23:9c:03:8e:70, Hardware address: 00:23:9c:03:8e:70
Last flapped : 2009-05-12 08:01:04 UTC (00:13:44 ago)
Input rate : 36432 bps (3 pps)
Output rate : 0 bps (0 pps)
Active alarms : None
Active defects : None

Logical interface xe-4/1/0.0 (Index 66) (SNMP ifIndex 417)
Flags: SNMP-Traps Encapsulation: ENET2
Input packets : 0
Output packets: 0
Protocol eth-switch
Flags: None

user@switch> show interfaces xe-0/1/0 brief
Physical interface: xe-0/1/0, Enabled, Physical link is Up
Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None

Logical interface xe-0/1/0.0
Flags: SNMP-Traps Encapsulation: ENET2
eth-switch

user@switch> show interfaces xe-4/1/0 detail
Physical interface: xe-4/1/0, Enabled, Physical link is Up
Interface index: 387, SNMP ifIndex: 369, Generation: 390
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None

```

```

CoS queues      : 8 supported, 8 maximum usable queues
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:23:9c:03:8e:70, Hardware address: 00:23:9c:03:8e:70
Last flapped   : 2009-05-12 08:01:04 UTC (00:13:49 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   :          4945644          48576 bps
Output bytes  :              0          0 bps
Input packets:          3258          4 pps
Output packets:              0          0 pps
IPv6 transit statistics:
Input bytes   :              0
Output bytes  :              0
Input packets:              0
Output packets:              0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort          0              0              0
  1 assured-forw        0              0              0
  5 expedited-fo       0              0              0
  7 network-cont       0              0              0

Active alarms : None
Active defects : None

```

```

Logical interface xe-4/1/0.0 (Index 66) (SNMP ifIndex 417) (Generation 158)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
Input bytes   :              0
Output bytes  :              0
Input packets:              0
Output packets:              0
Local statistics:
Input bytes   :              0
Output bytes  :              0
Input packets:              0
Output packets:              0
Transit statistics:
Input bytes   :              0          0 bps
Output bytes  :              0          0 bps
Input packets:              0          0 pps
Output packets:              0          0 pps
Protocol eth-switch, Generation: 174, Route table: 0
Flags: None
Input Filters: f1,
Output Filters: f2,,,,

```

```

show interfaces user@switch> show interfaces xe-6/0/39 extensive
xe-6/0/39 extensive Physical interface: xe-6/0/39, Enabled, Physical link is Up
Interface index: 291, SNMP ifIndex: 1641, Generation: 316
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags     : None
CoS queues     : 8 supported, 8 maximum usable queues

```

```

Hold-times      : Up 0 ms, Down 0 ms
Current address: 00:19:e2:72:f2:88, Hardware address: 00:19:e2:72:f2:88
Last flapped   : 2010-05-13 14:49:43 PDT (1d 00:14 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   : 49625962140160          4391057408 bps
Output bytes  : 47686985710805          4258984960 bps
Input packets : 387702829264            4288139 pps
Output packets: 372554570944            4159166 pps
IPv6 transit statistics:
Input bytes   : 0
Output bytes  : 0
Input packets : 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Ingress queues: 2 supported, 2 in use
Queue counters:  Queued packets  Transmitted packets  Dropped packets
  Low priority      0          336342805223        7986622358
  High priority     0          0
Egress queues: 8 supported, 8 in use
Queue counters:  Queued packets  Transmitted packets  Dropped packets
  0 best-effort     0          333760130103        0
  1 assured-forw    0          0
  2 mcast-be        0          274948977           0
  3 queue3          0          0
  4 mcast-ef        0          0
  5 expedited-fo    0          0
  6 mcast-af        0          0
  7 network-cont    0          46613               0
PFE Egress queues: 8 supported, 8 in use
Queue counters:  Queued packets  Transmitted packets  Dropped packets
  0 best-effort     0          737867061290       5595302082
  1 assured-forw    0          0
  2 mcast-be        0          0
  3 queue3          0          0
  4 mcast-ef        0          0
  5 expedited-fo    0          0
  6 mcast-af        0          0
  7 network-cont    0          97800               0
Active alarms : None
Active defects : None
MAC statistics:
                Receive          Transmit
Total octets    49625962140160  47686985710805
Total packets   387702829264    372554570944
Unicast packets 387702829264    372554518472
Broadcast packets 0                2
Multicast packets 0                52470
CRC/Align errors 0                0
FIFO errors      0                0
MAC control frames 0                0
MAC pause frames 0                0
Oversized frames 0
Jabber frames    0
Fragment frames  0

```

```

Code violations                                0
Packet Forwarding Engine configuration:
  Destination slot: 6
CoS information:
  Direction : Output
  CoS transmit queue      Bandwidth      Buffer Priority  Limit
                           %      bps      %      usec
0 best-effort             75  7500000000  75      0      low  none
2 mcast-be                 20  2000000000  20      0      low  none
7 network-cont             5   500000000   5       0      low  none
    
```

Logical interface xe-6/0/39.0 (Index 1810) (SNMP ifIndex 2238) (Generation 1923)

```

Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
  Input bytes :          0
  Output bytes :        9375416
  Input packets:         0
  Output packets:       48901
Local statistics:
  Input bytes :          0
  Output bytes :        9375416
  Input packets:         0
  Output packets:       48901
Transit statistics:
  Input bytes :          0          0 bps
  Output bytes :         0          0 bps
  Input packets:         0          0 pps
  Output packets:        0          0 pps
Protocol eth-switch, Generation: 1937, Route table: 0
  Flags: Trunk-Mode
    
```

## show ipv6 neighbors

|                                 |                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ipv6 neighbors                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                              |
| <b>Description</b>              | Display information about the IPv6 neighbor cache.                                                                                                                     |
| <b>Options</b>                  | This command has no options.                                                                                                                                           |
| <b>Required Privilege Level</b> | view                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>clear ipv6 neighbors on page 1180</li> </ul>                                                                                    |
| <b>List of Sample Output</b>    | <p>show ipv6 neighbors on page 1241</p> <p>show ipv6 neighbors on page 1241</p>                                                                                        |
| <b>Output Fields</b>            | Table 176 on page 1241 describes the output fields for the <b>show ipv6 neighbors</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 176: show ipv6 neighbors Output Fields**

| Field Name        | Field Description                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------|
| IPv6 Address      | Name of the IPv6 interface.                                                                                                |
| Linklayer Address | Link-layer address.                                                                                                        |
| State             | State of the link: <b>up</b> , <b>down</b> , <b>incomplete</b> , <b>reachable</b> , <b>stale</b> , or <b>unreachable</b> . |
| Exp               | Number of seconds until the entry expires.                                                                                 |
| Rtr               | Whether the neighbor is a routing device: <b>yes</b> or <b>no</b> .                                                        |
| Secure            | Whether this entry was created using the Secure Neighbor Discovery (SEND) protocol: <b>yes</b> or <b>no</b> .              |
| Interface         | Name of the interface.                                                                                                     |

## Sample Output

```

user@host> show ipv6 neighbors
IPv6 Address          Linklayer Address  State      Exp  Rtr  Interface
fe80::2a0:c9ff:fe5b:4c1e  00:a0:c9:5b:4c:1e  reachable  15   yes  fxp0.0

user@host > show ipv6 neighbors
IPv6 Address          Linklayer Address  State      Exp  Rtr  Secure
Interface

```

```
fe80::14fb:5dcf:54bd:ff76    00:90:69:a0:a8:bc    stale    1113 yes yes
ge-3/2/0.0
```

## show lacp interfaces

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show lacp interfaces <i>interface-name</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Display Link Aggregation Control Protocol (LACP) information about the specified aggregated Ethernet or Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><code>none</code>—Display LACP information for all interfaces.</p> <p><i>interface-name</i>—(Optional) Display LACP information for the specified interface:</p> <ul style="list-style-type: none"> <li>• Aggregated Ethernet—<code>aex</code></li> <li>• Gigabit Ethernet—<code>ge-<i>fpc/pic/port</i></code></li> <li>• 10-Gigabit Ethernet—<code>xe-<i>fpc/pic/port</i></code></li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 777</li> <li>• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a J-EX4200 Virtual Chassis Access Switch and a J-EX4200 Virtual Chassis Distribution Switch on page 783</li> <li>• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 1081</li> <li>• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 1085</li> <li>• Understanding Aggregated Ethernet Interfaces and LACP on page 1003</li> <li>• <i>Junos OS Network Interfaces Configuration Guide</i></li> </ul> |
| <b>List of Sample Output</b>    | <b>show lacp interfaces (Aggregated Ethernet) on page 1246</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | Table 177 on page 1243 lists the output fields for the <b>show lacp interfaces</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Table 177: show lacp interfaces Output Fields**

| Field Name           | Field Description                    |
|----------------------|--------------------------------------|
| Aggregated interface | Aggregated Ethernet interface value. |

Table 177: show lacp interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LACP State</b> | <p>LACP state information for each aggregated Ethernet interface:</p> <ul style="list-style-type: none"> <li>• For a child interface configured with force-up, LACP state displays FUP along with the interface name.</li> <li>• <b>Role</b>—Role played by the interface. It can be one of the following: <ul style="list-style-type: none"> <li>• <b>Actor</b>—Local device participating in LACP negotiation.</li> <li>• <b>Partner</b>—Remote device participating in LACP negotiation.</li> </ul> </li> <li>• <b>Exp</b>—Expired state. <b>Yes</b> indicates the actor or partner is in an expired state. <b>No</b> indicates the actor or partner is not in an expired state.</li> <li>• <b>Def</b>—Default. <b>Yes</b> indicates that the actor's receive machine is using the default operational partner information, administratively configured for the partner. <b>No</b> indicates the operational partner information in use has been received in an LACP PDU.</li> <li>• <b>Dist</b>—Distribution of outgoing frames. <b>No</b> indicates distribution of outgoing frames on the link is currently disabled and is not expected to be enabled. Otherwise, the value is <b>Yes</b>.</li> <li>• <b>Col</b>—Collection of incoming frames. <b>Yes</b> indicates collection of incoming frames on the link is currently enabled and is not expected to be disabled. Otherwise, the value is <b>No</b>.</li> <li>• <b>Syn</b>—Synchronization. If the value is <b>Yes</b>, the link is considered synchronized. It has been allocated to the correct link aggregation group, the group has been associated with a compatible aggregator, and the identity of the link aggregation group is consistent with the system ID and operational key information transmitted. If the value is <b>No</b>, the link is not synchronized. It is currently not in the right aggregation.</li> <li>• <b>Aggr</b>—Ability of aggregation port to aggregate (<b>Yes</b>) or to operate only as an individual link (<b>No</b>).</li> <li>• <b>Timeout</b>—LACP timeout preference. Periodic transmissions of LACP PDUs occur at either a slow or fast transmission rate, depending upon the expressed LACP timeout preference (<b>Long Timeout</b> or <b>Short Timeout</b>).</li> <li>• <b>Activity</b>—Actor or partner's port activity. <b>Passive</b> indicates the port's preference for not transmitting LAC PDUs unless its partner's control value is <b>Active</b>. <b>Active</b> indicates the port's preference to participate in the protocol regardless of the partner's control value.</li> </ul> |



Table 177: show lacp interfaces Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LACP Protocol   | <p>LACP protocol information for each aggregated interface:</p> <ul style="list-style-type: none"> <li>• Link state (active or standby) indicated in parentheses next to the interface when link protection is configured.</li> <li>• <b>Receive State</b>—One of the following values: <ul style="list-style-type: none"> <li>• <b>Current</b>—The state machine receives an LACP PDU and enters the <b>Current</b> state.</li> <li>• <b>Defaulted</b>—If no LACP PDU is received before the timer for the <b>Current</b> state expires a second time, the state machine enters the <b>Defaulted</b> state.</li> <li>• <b>Expired</b>—If no LACP PDU is received before the timer for the <b>Current</b> state expires once, the state machine enters the <b>Expired</b> state.</li> <li>• <b>Initialize</b>—When the physical connectivity of a link changes or a Begin event occurs, the state machine enters the <b>Initialize</b> state.</li> <li>• <b>LACP Disabled</b>—If the port is operating in half duplex, the operation of LACP is disabled on the port, forcing the state to <b>LACP Disabled</b>. This state is similar to the <b>Defaulted</b> state, except that the port is forced to operate as an individual port.</li> <li>• <b>Port Disabled</b>—If the port becomes inoperable and a Begin event has not occurred, the state machine enters the <b>Port Disabled</b> state.</li> </ul> </li> <li>• <b>Transmit State</b>—Transmit state of state machine. One of the following values: <ul style="list-style-type: none"> <li>• <b>Fast Periodic</b>—Periodic transmissions are enabled at a fast transmission rate.</li> <li>• <b>No Periodic</b>—Periodic transmissions are disabled.</li> <li>• <b>Periodic Timer</b>—Transitory state entered when the periodic timer expires.</li> <li>• <b>Slow Periodic</b>—Periodic transmissions are enabled at a slow transmission rate.</li> </ul> </li> <li>• <b>Mux State</b>—State of the multiplexer state machine for the aggregation port. The state is one of the following values: <ul style="list-style-type: none"> <li>• <b>Attached</b>—Multiplexer state machine initiates the process of attaching the port to the selected aggregator.</li> <li>• <b>Collecting—Yes</b> indicates that the receive function of this link is enabled with respect to its participation in an aggregation. Received frames are passed to the aggregator for collection. <b>No</b> indicates the receive function of this link is not enabled.</li> <li>• <b>Collecting Distributing</b>—Collecting and distributing states are merged together to form a combined state (coupled control). Because independent control is not possible, the coupled control state machine does not wait for the partner to signal that collection has started before enabling both collection and distribution.</li> <li>• <b>Detached</b>—Process of detaching the port from the aggregator is in progress.</li> <li>• <b>Distributing—Yes</b> indicates that the transmit function of this link is enabled with respect to its participation in an aggregation. Frames may be passed down from the aggregator's distribution function for transmission. <b>No</b> indicates the transmit function of this link is not enabled.</li> <li>• <b>Waiting</b>—Multiplexer state machine is in a holding process, awaiting an outcome.</li> </ul> </li> </ul> |
| LACP Statistics | <p>LACP statistics are returned when the <b>extensive</b> option is used and provides the following information:</p> <ul style="list-style-type: none"> <li>• <b>LACP Rx</b>—LACP received counter that increments for each normal hello.</li> <li>• <b>LACP Tx</b>—Number of LACP transmit packet errors logged.</li> <li>• <b>Unknown Rx</b>—Number of unrecognized packet errors logged.</li> <li>• <b>Illegal Rx</b>—Number of invalid packets received.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

```

show lacp interfaces      user@host> show lacp interfaces ae0 extensive
(Aggregated Ethernet)  Aggregated interface: ae0
                          LACP state:      Role  Exp  Def  Dist  Co1  Syn  Aggr  Timeout  Activity
                          ge-1/0/1FUP  Actor  No  Yes  No  No  No  Yes  Fast  Active
                          ge-1/0/1FUP  Partner  No  Yes  No  No  No  Yes  Fast  Passive
                          ge-1/0/2    Actor  No  Yes  No  No  No  Yes  Fast  Active
                          ge-1/0/2    Partner  No  Yes  No  No  No  Yes  Fast  Passive

                          LACP protocol:      Receive State      Transmit State      Mux State
                          ge-1/0/1FUP          CURRENT            Fast periodic       Collecting
distributing
                          ge-1/0/2            CURRENT            Fast periodic       Collecting
distributing
                          ge-1/0/1 (active)    CURRENT            Fast periodic       Collecting
distributing
                          ge-1/0/2 (standby)   CURRENT            Fast periodic       WAITING
LACP Statistics:          LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
                          ge-1/0/1          0             0             0             0
                          ge-1/0/2          0             0             0             0

```

## test interface restart-auto-negotiation

---

|                                 |                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>test interface restart-auto-negotiation <i>interface-name</i></code>                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 10.2 for J-EX Series switches.                     |
| <b>Description</b>              | Restarts auto-negotiation on a Fast Ethernet or Gigabit Ethernet interface.                   |
| <b>Options</b>                  | <i>interface-name</i> —Interface name: <b>fe-fpc/pic/port</b> or <b>ge-fpc/pic/port</b> .     |
| <b>Required Privilege Level</b> | view                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">test interface restart-auto-negotiation on page 1247</a>                          |
| <b>Output Fields</b>            | Use the <code>show interfaces extensive</code> command to see the state for auto-negotiation. |

### Sample Output

```
test interface restart-auto-negotiation user@host> test interface restart-auto-negotiation fe-1/0/0
```



PART 13

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