Dell Networking S4820T and Dell Force10 S4820T

Switch Configuration Guide for PS Series SANs

Dell Storage Engineering
February 2016

A Dell Deployment and Configuration Guide

Revisions

Date	Description
February 2013	Initial release
September 2013	Updated to firmware 9.2.0.0
January 2014	Updated for firmware 9.3.0.0
April 2014	Minor update
February 2016	Updated for FTOS v9.9.0.0

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1 Introduction

This document illustrates how to configure Dell Networking or Dell™ Force10 S4820T switches for use with Dell PS Series storage using Dell best practices. The recommended configuration uses link aggregation groups (LAGs) for inter-switch connections. Optional steps are provided in section 3 to enable Data Center Bridging (DCB).

If you are following the **Rapid EqualLogic Configuration** steps at http://en.community.dell.com/techcenter/storage/w/wiki/3615.rapid-equallogic-configuration-portal-by-sis.aspx, use sections 1 and 2, or 1 and 5 in this guide.

For more information on PS Series SAN design recommendations, see the *Dell PS Series Configuration Guide*.

1.1 Audience

This switch configuration guide describes an optimal configuration following Dell best practices for a PS Series iSCSI SAN and is intended for storage or network administrators and deployment personnel.

1.2 Switch details

The table below provides an overview of the switch configuration.

Table 1 Switch specifications

Dell Networking or Force10 S4820T	
Switch vendor	Dell
Switch model	S4820T
Switch firmware	9.9.0.0 or later

Note: For proper functionality, the switch must be at the switch firmware version shown in the table above before proceeding with this configuration. Using previous firmware versions may have unpredictable results.

The latest firmware updates and documentation can be found at: www.force10networks.com. This site requires a login.

Note: FTOS v9.3.0.0 incorporates new command line syntax for DCB configuration. To configure a new switch for DCB operation, follow the configuration steps in this Software Configuration Guide as outlined below.

If you are upgrading from an FTOS version prior to v9.3.0.0, your DCB settings in the running configuration file will be preserved and you may continue to use the original DCB command line syntax. If you make changes using the previous DCB command line syntax, you will receive a warning message that the commands have been deprecated, however the commands will still continue to function as they did with the previous version.

1.3 Cabling diagram

The cabling diagram shown below represents the Dell recommend method for deploying your servers and PS arrays.

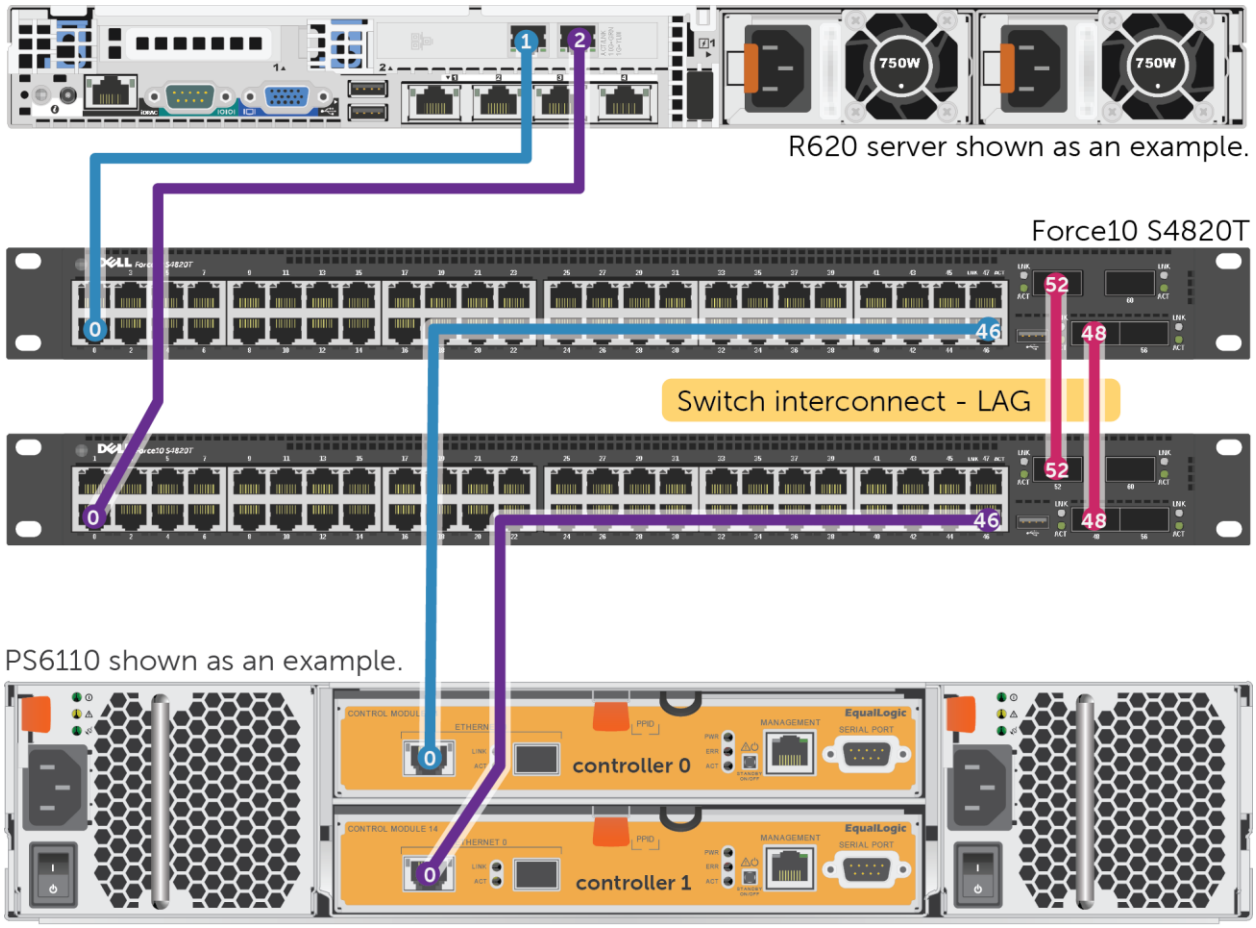

Figure 1 Cabling diagram

2 Dell recommended switch configuration

These steps show you how to configure two Dell Networking or Force10 S4820T switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 40 GbE Quad Small Form-factor Pluggable (QSFP) uplink ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP).

2.1 Hardware configuration

1. Power on the two switches.
2. Connect a serial cable to the serial port of the first switch.
3. Using Putty or another terminal utility, open a serial connection session to the switch.
4. Open your terminal emulator and configure it to use the serial port (usually COM1 but this may vary depending on your system). Configure serial communications for 9600,N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches, by connecting port 48 on switch 1 to port 48 on switch2 and port 52 on switch 1 to port 52 on switch 2. See this configuration in Figure 1.

2.2 Delete startup configuration

Note: The following commands will delete all configuration settings.

```
FTOS>enable

FTOS#delete startup-config

Proceed to delete startup-config [confirm yes/no]yes

FTOS#reload

System configuration has been modified. Save? [yes/no]no

Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

2.3 Configure out of band (OOB) management port

```
FTOS>enable

Password:
```

After the startup configuration is deleted, the factory default Enable mode password is **force10.**

```
FTOS>#config

FTOS(conf)#interface Managementethernet 0/0
```

```
FTOS(conf-if-ma-0/0)#no shutdown

FTOS(conf-if-ma-0/0)#ip address ipaddress mask

FTOS(conf-if-ma-0/0)#exit
```

2.4 Configure route for OOB management port (optional)

```
FTOS (conf)#management route X.Y.Z.0 /24 A.B.C.1
```

Note: X.Y.Z.0 is the network your management system is connecting from and A.B.C.1 is the gateway for the switch. If your management system is on the same subnet as the switch, the previous step may be omitted. The example above assumes a class C subnet mask.

2.5 Configure login credentials

```
FTOS(conf)#username admin privilege 15 password 0 yourpassword

FTOS(conf)#enable password level 15 0 yourpassword

FTOS(conf)#exit
```

2.6 Enable switch ports

Option 1: You can enable ports individually by entering the port number

```
FTOS#configure

FTOS(conf)#interface tengigabitethernet 0/0

FTOS(conf-if-te-0/0)#switchport

FTOS(conf-if-te-0/0)#no shutdown

FTOS(conf-if-te-0/0)#exit

FTOS(conf)#exit
```

Option 2: You can enable multiple ports at once using the "range" parameter

```
FTOS#configure

FTOS(conf)#interface range tengigabitethernet 0/0 – 47

FTOS(conf-if-range-te-0/0-47)#switchport

FTOS(conf-if-range-te-0/0-47)#no shutdown
```

```
FTOS(conf-if-range-te-0/0-47)#exit
```

2.7 Enable Jumbo Frames

```
FTOS#configure

FTOS(conf)# interface range tengigabitethernet 0/0 – 47

FTOS(conf -if-range-te-0/0-47)#mtu 12000
```

2.8 Configure flow control

```
FTOS(conf)#interface range tengigabitethernet 0/0 – 47

FTOS(conf-if-range-te-0/0-47)#flowcontrol rx on tx off
```

2.9 Configure spanning tree on edge ports

```
FTOS(conf-if-range-te-0/0-47)#spanning-tree rstp edge-port

FTOS(conf-if-range-te-0/0-47)#exit

FTOS(conf)#protocol spanning-tree rstp

FTOS(conf-rstp)#no disable

FTOS(conf-rstp)#exit
```

2.10 Configure port channel for LAG

These commands create a port channel or LAG.

```
FTOS(conf)#interface Port-channel 1

FTOS(conf-if-po-1)#mtu 12000

FTOS(conf-if-po-1)#switchport

FTOS(conf-if-po-1)#no shutdown

FTOS(conf-if-po-1)#exit
```

2.11 Configure QSFP ports for LAG

This step assigns the 40Gb QSFP ports to the Port Channel.

```
FTOS(conf)#interface range fortyGigE 0/48 , fortyGigE 0/52

FTOS(conf-if-range-fo-0/48,fo-0/52)#mtu 12000
```

```
FTOS(conf-if-range-fo-0/48,fo-0/52)#no shutdown

FTOS(conf-if-range-fo-0/48,fo-0/52)#flowcontrol rx on tx off

FTOS(conf-if-range-fo-0/48,fo-0/52)#port-channel-protocol lacp

FTOS(conf-if-range-fo-0/48,fo-0/52-lacp)#port-channel 1 mode active

FTOS(conf-if-range-fo-0/48,fo-0/52-lacp)#exit

FTOS(conf-if-range-fo-0/48,fo-0/52)#exit

FTOS(conf)#exit
```

2.12 Save configuration

```
FTOS#copy running-config startup-config
```

2.13 Configure additional switch

Repeat the commands from section 2 to configure the second switch.

Note: The preceding procedure places all switch ports in the default VLAN. If you prefer to place ports in a non-default VLAN, refer to the documentation for your switch.

3 Configure Data Center Bridging (DCB) (optional)

To enable DCB mode on the switch, use the following commands.

Note: You must complete the Dell recommended switch configuration steps in sections 2.1 to 2.13 before configuring the switch for DCB mode.

3.1 Disable 802.3x flowcontrol on SFP+ ports

```
FTOS#configure

FTOS(conf)#interface range tengigabitethernet 0/0 - 47

FTOS(conf-if-range-te-0/0-47)#no flowcontrol rx on tx off

FTOS(conf-if-range-te-0/0-47)#exit
```

3.2 Disable 802.3x flowcontrol on all QSFP ports

```
FTOS(conf)#interface range fortyGigE 0/48 , fortyGigE 0/52

FTOS(conf-if-range-fo-0/48,fo-0/52)#no flowcontrol rx on tx off

FTOS(conf-if-range-fo-0/48,fo-0/52)#exit
```

3.3 Enable DCB and reload

```
FTOS(conf)#dcb enable

FTOS(conf)#exit

FTOS#copy running-config startup-config

FTOS#reload
```

Note: The switch will reboot.

3.4 Create tagged VLAN for all ports and port-channels

```
FTOS>enable

FTOS#configure

FTOS(conf)#interface vlan vlan-id
```

Note: You must supply a VLAN id. The valid range is 2-4093.

```
FTOS (conf-if-vl-vlan-id*)#no shutdown

FTOS (conf-if-vl-vlan-id*)#tagged tengigabitethernet 0/0-47

FTOS (conf-if-vl-vlan-id*)#tagged port-channel 1

FTOS (conf-if-vl-vlan-id*)#exit
```

3.5 Configure DCB policies

```
FTOS(conf)#dcb-map profile-name

FTOS(conf-dcbmap-profile-name*)#priority-group 0 bandwidth 50 pfc off

FTOS(conf-dcbmap-profile-name*)#priority-group 1 bandwidth 50 pfc on
```

Note: The sum of the bandwidth-percentages must be equal to 100. **The bandwidth percentage used in this section is just an example.** Monitor the LAN and SAN performance in your environment to determine optimal bandwidth settings.

```
FTOS(conf-dcbmap-profile-name*)#priority-pgid 0 0 0 0 1 0 0 0

FTOS(conf-dcb-profile-name*)#exit
```

3.6 Apply policies to switch ports

```
FTOS(conf)#interface range ten 0/0 - 47

FTOS(conf-if-range-te-0/0-47)# dcb-map profile-name

FTOS(conf-if-range-te-0/0-47)#exit


FTOS(conf)#interface range fortyGigE 0/48 , fortyGigE 0/52

FTOS(conf-if-range-fo-0/48,fo-0/52)# dcb-map profile-name

FTOS(conf-if-range-fo-0/48,fo-0/52)#exit

FTOS(conf)#exit
```

3.7 Save configuration

```
FTOS#copy running-config startup-config
```

3.8 Configure additional switches

Repeat the commands from section 3 to configure DCB on additional switches.

4 Reverting from DCB to non-DCB configuration (optional)

One method to revert from a DCB configured switch to a non-DCB configured switch is to delete the current configuration (startup-config) and follow the steps in section 2. If deleting the current configuration is not an option, then use the following procedure to unconfigure DCB and enable standard flow control.

Note: This is a disruptive operation that requires down time. The arrays will temporarily lose communication with each other. Power off all arrays and hosts connected to the SAN before proceeding with these steps.

4.1 Disable DCB

```
FTOS#configure

FTOS(conf)#no dcb enable

FTOS(conf)#exit
```

4.2 Remove DCB policies and apply standard flow control

```
FTOS#configure

FTOS(conf)#interface range tengigabitethernet 0/0 - 47

FTOS(conf-if-range-te-0/0-47)# no dcb-map profile-name

FTOS(conf-if-range-te-0/0-47)#flowcontrol rx on tx off

FTOS(conf-if-range-te-0/0-47)#exit


FTOS(conf)#interface range fortyGigE 0/48 , fortyGigE 0/52

FTOS(conf-if-range-fo-0/48,fo-0/52)#no dcb-map profile-name

FTOS(conf-if-range-fo-0/48,fo-0/52)#flowcontrol rx on tx off

FTOS(conf-if-range-fo-0/48,fo-0/52)#exit

FTOS(conf)#exit
```

4.3 Revert to default VLAN ID on switch and arrays

Once DCB is disabled on the switch, the PS arrays will no longer use the VLAN ID that was configured when DCB was enabled. The arrays will revert to the default or native VLAN. Therefore, a valid VLAN must be configured for all host servers, switches, and PS array members. A valid VLAN can use the default or

native VLAN ID (typically 0 or 1) or a specific VLAN can be configured (for example, VLAN 100). If a non-default VLAN is configured, then any ports connected to the arrays must be configured as "untagged".

Use the steps below to configure the native VLAN on the switch.

```
FTOS#configure

FTOS(conf)#no interface vlan vlan-id
```

4.4 Save configuration

```
FTOS#copy running-config startup-config
```

4.5 Reload

```
FTOS#reload

System configuration has been modified. Save? [yes/no]yes

Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

4.6 Verify DCB status

```
FTOS#show dcb
```

4.7 Configure additional switch

Repeat the commands from section 4 to disable DCB on any additional switches.

5 Optional stack configuration

Note: If you wish to use a stack configuration instead of LAG, follow the instructions below instead of section 2.

One advantage of stacked switches is that they can be managed as a single switch; however firmware updates will update all members of the stack simultaneously and therefore should only be done during planned downtime.

5.1 Delete startup configuration on the first switch

```
FTOS>enable

FTOS#delete startup-config

Proceed to delete startup-config [confirm yes/no]yes

FTOS#reload

System configuration has been modified. Save? [yes/no]no

Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

5.2 Configure stack on the first switch

```
FTOS>enable
```

After the startup configuration is deleted, the factory default Enable mode password is **force10.**

```
FTOS#config

FTOS(conf)#stack-unit 0 priority 1

FTOS(conf)#stack-unit 0 stack-group 12

FTOS(conf)#stack-unit 0 stack-group 13

FTOS(conf)#exit

FTOS#copy running-config startup-config

FTOS#reload
```

5.3 Delete startup configuration on the second switch

```
FTOS>enable

FTOS#delete startup-config

Proceed to delete startup-config [confirm yes/no]yes

FTOS#reload

System configuration has been modified. Save? [yes/no]no

Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

5.4 Configure stack on the second switch

```
FTOS>enable

FTOS#stack-unit 0 renumber 1
```

Note: The switch will reboot.

```
FTOS#config

FTOS(conf)#stack-unit 1 priority 1

FTOS(conf)#stack-unit 1 stack-group 12

FTOS(conf)#stack-unit 1 stack-group 13

FTOS(conf)#exit

FTOS# copy running-config startup-config

FTOS#reload
```

5.5 Verify stack configuration

From the first switch (Master) CLI, confirm that the stack has formed:

```
FTOS#show redundancy
```

Note: The switch front panel will show a steady light in the MASTER LED for the Master unit and a blinking light for the Standby unit. All the following configuration steps must be performed from the master switch.

5.6 Configure out of band (OOB) management port

```
FTOS#config

FTOS(conf)#interface ManagementEthernet 0/0

FTOS(conf-if-ma-0/0)#no shutdown

FTOS(conf-if-ma-0/0)#ip address ipaddress mask

FTOS(conf-if-ma-0/0)#no shutdown

FTOS(conf-if-ma-0/0)#exit
```

5.7 Configure route for OOB management port (optional)

```
FTOS(conf)#management route X.Y.Z.0 /24 A.B.C.1
```

Note: X.Y.Z.0 is the network your management system is connecting from and A.B.C.1 is the gateway for the switch. If your management system is on the same subnet as the switch, the previous step may be omitted. The example above assumes a class C subnet mask.

5.8 Configure login credentials

```
FTOS(conf)#username admin privilege 15 password 0 yourpassword

FTOS(conf)#enable password level 15 0 yourpassword
```

5.9 Configuring switch ports

```
FTOS(conf)#interface range tengigabitethernet 0/0 - 47

FTOS(conf-if-range-te-0/0-47)#mtu 12000

FTOS(conf-if-range-te-0/0-47)#switchport

FTOS(conf-if-range-te-0/0-47)#spanning-tree rstp edge-port

FTOS(conf-if-range-te-0/0-47)#flowcontrol rx on tx off

FTOS(conf-if-range-te-0/0-47)#no shutdown

FTOS(conf-if-range-te-0/0-47)#exit


FTOS(conf)#interface range tengigabitethernet 1/0 - 47

FTOS(conf-if-range-te-1/0-47)#mtu 12000
```

```
FTOS(conf-if-range-te-1/0-47)#switchport

FTOS(conf-if-range-te-1/0-47)#spanning-tree rstp edge-port

FTOS(conf-if-range-te-1/0-47)#flowcontrol rx on tx off

FTOS(conf-if-range-te-1/0-47)#no shut

FTOS(conf-if-range-te-1/0-47)#exit

FTOS(conf)#exit

FTOS(conf)#protocol spanning-tree rstp

FTOS(conf-rstp)#no disable

FTOS(conf-rstp)#exit

FTOS(conf)#exit
```

5.10 Save configuration

```
FTOS# copy running-config startup-config
```

Reload the stack to allow settings to take effect:

```
FTOS#reload
```

Note: The preceding procedure places all switch ports in the default VLAN. If you prefer to place ports in a non-default VLAN, refer to the documentation for your switch.

Additional resources

Dell.com/support is focused on meeting your needs with proven services and support.

DellTechCenter.com is an IT Community where you can connect with Dell Customers and Dell employees for the purpose of sharing knowledge, best practices, and information about Dell products and your installations.

Referenced or recommended Dell publications:

- *Dell PS Series Configuration Guide*: http://en.community.dell.com/dell-groups/dtcmedia/m/mediagallery/19852516
- *Dell Storage Compatibility Matrix*: http://en.community.dell.com/techcenter/storage/w/wiki/5069.dell-storage-compatibility-matrix-ps-series-sc-series-fs-series

For PS Series best practices white papers, reference architectures, and sizing guidelines for enterprise applications and SANs, refer to PS Series Technical Documents.