Dell EMC Networking S6010-ON

Switch Configuration Guide for Dell PS Series SANs

Abstract

This document illustrates how to configure Dell EMC™ Networking S6010-ON switches for use with Dell™ PS Series storage using Dell EMC best practices.

February 2018

Revisions

Date	Revision
June 2016	Initial release
February 2018	Update to include configuration steps for both OS 9.x and 10.x

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1 Introduction

This document illustrates how to configure Dell EMC™ Networking S6010-ON switches for use with Dell™ PS Series storage using Dell EMC best practices. The recommended configuration uses link aggregation groups (LAGs) for inter-switch connections.

The host servers and storage controllers can be connected to the switches using 40GbE-to-10GbE breakout cables. The switches are interconnected to each other using 40GbE cables.

To enable Data Center Bridging (optional), see section 2.2 (OS 9.x) or 3.2 (OS 10.x).

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

1.1 Firmware support

The Dell EMC Networking S6010-ON Open Networking switch has the ability to run different switch operating systems software/firmware. This document provides configuration steps specific to Dell Networking OS 9.x (firmware 9.x) and Dell Networking OS 10.x (firmware 10.x). Refer the section of this document that is applicable to your firmware version:

- Dell Networking OS 9.x (firmware 9): section 2
- Dell Networking OS 10.x (firmware 10): section 3

1.2 Document conventions

Table 1 lists the formatting conventions used in this document.

Table 1 Document conventions

Item	Convention	Example
Code samples	Monospace	`System configuration has been modified.`
Parameters	Italic	`Dell(`*`profile-name`*`)#`
Command-line commands	Bold	`OS#`**`show version`**
Command-line user-supplied variables	Bold, italic, brackets	**`<vlan-id>`**

1.3 Audience

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

1.4 Cabling diagram

The cabling diagram in Figure 1 represents the Dell EMC recommended method for deploying servers and PS Series arrays.

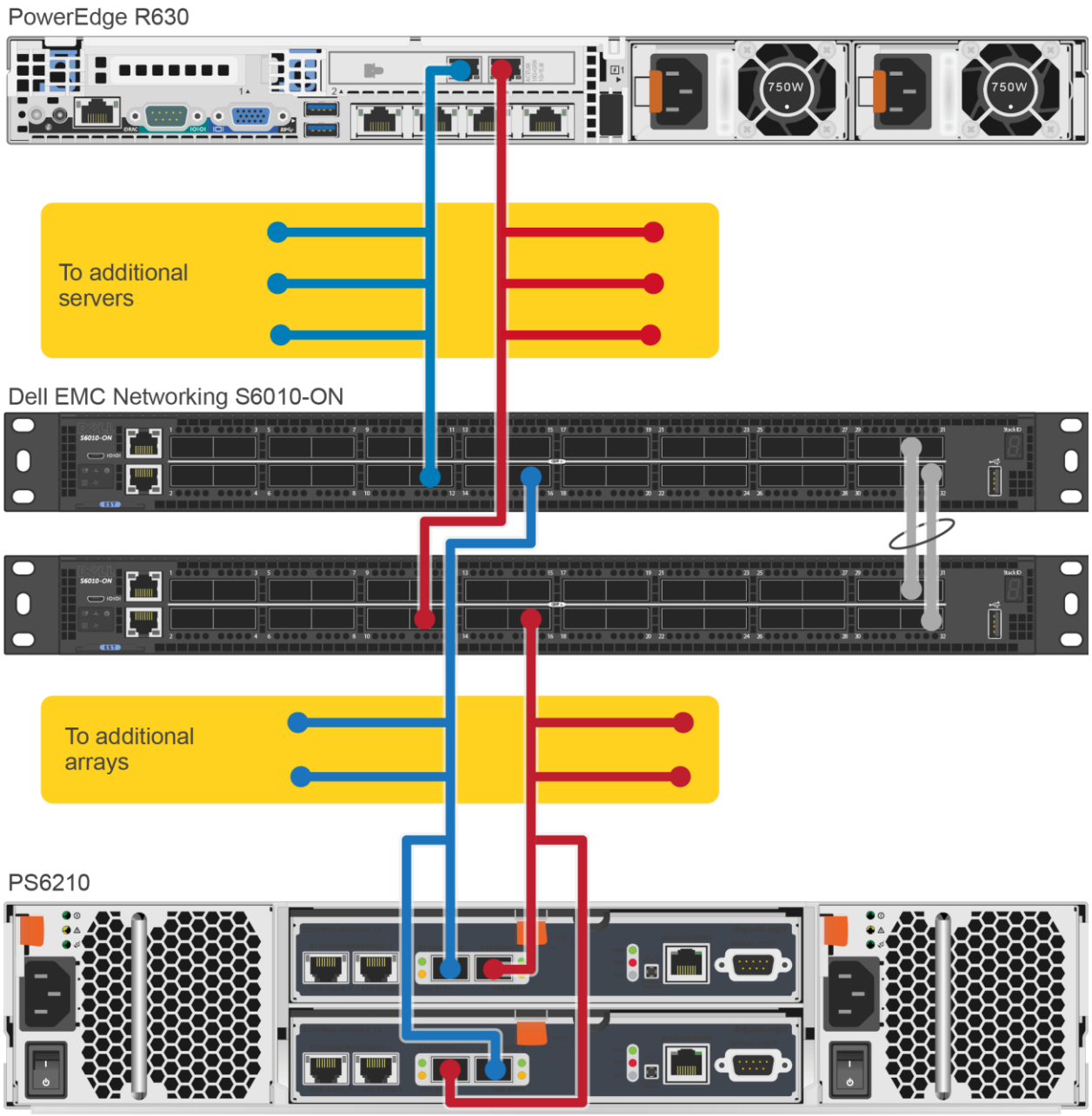

Figure 1 Cabling diagram

2 Switch configuration (OS 9.x)

This section provides steps to configure Dell EMC Networking S6010-ON switches running Dell Networking OS 9.x (firmware 9.x). If your switches are running Dell Networking OS 10.x (firmware 10.x), follow the steps in section 3 instead.

Table 2 provides an overview of the switch configuration.

Table 2 Switch specifications (OS 9.x)

Dell EMC Networking S6010-ON	
Switch vendor	Dell EMC
Switch model	S6010-ON
Switch firmware	9.x (9.10.0.0 or above)

Note: For proper functionality, the switch must be at the switch firmware version shown in Table 2 before proceeding with this configuration. Using firmware other than the versions specified in this document may have unpredictable results.

Note: Firmware downloads and documentation can be found at Dell.com/support.

2.1 Dell EMC recommended switch configuration

The steps in this section show how to configure two S6010-ON switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 40GbE Quad Small Form-factor Pluggable (QSFP) ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP). This example uses physical ports 12 and 16 for the host server and storage controller connections.

2.1.1 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 the terminal emulator and configure it to use the serial port (COM1, COM2). Configure serial communications for 115200 N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches, by connecting physical port 31 on switch 1 to physical port 31 on switch 2 and physical port 32 on switch 1 to physical port 32 on switch 2. See this configuration in Figure 1.

2.1.2 Check firmware version

```
Dell>enable
Dell#show version
```

Note: If the active version displayed here is not 9.x (9.10.0.0 or above), visit Dell.com/support and download the appropriate firmware for your switches.

2.1.3 Delete startup configuration

Note: The following commands will delete all configuration settings.

```
Dell>enable
Dell#delete startup-config
Proceed to delete startup-config [confirm yes/no]yes
Dell#reload
System configuration has been modified. Save? [yes/no]no
Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

2.1.4 Configure out of band (OOB) management port

```
Dell>enable
```

Note: After the startup configuration is deleted, the factory default enable mode password is **calvin.**

```
Dell#config
Dell(conf)#interface Managementethernet 1/1
Dell(conf-if-ma-1/1)#no shutdown
Dell(conf-if-ma-1/1)#ip address <ipaddress> <mask>
Dell(conf-if-ma-1/1)#exit
```

2.1.5 Configure route for OOB management port (optional)

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

Note: In the previous command, ***<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 prior example assumes a class C subnet mask.

2.1.6 Configure login credentials

```
Dell(conf)#username admin privilege 15 password 0 <yourpassword>
Dell(conf)#enable password level 15 0 <yourpassword>
Dell(conf)#
```

2.1.7 Configure 40GbE ports to 4 x 10GbE ports

Identify the 40GbE ports number that will be configured as 4 x 10GbE ports, and use the following command to configure them (for the port-number, use port number 12 and 16):

```
Dell(conf)#stack-unit 1 port port-number portmode quad
Dell(conf)#exit
Dell#copy running-config startup-config
```

Use the following command to check port interface status:

```
Dell#show interface status
```

2.1.8 Enable switch ports

Option 1: Enable ports individually by entering the port number.

```
Dell#configure
Dell(conf)#interface tengigabitethernet 1/12/1
Dell(conf-if-te-1/12/1)#switchport
Dell(conf-if-te-1/12/1)#no shutdown
Dell(conf-if-te-1/12/1)#exit

Dell(conf)#interface fortyGigE 1/31
Dell(conf-if-fo-1/31)#switchport
Dell(conf-if-fo-1/31)#no shutdown
Dell(conf-if-fo-1/31)#exit
Dell(conf)#exit
```

Option 2: Enable multiple ports at once using the **range** parameter.

```
Dell#configure
Dell(conf)#interface range te 1/12/1 - 1/12/4 , te 1/16/1 - 1/16/4

Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#switchport
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#no shutdown
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#exit
```

2.1.9 Enable Jumbo frames and flow control

```
Dell(conf)#interface range te 1/12/1 - 1/12/4 , te 1/16/1 -  1/16/4
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#mtu 9216
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#flowcontrol rx on tx off
```

2.1.10 Configure spanning tree on edge ports

```
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#spanning-tree rstp edge-port
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#exit
Dell(conf)#protocol spanning-tree rstp
Dell(conf-rstp)#no disable
Dell(conf-rstp)#exit
```

2.1.11 Configure port channel for LAG

Create a port channel or LAG.

```
Dell(conf)#interface Port-channel 1
Dell(conf-if-po-1)#mtu 9216
Dell(conf-if-po-1)#switchport
Dell(conf-if-po-1)#no shutdown
Dell(conf-if-po-1)#exit
```

2.1.12 Configure 40GbE ports for LAG

Assign the 40GbE QSFP ports to the port channel.

```
Dell(conf)#interface range fortyGigE 1/31 - 1/32
Dell(conf-if-range-fo-1/31-1/32)#mtu 9216
Dell(conf-if-range-fo-1/31-1/32)#flowcontrol rx on tx off
Dell(conf-if-range-fo-1/31-1/32)#port-channel-protocol lacp
Dell(conf-if-range-fo-1/31-1/32-lacp)#port-channel 1 mode active
Dell(conf-if-range-fo-1/31-1/32-lacp)#exit
Dell(conf-if-range-fo-1/31-1/32)#no shutdown
Dell(conf-if-range-fo-1/31-1/32)#end
Dell#
```

2.1.13 Save configuration

```
Dell#copy running-config startup-config
Proceed to copy the file [confirm yes/no]: yes
Dell#reload
System configuration has been modified. Save? [yes/no]: yes
Proceed with reload [confirm yes/no]: yes
```

2.1.14 Configure additional switch

Repeat the commands from section 2.1 to configure the second switch.

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

2.2 Configure Data Center Bridging (DCB) (optional)

Use the following commands to enable DCB mode on the switch.

Note: You must complete the Dell EMC recommended switch configuration steps in section 2.1 before configuring the switch for DCB mode.

2.2.1 Disable 802.3x flowcontrol on SFP+ ports

```
Dell#configure
Dell(conf)#interface range te 1/12/1 - 1/12/4 , te 1/16/1 - 1/16/4
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#no flowcontrol rx on tx off
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#exit
```

2.2.2 Disable 802.3x flowcontrol on all QSFP ports

```
Dell(conf)#interface range fortyGigE 1/31 - 1/32
Dell(conf-if-range-fo-1/31-1/32)#no flowcontrol rx on tx off
Dell(conf-if-range-fo-1/31-1/32)#exit
```

2.2.3 Enable DCB

```
Dell(conf)#dcb enable
```

2.2.4 Create tagged VLAN for all ports and port-channels

```
Dell(conf)#interface vlan <vlan-id>
```

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

```
Dell(conf-if-vl-vlan-id*)#mtu 9216
Dell(conf-if-vl-vlan-id*)#no shutdown
Dell(conf-if-vl-vlan-id*)#tagged tengigabitethernet 1/<xx>/<yy>
```

Note: In the previous command, **1** represents the switch stack number, **<*xx*>** represents the port number and **<*yy*>** represents the sub port.

```
Dell(conf-if-vl-vlan-id*)#tagged tengigabitethernet 1/12/1 - 1/12/4
Dell(conf-if-vl-vlan-id*)#tagged tengigabitethernet 1/16/1 - 1/16/4
Dell(conf-if-vl-vlan-id*)#tagged port-channel 1
Dell(conf-if-vl-vlan-id*)#exit
```

2.2.5 Configure DCB policies

```
Dell(conf)#dcb-map profile-name
Dell(conf-dcbmap-profile-name*)#priority-group 0 bandwidth 50 pfc off
Dell(conf-dcbmap-profile-name*)#priority-group 1 bandwidth 50 pfc on
```

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

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

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

2.2.6 Apply policies to switch ports

```
Dell(conf)#interface range te 1/12/1 – 1/12/4 , te 1/16/1 – 1/16/4
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#dcb-map <profile-name>

Dell(conf-dcb-profile-name*)#exit

Dell(conf)#interface range fortyGigE 1/31 - 1/32
Dell(conf-if-range-fo-1/31-1/32)#dcb-map <profile-name>
Dell(conf-if-range-fo-1/31-1/32)#end
```

2.2.7 Save configuration

```
Dell#copy running-config startup-config

Dell#reload
Proceed to copy the file [confirm yes/no]: yes

Dell#reload
System configuration has been modified. Save? [yes/no]: yes
Proceed with reload [confirm yes/no]: yes
```

2.2.8 Configure additional switches

Repeat the commands from section 2.2 to configure DCB on additional switches.

2.3 Revert 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 2.1. If deleting the current configuration is not an option, use the following procedure to unconfigure DCB and enable standard flow control.

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

2.3.1 Disable DCB

```
Dell#configure
Dell(conf)#no dcb enable
Dell(conf)#exit
```

2.3.2 Remove DCB policies and apply standard flow control

```
Dell#configure
Dell(conf)# interface range te 1/12/1 – 1/12/4 , te 1/16/1 – 1/16/4
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)# no dcb-map <profile-name>
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#flowcontrol rx on tx off
Dell(conf-if-range-te-1/12/1-1/12/4,te-1/16/1-...)#exit
Dell(conf)# interface range fortyGigE 1/31 - 1/32
Dell(conf-if-range-fo-1/31-1/32)# no dcb-map profile-name
Dell(conf-if-range-fo-1/31-1/32)#flowcontrol rx on tx off
Dell(conf-if-range-fo-1/31-1/32)#exit
```

2.3.3 Revert to default VLAN ID on switch and arrays

Once DCB is disabled on the switch, the PS Series 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 Series 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 following steps to configure the native VLAN on the switch.

```
Dell#configure
Dell(conf)#no interface vlan <vlan-id>
```

2.3.4 Save configuration

```
Dell#copy running-config startup-config
```

2.3.5 Reload

```
Dell#reload
System configuration has been modified. Save? [yes/no]yes
Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

2.3.6 Verify DCB status

```
Dell#show dcb
       DCB Status : Disabled
```

2.3.7 Configure additional switch

Repeat the commands from section 2.3 to disable DCB on any additional switches.

3 Switch configuration (OS 10.x)

This section provides steps to configure Dell EMC Networking S6010-ON switches running Dell Networking OS 10.x (firmware 10.x). If your switches are running Dell Networking OS 9.x (firmware 9.x), follow the steps in section 2 instead.

Table 3 provides an overview of the switch configuration.

Table 3 Switch specifications (OS 10.x)

Dell EMC Networking S6010-ON	
Switch vendor	Dell EMC
Switch model	S6010-ON
Switch firmware	10.3.1 or above

Note: For proper functionality, the switch must be at the switch firmware version shown in Table 3 before proceeding with this configuration. Using firmware other than the versions specified in this document may have unpredictable results.

Note: Firmware downloads and documentation can be found at Dell.com/support.

3.1 Dell EMC recommended switch configuration

These steps show how to configure two S6010-ON switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 40GbE Quad Small Form-factor Pluggable (QSFP) ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP). This example uses physical ports 12 and 16 for the host server and storage controller connections.

3.1.1 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 the terminal emulator and configure it to use the serial port (COM1, COM2). Configure serial communications for 115200 N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches, by connecting physical port 31 on switch 1 to physical port 31 on switch 2 and physical port 32 on switch 1 to physical port 32 on switch 2. See this configuration in Figure 1.

3.1.2 Check firmware version

```
OS10# show version
```

Note: If the active version displayed here is not 10.3.1 or above, visit Dell.com/support and download the latest update for the switches.

3.1.3 Delete startup configuration

Note: The following commands will delete all configuration settings.

```
OS10# delete startup-configuration
Proceed to delete startup-config [confirm yes/no(default)]yes
OS10# reload
System configuration has been modified. Save? [yes/no]no
Proceed to reboot the system? [confirm yes/no]yes
```

Note: The switch will reboot.

3.1.4 Configure out of band (OOB) management port

Note: After the startup configuration is deleted, the factory default password is **admin.**

```
OS10# configure terminal
OS10(config)# interface mgmt 1/1/1
OS10(conf-if-ma-1/1/1)# no ip address dhcp
OS10(conf-if-ma-1/1/1)# ip address <ipaddress>/<subnet>
OS10(conf-if-ma-1/1/1)# exit
OS10(config)#
```

3.1.5 Configure login credentials

```
OS10(config)# username admin password $0$<password>
```

3.1.6 Configure QSPF ports to 4 x 10GbE breakout ports

Identify the QSPF (40GbE) ports number that will be configured as 4 x 10GbE ports and use the following command to configure them. Repeat the following commands for all ports to be configured as 4 x 10GbE breakout ports.

```
OS10(config)# interface breakout 1/1/<port-number> map 10g-4x
OS10(config)# exit
OS10#
```

Use the following command to check port interface status:

```
OS10# show interface status
```

3.1.7 Enable switch ports

Switch ports are enabled and are configured for **switchport mode access** by default for S6010-ON switches. If choosing to reconfigure the ports, use the following steps.

Note: This example assumes all the switch ports are configured as 4 x 10GbE breakout ports for connectivity to 10GbE edge devices.

Option 1: Enable ports individually by entering the port number.

Note: Ports configured as 4 x 10GbE breakout ports, use the following command in which **1/1** represents the switch number, **<*xx*>** represents port number, **<*yy*>** represents sub port number.
`OS10(conf)#interface ethernet 1/1/<xx>:<yy>`

```
OS10# configure terminal
OS10(config)#interface ethernet 1/1/1:1
OS10(conf-if-eth1/1/1:1)# switchport mode access
OS10(conf-if-eth1/1/1:1)# no shutdown
OS10(conf-if-eth1/1/1:1)# exit
```

Option 2: Enable multiple ports at once using the **range** parameter.

The following command will configure all switch ports except ports 1/1/31 and 1/1/32 which will be used for switch interconnect and will be added as member ports to the port channel.

Note: For ports configured as 4 x 10GbE breakout ports, use the following command in which **1/1** represents the switch number, **<*xx*>** represents the port number, and **<*yy*>** represents sub port number:
`OS10(conf)#interface range ethernet 1/1/<xx>:<yy>-1/1/<xx>:<yy>`

```
OS10# configure terminal
OS10(config)# interface range ethernet 1/1/1:1-1/1/30:4
OS10(conf-range-eth1/1/1:1-1/1/30:4)# switchport
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no shutdown
OS10(conf-range-eth1/1/1:1-1/1/30:4)# exit
```

3.1.8 iSCSI enable

This section describes enabling iSCSI auto-detection of attached storage arrays and switch auto-configuration. PS Series and SC Series storage arrays will be detected by the switch when iscsi is enabled. The switch will auto-configure for Jumbo frames with MTU 9216 and flowcontrol receive on, transmit off for all the ports. The ports detected to be connected to the storage units will be auto-configured as spanning-tree edge ports with unicast storm control disabled.

```
OS10(config)# iscsi enable
OS10(config)# iscsi session-monitoring enable
```

3.1.9 Enable Jumbo frames and flow control (optional)

Note: This step is optional because iSCSI auto-detection and auto-configuration enabled in the previous step will enable Jumbo frames with MTU 9216 and enable receive flowcontrol on all ports once PS Series or Dell EMC SC Series storage ports are detected on the switch.

```
OS10(config)# interface range ethernet 1/1/1:1-1/1/30:4
OS10(conf-range-eth1/1/1:1-1/1/30:4)# mtu 9216
OS10(conf-range-eth1/1/1:1-1/1/30:4)# flowcontrol receive on
OS10(conf-range-eth1/1/1:1-1/1/30:4)# flowcontrol transmit off
```

3.1.10 Configure spanning tree on edge ports

```
OS10(conf-range-eth1/1/1:1-1/1/30:4)# spanning-tree port type edge
OS10(conf-range-eth1/1/1:1-1/1/30:4)# exit
```

Note: Spanning tree is enabled by default. If it needs to be reconfigured, use the following commands.

```
OS10(config)# no spanning-tree disable
OS10(config)# exit
```

3.1.11 Configure port channel for link aggregation

These commands create a port channel or link aggregation used as an interconnect between two switches.

```
OS10# configure terminal
OS10(config)# interface port-channel 1
OS10(conf-if-po-1)#mtu 9216
OS10(conf-if-po-1)#no shutdown
OS10(conf-if-po-1)#exit
```

3.1.12 Configure port channel member ports

This configuration guide uses ports 1/1/31 and 1/1/32 as port channel member ports, and they are configured using the following commands.

```
OS10(config)# interface range ethernet 1/1/31,1/1/32
OS10(conf-range-eth1/1/31,1/1/32)# no switchport
OS10(conf-range-eth1/1/31,1/1/32)# channel-group 1 mode active
OS10(conf-range-eth1/1/31,1/1/32)# mtu 9216
OS10(conf-range-eth1/1/31,1/1/32)# flowcontrol receive on
OS10(conf-range-eth1/1/31,1/1/32)# flowcontrol transmit off
OS10(conf-range-eth1/1/31,1/1/32)# exit
OS10(config)# exit
```

3.1.13 Save configuration

```
OS10#copy running-configuration startup-configuration
OS10#reload
System configuration has been modified. Save? [yes/no]: yes
Proceed to reboot the system? [confirm yes/no]:yes
```

3.1.14 Configure additional switch

Repeat the commands from section 3.1 to configure the second switch.

Note: The preceding procedure places all switch ports in the default VLAN. If it is preferred to place ports in a non-default VLAN, refer to the switch documentation.

3.2 Configure Data Center Bridging (DCB) (optional)

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

Note: You must complete the Dell EMC recommended switch configuration steps in section 3.1 before configuring the switch for DCB mode.

3.2.1 Disable iSCSI

```
OS10# configure terminal
OS10(config)# no iscsi enable
OS10(config)# no iscsi session-monitoring enable
```

3.2.2 Disable 802.3x flowcontrol on all ports

```
OS10(config)# interface range ethernet 1/1/1:1-1/1/30:4
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no flowcontrol receive
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no flowcontrol transmit
OS10(conf-range-eth1/1/1:1-1/1/30:4)# exit
OS10(config)#
```

3.2.3 Enable DCB

```
OS10(config)# dcbx enable
```

3.2.4 Create tagged VLAN for all ports and port-channels

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

The following commands will configure single VLAN ID. If desired, multiple VLAN IDs can be created on the switch and assigned to ports.

```
OS10(config)# interface vlan <vlan-id>
OS10(conf-if-vl-<vlan-id>)# mtu 9216
OS10(conf-if-vl-<vlan-id>)# no shutdown
OS10(conf-if-vl-<vlan-id>)# exit
```

3.2.5 Create QoS policy-map with dot1p values as trusted

```
OS10(config)# policy-map type qos <trust-policy-map-name>
OS10(config-pmap-qos)# class class-trust
OS10(config-pmap-c-qos)# trust dot1p
OS10(config-pmap-c-qos)# exit
OS10(config-pmap-qos)# exit
OS10(config)#
```

3.2.6 Create PFC dot1p traffic class

The following commands configure a network QoS class map and match the iSCSI traffic class.

```
OS10(config)# class-map type network-qos <iSCSI-class-map-name>
OS10 (config-cmap-nqos)# match qos-group 4
OS10 (config-cmap-nqos)# exit
OS10(config)#
```

3.2.7 Configure network QoS policy map

```
OS10(config)# policy-map type network-qos <policy-map-name>
OS10(config-pmap-network-qos)# class <iSCSI-class-map-name>
OS10 (config-pmap-c-nqos)# pause
OS10 (config-pmap-c-nqos)# pfc-cos 4
OS10 (config-pmap-c-nqos)# exit
OS10(config-pmap-network-qos)# exit
OS10(config)#
OS10(config)# policy-map type application <qos-policy-map-name>
OS10(config-pmap-application)# class class-iscsi
OS10 (config-pmap-c-app)# set qos-group 4
OS10 (config-pmap-c-app)# set cos 4
OS10 (config-pmap-c-app)# exit
OS10(config-pmap-application)# exit
OS10(config)#
```

3.2.8 Configure ETS policies

```
OS10(config)# qos-map traffic-class <queue-map-name>
OS10(config-qos-map)# queue 0 qos-group 0-3,5-7
OS10(config-qos-map)# queue 4 qos-group 4
OS10(config-qos-map)# exit
OS10(config)#
OS10(config)# class-map type queuing <LAN-traffic-map-name>
OS10(config-cmap-queuing)# match queue 0
OS10(config-cmap-queuing)# exit
OS10(config)#
OS10(config)# class-map type queuing <iSCSI-traffic-map-name>
OS10(config-cmap-queuing)# match queue 4
OS10(config-cmap-queuing)# exit
OS10(config)#
```

3.2.9 Create ETS policy-map for bandwidth allocations

```
OS10(config)# policy-map type queuing <queuing-policy-name>
OS10(config-pmap-queuing)# class <LAN-traffic-map-name>
OS10(config-pmap-c-que)# bandwidth percent <bandwidth-percentage>
OS10(config-pmap-c-que)# exit
OS10(config-pmap-queuing)# class <iSCSI-traffic-map-name>
OS10(config-pmap-c-que)# bandwidth percent <bandwidth-percentage>
OS10(config-pmap-c-que)# exit
OS10(config-pmap-queuing)# exit
OS10(config)#
```

Note: The sum of the bandwidth-percentages must be equal to 100. Monitor the LAN and SAN performance in your environment to determine optimal bandwidth settings.

3.2.10 QoS policy

```
OS10(config)# system qos
OS10(config-sys-qos)# service-policy input type qos <trust-policy-map-name>
OS10(config-sys-qos)# service-policy type application <qos-policy-map-name>
OS10(config-sys-qos)# ets mode on
OS10(config-sys-qos)# exit
OS10(config)#
```

3.2.11 Apply policies and VLAN ID to all switch edge ports (except port channel member ports)

```
OS10(config)# interface range ethernet 1/1/1:1-1/1/30:4
OS10(conf-range-eth1/1/1:1-1/1/30:4)# switchport mode trunk
OS10(conf-range-eth1/1/1:1-1/1/30:4)# switchport trunk allowed vlan <vlan-id>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# service-policy input type network-qos
<policy-map-name>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# service-policy output type queuing
<queuing-policy-name>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# ets mode on
OS10(conf-range-eth1/1/1:1-1/1/30:4)# qos-map traffic-class <queue-map-name>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# priority-flow-control mode on
OS10(conf-range-eth1/1/1:1-1/1/30:4)# exit
OS10(config)#
```

3.2.12 Apply policies and VLAN ID on port channel and its member ports

```
OS10(config)# interface port-channel1
OS10(conf-if-po-1)# switchport mode trunk
OS10(conf-if-po-1)# switchport trunk allowed vlan <vlan-id>
OS10(conf-if-po-1)# no shutdown
OS10(conf-if-po-1)# exit
OS10(config)#
```

This configuration guide uses ports 1/1/49 and 1/1/50 as port-channel member ports, and they are configured using the following commands.

```
OS10(config)# interface range ethernet 1/1/31,1/1/32
OS10(conf-range-eth1/1/31,1/1/32)# service-policy input type network-qos
<policy-map-name>
OS10(conf-range-eth1/1/31,1/1/32)# service-policy output type queuing <queuing-
policy-name>
OS10(conf-range-eth1/1/31,1/1/32)# ets mode on
OS10(conf-range-eth1/1/31,1/1/32)# qos-map traffic-class <queue-map-name>
OS10(conf-range-eth1/1/31,1/1/32)# priority-flow-control mode on
OS10(conf-range-eth1/1/31,1/1/32)# exit
OS10(config)# exit
OS10(config)#
```

3.2.13 iSCSI enable

```
OS10(config)# iscsi enable
OS10(config)# iscsi session-monitoring enable
OS10(config)# exit
```

3.2.14 Save configuration

```
OS10# copy running-configuration startup-configuration
```

3.2.15 Show commands to verify DCBx, ETS, and PFC status on individual ports

```
OS10# show lldp dcbx interface ethernet 1/1/<port-number>
OS10# show lldp dcbx interface ethernet 1/1/<port-number> pfc detail
OS10# show lldp dcbx interface ethernet 1/1/<port-number> ets detail
```

3.2.16 Configure additional switches

Repeat the commands from section 3.2 to configure DCB on additional switches.

3.3 Revert 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 3.1. If deleting the current configuration is not an option, use the following procedure to unconfigure DCB and enable standard flow control.

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

3.3.1 Disable DCB

```
OS10# configure terminal
OS10(config)# no dcbx enable
OS10(config)#
```

3.3.2 Disable iSCSI

```
OS10(config)# no iscsi enable
OS10(config)# no iscsi session-monitoring enable
```

3.3.3 Remove DCB policies and apply standard flow control on edge ports

```
OS10(config)# interface range ethernet 1/1/1:1-1/1/30:4
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no priority-flow-control
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no qos-map traffic-class
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no ets
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no service-policy output type queuing
<queuing-policy-name>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no service-policy input type network-qos
<policy-map-name>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no switchport trunk allowed vlan <vlan-id>
OS10(conf-range-eth1/1/1:1-1/1/30:4)# no switchport mode
OS10(conf-range-eth1/1/1:1-1/1/30:4)# switchport mode access
OS10(conf-range-eth1/1/1:1-1/1/30:4)# flowcontrol receive on
OS10(conf-range-eth1/1/1:1-1/1/30:4)# flowcontrol transmit off
OS10(conf-range-eth1/1/1:1-1/1/30:4)# exit
OS10(config)#
```

3.3.4 Remove DCB policies and apply standard flow control on port-channel member ports

```
OS10(config)# interface range ethernet 1/1/31,1/1/32
OS10(conf-range-eth1/1/31,1/1/32)# no priority-flow-control
OS10(conf-range-eth1/1/31,1/1/32)# no ets
OS10(conf-range-eth1/1/31,1/1/32)# no qos-map traffic-class
OS10(conf-range-eth1/1/31,1/1/32)# no service-policy output type queuing
<queuing-policy-name>
OS10(conf-range-eth1/1/31,1/1/32)# no service-policy input type network-qos
<policy-map-name>
OS10(conf-range-eth1/1/31,1/1/32)# flowcontrol receive on
OS10(conf-range-eth1/1/31,1/1/32)# flowcontrol transmit off
OS10(conf-range-eth1/1/31,1/1/32)# exit
OS10(config)#
OS10(config)# interface port-channel 1
OS10(conf-if-po-1)# no switchport trunk allowed vlan <vlan-id>
OS10(conf-if-po-1)# switchport access vlan 1
OS10(conf-if-po-1)# exit
OS10(config)#
```

3.3.5 Revert to default VLAN ID on switch and arrays

Once DCB is disabled on the switch, the PS Series 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 Series 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**.

The prior steps in sections 3.3.3 and 3.3.4 revert the switch ports to default native vlan 1. Use the following command to remove VLANs other than vlan 1 from the switch configuration.

```
OS10(config)# no interface vlan <vlan-id>
```

3.3.6 Remove ETS, PFC, and other policies from switch configuration

```
OS10(config)# no policy-map type queuing <queuing-policy-name>
OS10(config)# no class-map type queuing <LAN-traffic-map-name>
OS10(config)# no class-map type queuing <iSCSI-traffic-map-name>
OS10(config)#ss system qos
OS10(config-sys-qos)# no ets
OS10(config-sys-qos)# no service-policy input type qos <trust-policy-map-name>
OS10(config-sys-qos)# no service-policy type application <qos-policy-map-name>
OS10(config-sys-qos)# exit
OS10(config)# no policy-map type network-qos <policy-map-name>
OS10(config)# no policy-map type qos <trust-policy-map-name>
OS10(config)# policy-map type application <qos-policy-map-name>
OS10(config-pmap-application)# no class class-iscsi
OS10(config-pmap-application)# exit
OS10(config)# no qos-map traffic-class <queue-map-name>
OS10(config)# no class-map type network-qos <iSCSI-class-map-name>
OS10(config)# no class-map type application <qos-policy-map-name>
OS10(config)#
```

3.3.7 iSCSI enable

```
OS10(config)# iscsi enable
OS10(config)# iscsi session-monitoring enable
OS10(config)# exit
```

3.3.8 Save configuration

```
OS10# copy running-configuration startup-configuration
```

3.3.9 Reload

```
OS10# reload
Proceed to reboot the system? [confirm yes/no]:yes
```

Note: The switch will reboot.

3.3.10 Verify DCB status

```
OS10# show lldp dcbx interface ethernet 1/1/<port-number>
```

3.3.11 Configure additional switch

Repeat the commands from section 3.3 to disable DCB on any additional switches.

A Technical support and resources

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

Dell TechCenter is an online technical community where IT professionals have access to numerous resources for Dell EMC software, hardware, and services.

Storage Solutions Technical Documents on Dell TechCenter provide expertise that helps to ensure customer success on Dell EMC storage platforms.

A.1 Related resources

Referenced or recommended Dell publications:

- *Dell PS Series Configuration Guide*
- *Dell EMC Storage Compatibility Matrix*

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