Dell EMC Networking S4048-ON

Switch Configuration Guide for Dell PS Series SANs

Abstract
This document illustrates how to configure Dell EMC™ Networking S4048-ON switches for use with Dell™ PS Series storage while using Dell EMC best practices.

February 2018
Revisions

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<td>August 2015</td>
<td>Initial release</td>
</tr>
<tr>
<td>February 2018</td>
<td>Update to include configuration steps for both OS 9.x and 10.x</td>
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1 Introduction

This document illustrates how to configure Dell EMC™ Networking S4048-ON switches for use with Dell™ PS Series storage while 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 the 40GbE Quad Small Form-factor Pluggable (QSFP) ports with appropriate 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).

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 3 in this Switch Configuration Guide.

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 S4048-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.x): section 2
- Dell Networking OS 10.x (firmware 10.x): section 3

1.2 Document conventions

Table 1 lists the formatting conventions used in this document.

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<th>Convention</th>
<th>Example</th>
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<tr>
<td>Code samples</td>
<td>Monospace</td>
<td>System configuration has been modified.</td>
</tr>
<tr>
<td>Parameters</td>
<td>Italic</td>
<td>Dell(profile-name)#</td>
</tr>
<tr>
<td>Command-line commands</td>
<td>Bold</td>
<td>OS#show version</td>
</tr>
<tr>
<td>Command-line user-supplied variables</td>
<td>Bold, italic, brackets</td>
<td>&lt;vlan-id&gt;</td>
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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 S4048-ON switches running Dell Networking OS 9.x (firmware 9.x). If your switches are running firmware 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)

<table>
<thead>
<tr>
<th>Switch vendor</th>
<th>Dell EMC</th>
</tr>
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<tr>
<td>Switch model</td>
<td>S4048-ON</td>
</tr>
<tr>
<td>Switch firmware</td>
<td>9.x (9.10.0.0 or above)</td>
</tr>
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</table>

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 S4048-ON switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 40Gbe Quad Small Form-factor Pluggable (QSFP) uplink ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP).

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 (usually COM1 but this may vary depending on your system). Configure serial communications for 115200,N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches by connecting port 49 on switch 1 to port 49 on switch 2 and port 50 on switch 1 to port 50 on switch 2. See this configuration in Figure 1.
2.1.2 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.

2.1.3 Configure out of band (OOB) management port

```
Dell> enable
```

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

```
Dell# configure
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
```

2.1.4 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.

2.1.5 Configure login credentials

```
Dell(conf)# username admin privilege 15 password 0 <yourpassword>
Dell(conf)# enable password level 15 0 <yourpassword>
```
2.1.6  **Enable switch ports**

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

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

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

Dell#configure
Dell(conf)#interface range tengigabitethernet 1/1-1/48
Dell(conf-if-range-te-1/1-1/48)#switchport
Dell(conf-if-range-te-1/1-1/48)#no shutdown
Dell(conf-if-range-te-1/1-1/48)#exit
Dell(conf)#exit

2.1.7  **Enable Jumbo frames**

Dell#configure
Dell(conf)#interface range tengigabitethernet 1/1-1/48
Dell(conf-if-range-te-1/1-1/48)#mtu 12000

2.1.8  **Configure flow control**

Dell(conf-if-range-te-1/1-1/48)#flowcontrol rx on tx off

2.1.9  **Configure spanning tree on edge ports**

Dell(conf-if-range-te-1/1-1/48)#spanning-tree rstp edge-port
Dell(conf-if-range-te-1/1-1/48)#exit
Dell(conf)#protocol spanning-tree rstp
Dell(conf-rstp)#no disable
Dell(conf-rstp)#exit

2.1.10  **Configure port channel for LAG**

Configure the switch interconnect as a LAG.

Dell(conf)#interface Port-channel 1
Dell(conf-if-po-1)#mtu 12000
Dell(conf-if-po-1)#switchport
Dell(conf-if-po-1)#no shutdown
Dell(conf-if-po-1)#exit
2.1.11 Configure QSFP ports for LAG
Assign 40Gb QSFP ports to the port channel.

Dell(conf)#interface range fortyGigE 1/49 , fortyGigE 1/50
Dell(conf-if-range-fo-1/49,fo-1/50)#no ip address
Dell(conf-if-range-fo-1/49,fo-1/50)#mtu 12000
Dell(conf-if-range-te-1/49,fo-1/50)#no shutdown
Dell(conf-if-range-fo-1/49,fo-1/50)#flowcontrol rx on tx off
Dell(conf-if-range-fo-1/49,fo-1/50)#port-channel-protocol lacp
Dell(conf-if-range-fo-1/49,fo-1/50-lacp)#port-channel 1 mode active
Dell(conf-if-range-fo-1/49,fo-1/50-lacp)#exit
Dell(conf-if-range-fo-1/49,fo-1/50)#exit
Dell(conf)#exit

2.1.12 Save configuration
Dell#copy running-config startup-config

2.1.13 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 you prefer to place ports in a non-default VLAN, refer to the documentation for your switch.
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 tengigabitethernet 1/1-1/48
Dell(conf-if-range-te-1/1-48)#no flowcontrol rx on tx off
Dell(conf-if-range-te-1/1-48)#exit
```

### 2.2.2 Disable 802.3x flowcontrol on QSFP ports

```
Dell(conf)#interface range fortyGigE 1/49 , fortyGigE 1/50
Dell(conf-if-range-fo-1/49-50)#no flowcontrol rx on tx off
Dell(conf-if-range-fo-1/49-50)#exit
```

### 2.2.3 Enable DCB and reload

```
Dell(conf)#dcb enable
Dell(conf)#exit
Dell#copy running-config startup-config
Dell#reload
```

**Note:** After confirming reload request, the switch will reboot.

### 2.2.4 Create tagged VLAN for all ports and port-channels

```
Dell#configure
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*)#no shutdown
Dell (conf-if-vl-vlan-id*)#tagged tengigabitethernet 1/1-1/48
Dell (conf-if-vl-vlan-id*)#tagged port-channel 1
Dell (conf-if-vl-vlan-id*)#exit
```
2.2.5 Configure DCB policies

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

**Note:** The sum of the bandwidth-percentages must be equal to 100.

Dell(config-dcbmap-profile-name*)#priority-pgid 0 0 0 0 1 0 0 0
Dell(config-dcb-profile-name*)#exit

2.2.6 Apply policies to switch ports

Dell(config)#interface range tengigabitethernet 1/1-1/48
Dell(config-if-range-te-1/1-48)# dcb-map <profile-name>
Dell(config-if-range-te-1/1-48)#exit

Dell(config)#interface range fortyGigE 1/49, fortyGigE 1/50
Dell(config-if-range-fo-1/49,fo-1/50)# dcb-map <profile-name>
Dell(config-if-range-fo-1/49,fo-1/50)#exit
Dell(config)#exit

**Note:** The sum of the bandwidth-percentages must be equal to 100.

2.2.7 Save configuration

Dell#copy running-config startup-config

2.2.8 Configure additional switch

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

```bash
dell#configure
dell(conf)#interface range tengigabitethernet 1/1-48
dell(conf-if-range-te-1/1-48)#no dcb-map <profile-name>
dell(conf-if-range-te-1/1-48)#flowcontrol rx on tx off
dell(conf-if-range-te-1/1-48)#exit

dell(conf)#interface range fortyGigE 1/49 , fortyGigE 1/50
dell(conf-if-range-fo-1/49,fo-1/50)#no dcb-map <profile-name>
dell(conf-if-range-fo-1/49,fo-1/50)#flowcontrol rx on tx off
dell(conf-if-range-fo-1/49,fo-1/50)#exit
dell(conf)#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**.

**Note:** The host NICS must also be updated with matching VLAN information.

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

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

### 2.3.4 Save configuration

```bash
dell#copy running-config startup-config
```

### 2.3.5 Reload

```bash
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

```bash
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.
2.4 Optional stack configuration

**Note:** If choosing to use a stack configuration instead of LAG, follow the instructions in this section instead of those in section 2.1.

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.

2.4.1 Delete startup configuration on first switch

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.

2.4.2 Configure stack on the first switch

Dell>enable

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

Dell#configure
Dell(conf)#stack-unit 1 priority 1
Dell(conf)#stack-unit 1 stack-group 12
Dell(conf)#stack-unit 1 stack-group 13
Dell(conf)#exit
Dell#copy running-config startup-config
Dell#reload

2.4.3 Delete startup configuration on the second switch

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.
2.4.4 Configure stack on the second switch

Dell>enable
Dell#stack-unit 1 renumber 2

**Note:** After confirming the configuration change, the switch will need to reboot.

Dell#configure
Dell(conf)#stack-unit 2 priority 1
Dell(conf)#stack-unit 2 stack-group 12
Dell(conf)#stack-unit 2 stack-group 13
Dell(conf)#exit
Dell#copy running-config startup-config
Dell#reload

2.4.5 Verify stack configuration

From the first switch (master) CLI, confirm that the stack has formed.

Dell#show redundancy
Dell#show boot system stack-unit all

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

2.4.6 Configure out of band (OOB) management port

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)#no shutdown
Dell(conf-if-ma-1/1)#exit

2.4.7 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.
Switch configuration (OS 9.x)

2.4.8 Configure login credentials
Dell(conf)#username admin privilege 15 password 0 <yourpassword>
Dell(conf)#enable password level 15 0 <yourpassword>

2.4.9 Configure switch ports
Dell(conf)#interface range tengigabitethernet 1/1-1/48
Dell(conf-if-range-te-1/1-48)#mtu 12000
Dell(conf-if-range-te-1/1-48)#switchport
Dell(conf-if-range-te-1/1-48)#spanning-tree rstp edge-port
Dell(conf-if-range-te-1/1-48)#flowcontrol rx on tx off
Dell(conf-if-range-te-1/1-48)#no shutdown
Dell(conf-if-range-te-1/1-48)#exit
Dell(conf)#interface range tengigabitethernet 2/1-2/48
Dell(conf-if-range-te-2/1-2/48)#mtu 12000
Dell(conf-if-range-te-2/1-2/48)#switchport
Dell(conf-if-range-te-2/1-2/48)#spanning-tree rstp edge-port
Dell(conf-if-range-te-2/1-2/48)#flowcontrol rx on tx off
Dell(conf-if-range-te-2/1-2/48)#no shut
Dell(conf-if-range-te-2/1-2/48)#exit

Dell(conf)# protocol spanning-tree rstp
Dell(conf-rstp)#no disable
Dell(conf-rstp)#exit

Dell(conf)#exit

2.4.10 Save configuration and reload
Dell#copy running-config startup-config

Reload the stack to allow settings to take effect:
Dell#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 switch documentation.
3 Switch configuration (OS 10.x)

This section provides steps to configure Dell EMC Networking S4048-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)

<table>
<thead>
<tr>
<th>Dell EMC Networking S4048-ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch vendor</td>
</tr>
<tr>
<td>Switch model</td>
</tr>
<tr>
<td>Switch firmware</td>
</tr>
</tbody>
</table>

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 S4048-ON switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 40GbE Quad Small Form-factor Pluggable (QSFP) uplink ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP).

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 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 115200,N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches by connecting port 49 on switch 1 to port 49 on switch 2 and port 50 on switch 1 to port 50 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.

```bash
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**

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

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

3.1.5 **Configure login credentials**

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

3.1.6 **Configure QSPF ports to 4 x 10GbE breakout ports**

QSFP ports can be configured as breakouts to be used with 10GbE iSCSI storage or server network adapters. To configure these ports as 4 x 10GbE ports, use the following commands.

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

Use the following command to check port interface status.

```bash
OS10# show interface status
```
3.1.7 Enable switch ports

Switch ports are enabled and are configured for switchport mode access by default for S4048 switches. If choosing to reconfigure the ports, use the following steps.

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

```
OS10# configure terminal
OS10(config)#interface ethernet 1/1/1
```

**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>
```

```
OS10(conf-if-eth1/1/1)# switchport mode access
OS10(conf-if-eth1/1/1)# no shutdown
OS10(conf-if-eth1/1/1)# exit
```

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

```
OS10# configure terminal
OS10(config)# interface range ethernet 1/1-1/1/48
```

**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(conf-range-eth1/1-1/1/48)# switchport
OS10(conf-range-eth1/1-1/1/48)# no shutdown
OS10(conf-range-eth1/1-1/1/48)# exit
```

3.1.8 iSCSI enable

This section describes enabling iSCSI auto-detection of attached storage arrays and switch auto-configuration. PS Series and Dell EMC 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 above storage units will be auto-configured as spanning-tree edge ports and unicast storm control is 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 as iSCSI auto-detection and auto-configuration enabled in previous step will enable Jumbo frames with MTU 9216 and enable receive flowcontrol on all ports once PS Series or SC Series storage ports are detected on the switch.

```
OS10(config)# interface range ethernet 1/1/1-1/1/48
OS10(conf-range-eth1/1-1/1/48)# mtu 9216
OS10(conf-range-eth1/1-1/1/48)# flowcontrol receive on
OS10(conf-range-eth1/1-1/1/48)# flowcontrol transmit off
```

3.1.10 Configure spanning tree on edge ports

```
OS10(conf-range-eth1/1-1/1/48)# spanning-tree port type edge
OS10(conf-range-eth1/1-1/1/48)# exit
```

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

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

3.1.11 Configure port channel for link aggregation

Use the following commands to 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 1/1/49 and 1/1/50 as port-channel member ports which are configured using following commands.

```
OS10(config)# interface range ethernet 1/1/49,1/1/50
OS10(conf-range-eth1/1-1/1/50)# no switchport
OS10(conf-range-eth1/1-1/1/50)# channel-group 1 mode active
OS10(conf-range-eth1/1-1/1/50)# mtu 9216
OS10(conf-range-eth1/1-1/1/50)# flowcontrol receive on
OS10(conf-range-eth1/1-1/1/50)# flowcontrol transmit off
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 you prefer 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 1/1/1-1/1/48`

OS10(config-range-eth1/1/1-1/1/48)# `no flowcontrol receive`

OS10(config-range-eth1/1/1-1/1/48)# `no flowcontrol transmit`

OS10(config-range-eth1/1/1-1/1/48)# `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 configure a 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(config-if-vl-<vlan-id>)# mtu 9216
OS10(config-if-vl-<vlan-id>)# no shutdown
OS10(config-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-c-que)# class <iSCSI-traffic-map-name>
OS10(config-pmap-c-que)# bandwidth percent <bandwidth-percentage>
OS10(config-pmap-c-que)# exit
OS10(config-pmap-c-que)# 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 1/1/1-1/1/48
OS10(config)# switchport mode trunk
OS10(config)# switchport trunk allowed vlan <vlan-id>
OS10(config)# service-policy input type network-qos <policy-map-name>
OS10(config)# service-policy output type queuing <queuing-policy-name>
OS10(config)# ets mode on
OS10(config)# qos-map traffic-class <queue-map-name>
OS10(config)# priority-flow-control mode on
OS10(config)# exit

3.2.12 Apply policies and vlan id on port-channel and its member ports

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

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

OS10(config)# interface range ethernet 1/1/49,1/1/50
OS10(config)# service-policy input type network-qos <policy-map-name>
OS10(config)# service-policy output type queuing <queuing-policy-name>
OS10(config)# ets mode on
OS10(config)# qos-map traffic-class <queue-map-name>
OS10(config)# priority-flow-control mode on
OS10(config)# exit
OS10(config)# exit

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

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

3.3.2 Disable iSCSI

```bash
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

```bash
OS10(config)# interface range ethernet 1/1/1-1/1/48
OS10(config-range-eth1/1/1-1/1/48)# no priority-flow-control
OS10(config-range-eth1/1/1-1/1/48)# no qos-map traffic-class
OS10(config-range-eth1/1/1-1/1/48)# no ets
OS10(config-range-eth1/1/1-1/1/48)# no service-policy output type queuing <queuing-policy-name>
OS10(config-range-eth1/1/1-1/1/48)# no service-policy input type network-qos <policy-map-name>
OS10(config-range-eth1/1/1-1/1/48)# no switchport trunk allowed vlan <vlan-id>
OS10(config-range-eth1/1/1-1/1/48)# no switchport mode
OS10(config-range-eth1/1/1-1/1/48)# switchport mode access
OS10(config-range-eth1/1/1-1/1/48)# flowcontrol receive on
OS10(config-range-eth1/1/1-1/1/48)# flowcontrol transmit off
OS10(config-range-eth1/1/1-1/1/48)# exit
OS10(config)#
```
3.3.4 Remove DCB policies and apply standard flow control on port-channel member ports

OS10(config)# interface range ethernet 1/1/49,1/1/50
OS10(conf-range-ethl/1/49,1/1/50)# no priority-flow-control
OS10(conf-range-ethl/1/49,1/1/50)# no ets
OS10(conf-range-ethl/1/49,1/1/50)# no qos-map traffic-class
OS10(conf-range-ethl/1/49,1/1/50)# no service-policy output type queuing <queuing-policy-name>
OS10(conf-range-ethl/1/49,1/1/50)# no service-policy input type network-qos <policy-map-name>
OS10(conf-range-ethl/1/49,1/1/50)# flowcontrol receive on
OS10(conf-range-ethl/1/49,1/1/50)# flowcontrol transmit off
OS10(conf-range-ethl/1/49,1/1/50)# 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 previous steps in section 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

```bash
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

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

3.3.8 Save configuration

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

3.3.9 Reload

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

Note: The switch will reboot.
```

3.3.10 Verify DCB status

```bash
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

See the following 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.