Notes, Cautions, and Warnings

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

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

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

This book provides information about the Dell Networking OS command line interface (CLI) on the Dell PowerEdge M I/O Aggregator.
This book also includes information about the protocols and features found in the Dell Networking OS and on the Dell Networking systems supported by the Dell Networking OS.

References

For more information about your system, refer to the following documents:

- Dell PowerEdge M I/O Aggregator Configuration Guide
- Dell PowerEdge M I/O Aggregator Getting Started Guide
- Release Notes for the Dell PowerEdge M I/O Aggregator

Objectives

This book is intended as a reference guide for the Aggregator CLI commands, with detailed syntax statements, along with usage information and sample output.
This guide contains an Appendix with a list of the request for comment (RFCs) and management information base files (MIBs) supported.

NOTE: For more information about when to use the CLI commands, refer to the Dell PowerEdge M I/O Aggregator Configuration Guide for your system.
Audience

This book is intended for system administrators who are responsible for configuring or maintaining networks. This guide assumes that you are knowledgeable in Layer 2 and Layer 3 networking technologies.

Conventions

This book uses the following conventions to describe command syntax.

- **Keyword**
  - Keywords are in Courier font and must be entered in the CLI as listed.

- **parameter**
  - Parameters are in italics and require a number or word to be entered in the CLI.

- {X}
  - Keywords and parameters within braces must be entered in the CLI.

- [X]
  - Keywords and parameters within brackets are optional.

- x|y
  - Keywords and parameters separated by a bar require you to choose one option.

- x||y
  - Keywords and parameters separated by a double bar allows you to choose any or all of the options.
Before You Start

By following the instructions in the *Dell PowerEdge M I/O Aggregator Getting Started Guide* that is shipped with the product, you install the Aggregator in a Dell PowerEdge M1000e Enclosure.

The Aggregator installs with zero-touch configuration. After you power it on, an Aggregator boots up with default settings and auto-configures with software features enabled. This chapter describes the default settings and software features that are automatically configured at startup. Use the tasks described in the other chapters to reconfigure the Aggregator for customized network operation.

Operational Modes

The I/O Aggregator supports four operational modes. Select the operational mode that meets your deployment needs. To enable a new operational mode, reload the switch.

- **Standalone mode** — stack-unit unit iom-mode standalone. This is the default mode for IOA. It is fully automated zero-touch mode that allows you to configure VLAN memberships. (Supported in CMC)
- **Programmable MUX mode (PMUX)** — stack-unit unit iom-mode programmable-mux. Select this mode to configure PMUX mode CLI commands.
- **Stacking mode** — stack-unit unit iom-mode stacking. Select this mode to stack up to 6 IOA stack units as a single logical switch. The stack units can be in the same or on different chassis. This is a low-touch mode where all configuration except VLAN membership is automated. To enable VLAN, you must configure it. In this operational mode, base module links are dedicated to stacking.
- **Virtual Link Trunking mode (VLT)** — stack-unit unit iom-mode vlt. Select this mode to multi-home server interfaces to different IOA modules. This is a low-touch mode where all configuration except VLAN membership is automated. To enable VLAN, you must configure it. In this mode, base module links are dedicated to VLT interconnect.

For more information, refer to the *Dell PowerEdge M I/O Aggregator Configuration Guide*.

Default Settings

The I/O Aggregator provides zero-touch configuration with the following default configuration settings:

- Default user name (**root**)
- Password (**calvin**)
- VLAN (**vlan1**) and IP address for in-band management (**DHCP-assigned**)
- IP address for out-of-band (OOB) management (**DHCP-assigned**)
- Read-only SNMP community name (**public**)
- Broadcast storm control (**enabled**)
- Unregistered Multicast Packets flooding (**enabled**)

Before You Start
• IGMP snooping in all VLANs except the default VLAN **enabled**
• VLAN configuration **all ports belong to all VLANs**

You can change any of these default settings using the CLI. Refer to the appropriate chapter for details.

**NOTE:** You can also change many of the default settings using the chassis management controller (CMC) interface. For information about how to access the CMC to configure an Aggregator, refer to the Dell PowerEdge M1000e Enclosure Hardware Owner’s Manual or Dell Chassis Management Controller (CMC) User’s Guide on the Dell Support website at http://support.dell.com/support/edocs/systems/pem/en/index.htm.

### Other Auto-Configured Settings

After the Aggregator powers on, it auto-configures and is operational with software features enabled, including:

• **VLANs:** All ports are configured as members of all (4094) VLANs. All VLANs are up and can send or receive layer 2 traffic. For more information, refer to VLANs.
• **Data Center Bridging Capability Exchange Protocol (DCBX)**
• **Fibre Channel over Ethernet (FCoE) connectivity**
• **FCoE Initiation Protocol (FIP) snooping**
• **Hybrid ports:** Ports are administratively up and auto-configured to operate as hybrid ports to transmit tagged and untagged VLAN traffic.
• **iSCSI optimization**
• **IGMP snooping**
• **Jumbo frames:** Ports are set to a maximum MTU of 12,000 bytes by default.
• **Link aggregation:** All uplink ports are configured in a single LAG (LAG 128).
• **Link Layer Discovery Protocol (LLDP):** Enabled on all ports.
• **Link tracking:** Enables server-facing links to be brought up only if the uplink port-channel (LAG 128) is up.
• **Stacking:** Stacking is supported only on the 40GbE ports on the base module. A single stack is limited to six Aggregators in the same chassis. Up to three stacks are supported in an M1000e chassis. To configure a switch stack, you must use the CLI. For more information, refer to Stacking Commands.

### DCB Support

DCB enhancements for data center networks are supported to eliminate packet loss and provision links with required bandwidth.

The Aggregator provides zero-touch configuration for DCB. The Aggregator auto-configures DCBX port roles to match the DCBX configuration in the ToR switches to which it connects through its uplink ports.

The Aggregator supports DCB only in standalone mode and not in the stacking mode.

### FCoE Connectivity

Many data centers use Fibre Channel (FC) in storage area networks (SANs). Fibre Channel over Ethernet (FCoE) encapsulates Fibre Channel frames over Ethernet networks.
On an Aggregator, the internal ports support FCoE connectivity and connect to the converged network adapter (CNA) in blade servers. FCoE allows Fibre Channel to use 10-Gigabit Ethernet networks while preserving the Fibre Channel protocol.

The Aggregator also provides zero-touch configuration for FCoE configuration. The Aggregator auto-configures to match the FCoE settings used in the ToR switches to which it connects through its uplink ports.

**iSCSI Operation**

Support for iSCSI traffic is turned on by default when the Aggregator powers up. No configuration is required.

When the Aggregator powers up, it monitors known TCP ports for iSCSI storage devices on all interfaces. When a session is detected, an entry is created and monitored as long as the session is active.

The Aggregator also detects iSCSI storage devices on all interfaces and auto-configures to optimize performance. Performance optimization operations, such as Jumbo frame size support, STP port-state fast, and disabling of storm control on interfaces connected to an iSCSI storage device, are applied automatically.

CLI configuration is necessary only when the configuration includes iSCSI storage devices that cannot be automatically detected and when non-default QoS handling is required.

**Link Aggregation**

In Standalone, VLT, and Stacking modes, all uplink ports are configured in a single LAG (LAG 128). There can be multiple uplink LAGs in programmable-mux mode. Server-facing ports are auto-configured as part of link aggregation groups if the corresponding server is configured for LACP-based NIC teaming. Static LAGs are supported in PUX mode.

> **NOTE:** The recommended LACP timeout is Long-Timeout mode.

**Link Tracking**

By default, all server-facing ports are tracked by the operational status of the uplink LAG. If the uplink LAG goes down, the Aggregator loses its connectivity and is no longer operational; all server-facing ports are brought down.

> **NOTE:** If installed servers do not have connectivity to a ToR switch, check the Link Status LED of uplink ports on the Aggregator. If all LEDs are ON, check the LACP configuration on the ToR switch that is connected to the Aggregator to ensure the LACP is correctly configured.

**VLANs**

By default, all Aggregator ports belong to all 4094 VLANs and are members of untagged VLAN 1. You can use the CLI or CMC interface to configure only the required VLANs on a port.
When you configure VLANs on server-facing interfaces (ports 1 to 32), you can assign VLANs to a port or a range of ports by entering the `vlan tagged` or `vlan untagged` commands in interface configuration mode; for example:

Dell(conf)# interface tengigabitethernet 0/2 - 4
Dell(conf-if-range-te-0/2-4)# vlan tagged 5,7,10-12
Dell(conf-if-range-te-0/2-4)# vlan untagged 3

**NOTE:** You can also use the CMC interface to configure VLANs.

**Uplink LAG**

The tagged VLAN membership of the uplink LAG is automatically configured based on the tagged and untagged VLAN configuration of all server-facing ports (ports 1 to 32).

The untagged VLAN used for the uplink LAG is always the default VLAN.

**Server-Facing LAGs**

The tagged VLAN membership of a server-facing LAG is automatically configured based on the server-facing ports that are members of the LAG.

The untagged VLAN of a server-facing LAG is configured based on the untagged VLAN to which the lowest numbered server-facing port in the LAG belongs.

**NOTE:** Dell Networking recommends that you configure the same VLAN membership on all LAG member ports.

**Stacking Mode**

When you configure an Aggregator to operate in stacking mode (See “Configuring and Bringing Up a Stack” in the Dell Networking Configuration Guide for the M I/O Aggregator), VLANs are reconfigured as follows:

If an Aggregator port belonged to all 4094 VLANs in standalone mode (default), all VLAN membership is removed and the port is assigned only to default VLAN 1. You must configure additional VLAN membership as necessary.

If you had manually configured an Aggregator port to belong to one or more VLANs (non-default) in standalone mode, the VLAN configuration is retained in stacking mode only on the master switch.

When you reconfigure an Aggregator from stacking to standalone mode:

Aggregator ports that you manually configured for VLAN membership in stacking mode retain their VLAN configuration in standalone mode.

To restore the default auto-VLAN mode of operation (in which all ports are members of all 4094 VLANs) on a port, enter the `auto vlan` command; for example:

Dell(conf)# interface tengigabitethernet 0/2
Dell(conf-if-te-0/2)# auto vlan

To get the default standalone mode configurations:

1. Delete the `startup-config` file and reboot the system.

22 Before You Start
2. Restore to factory default settings.
3. Configure auto vlan command on all the server ports.

Where to Go From Here

You can customize the Aggregator for use in your data center network as necessary. To perform additional switch configuration, do one of the following:

- For remote out-of-band management, enter the OOB management interface IP address into a Telnet or SSH client and log in to the switch using the user ID and password to access the CLI.
- For local management using the CLI, use the attached console connection.
- For remote in-band management from a network management station, enter the VLAN IP address of the management port and log in to the switch to access the CLI.

If you installed the Aggregator in a stack, you can configure additional settings for switch stacking.

In case of a Dell Networking OS upgrade, you can check to see that an Aggregator is running the latest Dell Networking OS version by entering the show version command. To download a Dell Networking OS version, go to http://support.dell.com.

Refer to the appropriate chapter for detailed information on how to configure specific software settings.
CLI Basics

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

Accessing the Command Line

When the system boots successfully, you are positioned on the command line in EXEC mode and not prompted to log in. You can access the commands through a serial console port or a Telnet session. When you Telnet into the switch, you are prompted to enter a login name and password.

Example

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

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

<table>
<thead>
<tr>
<th>Prompt</th>
<th>CLI Command Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell&gt;</td>
<td>EXEC</td>
</tr>
<tr>
<td>Dell#</td>
<td>EXEC Privilege</td>
</tr>
<tr>
<td>Dell(conf)#</td>
<td>CONFIGURATION</td>
</tr>
</tbody>
</table>

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

Multiple Configuration Users

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

Dell#conf

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

User "" on line console0
User "admin" on line vty0 ( 123.12.1.123 )
User "admin" on line vty1 ( 123.12.1.123 )
When another user enters CONFIGURATION mode, the Dell Networking OS sends a message similar to the following:

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

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

### Navigating the CLI

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

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

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

<table>
<thead>
<tr>
<th>Prompt</th>
<th>CLI Command Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell&gt;</td>
<td>EXEC</td>
</tr>
<tr>
<td>Dell#</td>
<td>EXEC Privilege</td>
</tr>
<tr>
<td>Dell(conf)#</td>
<td>CONFIGURATION</td>
</tr>
<tr>
<td>Dell(conf-if-te-0/0)#</td>
<td>INTERFACE</td>
</tr>
<tr>
<td>Dell(conf-if-vl-1)#</td>
<td></td>
</tr>
<tr>
<td>Dell(conf-if-ma-0/0)#</td>
<td></td>
</tr>
<tr>
<td>Dell(conf-if-range)#</td>
<td></td>
</tr>
<tr>
<td>Dell(conf-line-console)#</td>
<td>LINE</td>
</tr>
<tr>
<td>Dell(conf-line-vty)#</td>
<td></td>
</tr>
<tr>
<td>Dell(conf-mon-sess)#</td>
<td>MONITOR SESSION</td>
</tr>
</tbody>
</table>
Obtaining Help

As soon as you are in a command mode there are several ways to access help.

To obtain a list of keywords at any command mode:
Type a ? at the prompt or after a keyword. There must always be a space before the ?.

To obtain a list of keywords with a brief functional description:
Type help at the prompt.

To obtain a list of available options:
Type a keyword and then type a space and a ?.

To obtain a list of partial keywords using a partial keyword:
Type a partial keyword and then type a ?.

Example
The following is an example of typing ip ? at the prompt:

Dell(conf)#ip ?
igmp     Internet Group Management Protocol
route    Establish static routes
telnet   Specify telnet options

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

• The commands are not case-sensitive.
• You can enter partial (truncated) command keywords. For example, you can enter int tengig int for the interface tengigabitethernet interface command.
• To complete keywords in commands, use the TAB key.
• To display the last enabled command, use the up Arrow key.
• To erase the previous character, use either the Backspace key or Delete key.
• To navigate left or right in the Dell Networking OS command line, use the left and right Arrow keys.

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

<table>
<thead>
<tr>
<th>Key Combination</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNTL-A</td>
<td>Moves the cursor to the beginning of the command line.</td>
</tr>
<tr>
<td>CNTL-B</td>
<td>Moves the cursor back one character.</td>
</tr>
<tr>
<td>CNTL-D</td>
<td>Deletes the character at the cursor.</td>
</tr>
<tr>
<td>CNTL-E</td>
<td>Moves the cursor to the end of the line.</td>
</tr>
<tr>
<td>CNTL-F</td>
<td>Moves the cursor forward one character.</td>
</tr>
<tr>
<td>CNTL-I</td>
<td>Completes a keyword.</td>
</tr>
<tr>
<td>Key Combination</td>
<td>Action</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td>CNTL-K</td>
<td>Deletes all the characters from the cursor to the end of the command line.</td>
</tr>
<tr>
<td>CNTL-L</td>
<td>Re-enters the previous command.</td>
</tr>
<tr>
<td>CNTL-N</td>
<td>Returns to the more recent commands in the history buffer after recalling commands with Ctrl-P or the up Arrow key.</td>
</tr>
<tr>
<td>CNTL-P</td>
<td>Recalls commands, beginning with the last command.</td>
</tr>
<tr>
<td>CNTL-U</td>
<td>Deletes the line.</td>
</tr>
<tr>
<td>CNTL-W</td>
<td>Deletes the previous word.</td>
</tr>
<tr>
<td>CNTL-X</td>
<td>Deletes the line.</td>
</tr>
<tr>
<td>CNTL-Z</td>
<td>Comes back to EXEC mode from any CONFIGURATION mode.</td>
</tr>
<tr>
<td>Esc B</td>
<td>Moves the cursor back one word.</td>
</tr>
<tr>
<td>Esc F</td>
<td>Moves the cursor forward one word.</td>
</tr>
<tr>
<td>Esc D</td>
<td>Deletes all the characters from the cursor to the end of the word.</td>
</tr>
</tbody>
</table>

**Using the Keyword no Command**

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

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

**Syntax**

no {boot | default | enable | ftp-server | hardware | hostname | ip | line | logging | monitor | service | io-aggregator | broadcast storm-control | snmp-server | username}

**Defaults**

None

**Command Modes**

CONFIGURATION

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Filtering show Commands**

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

When you execute a `show` command, and then enter a pipe ( `|` ), one of the following parameters, and a regular expression, the resulting output either excludes or includes those parameters.
NOTE: The Dell Networking OS accepts a space before or after the pipe, no space before or after the pipe, or any combination. For example: Dell#command | grep gigabit | except regular-expression | find regular-expression.

- **except**: displays only the text that does not match the pattern (or regular expression)
- **find**: searches for the first occurrence of a pattern
- **grep**: displays text that matches a pattern.
- **no-more**: does not paginate the display output
- **save**: copies the output to a file for future use

The grep command option has an ignore-case sub-option that makes the search case-insensitive. For example, the commands:

- show run | grep Ethernet returns a search result with instances containing a capitalized “Ethernet,” such as interface TenGigabitEthernet 0/1.
- show run | grep ethernet does not return the search result above because it only searches for instances containing a non-capitalized “ethernet”.
- show run | grep Ethernet ignore-case returns instances containing both “Ethernet” and “ethernet”.

### Displaying All Output

To display the output all at once (not one screen at a time), use the **no-more** option after the pipe. This operation is similar to the **terminal length screen-length** command except that the **no-more** option affects the output of just the specified command. For example:

```
Dell#show running-config|no-more
```

### Filtering the Command Output Multiple Times

You can filter a single command output multiple times. To filter a command output multiple times, place the **save** option as the last filter. For example:

```
Dell# command | grep regular-expression | except regular-expression | grep other-regular-expression | find regular-expression | no-more | save
```

### Command Modes

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

#### EXEC Mode

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

When you are in EXEC mode, the > prompt is displayed following the host name prompt, which is “Dell” by default. You can change the host name prompt using the **hostname** command.
NOTE: Each mode prompt is preceded by the host name.

EXEC Privilege Mode

The `enable` command accesses EXEC Privilege mode. If an administrator has configured an “Enable” password, you are prompted to enter it. EXEC Privilege mode allows you to access all the commands accessible in EXEC mode, plus other commands, such as to clear address resolution protocol (ARP) entries and IP addresses. In addition, you can access CONFIGURATION mode to configure interfaces, routes and protocols on the switch. While you are logged in to EXEC Privilege mode, the # prompt displays.

CONFIGURATION Mode

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

To enter CONFIGURATION mode:

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

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

INTERFACE Mode

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

To enter INTERFACE mode:

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

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

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Interface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell(conf-if-te-0/1)#</td>
<td>Ten-Gigabit Ethernet interface then slot/port information</td>
</tr>
<tr>
<td>Dell(conf-if- vl-0)#</td>
<td>VLAN Interface then VLAN number (range 1–4094)</td>
</tr>
<tr>
<td>Dell(conf-if- ma-0/0)#</td>
<td>Management Ethernet interface then slot/port information</td>
</tr>
<tr>
<td>Dell(conf-if-range)#</td>
<td>Designated interface range (used for bulk configuration)</td>
</tr>
</tbody>
</table>

LINE Mode

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

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

You can exit this mode by using the exit command.

**MONITOR SESSION Mode**

In CONFIGURATION mode, use the monitor session command to enter MONITOR SESSION mode and configure port monitoring.

To enter MONITOR SESSION mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the monitor session command. Include the monitor session ID. The prompt changes to include (conf-mon-sess).

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

**PROTOCOL LLDP Mode**

In CONFIGURATION mode, use the protocol lldp command to enter PROTOCOL LLDP mode and configure the LLDP protocol.

To enter PROTOCOL LLDP mode:

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

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

This chapter contains commands needed to manage the configuration files and includes other file management commands.
The commands in this chapter are supported by the Dell Networking OS.

boot system gateway

Specify the IP address of the default next-hop gateway for the management subnet.

Syntax

boot system gateway ip-address

Parameters

ip-address Enter an IP address in dotted decimal format.

Command Modes

CONFIGURATION

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Usage Information

Saving the address to the startup configuration file preserves the address in NVRAM in case the startup configuration file is deleted.

boot system stack-unit

Specify the location of the Dell Networking OS image to be used to boot the system.

Syntax

boot system stack-unit <0-5 | all> {default | primary | secondary}

Parameters

0-5 Enter the stack member unit identifier of the stack member.

all Enter the keyword all to set the primary, secondary, and default images for the system.

default Enter the keyword default to set the default image path for the system.

primary Enter the keyword primary to set the primary image path for the system.
secondary

Enter the keyword secondary to set the secondary image path for the system.

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

The system first attempts to load the image from the primary path. If it fails to boot, the system tries to load the image from the secondary path and if that also fails, the system loads the default image.

cd

Change to a different working directory.

Syntax
cd directory

Parameters
directory (OPTIONAL) Enter one of the following:
- flash: (internal Flash) or any sub-directory
- usbflash: (external Flash) or any sub-directory

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

copy

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

Syntax

copy source-file-url destination-file-url

Parameters

file-url Enter the following location keywords and information:
- To copy a file from the internal FLASH, enter flash:// then the filename.
- To copy the running configuration, enter the keywords running-config.
- To copy the startup configuration, enter the keywords startup-config.
To copy a file on the external FLASH, enter `usbflash://` then the filename.

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**

The Dell Networking OS supports a maximum of 100 files, at the root directory level, on both the internal and external Flash.

The `usbflash` commands are supported. For a list of approved USB vendors, refer to the Dell Networking OS Release Notes.

When copying a file to a remote location (for example, using Secure Copy [SCP]), enter only the keywords and Dell Networking OS prompts you for the rest of the information.

For example, when using SCP, you can enter the `copy running-config scp:` command. The `running-config` is the source and the target is specified in the ensuing prompts. Dell Networking OS prompts you to enter any required information, as needed for the named destination — remote destination, destination filename, user ID and password, and so forth.

When you use the `copy running-config startup-config` command to copy the running configuration (the startup configuration file amended by any configuration changes made because the system was started) to the startup configuration file, Dell Networking OS creates a backup file on the internal flash of the startup configuration.

The Dell Networking OS supports copying the running-configuration to a TFTP server or to an FTP server:

- `copy running-config tftp:``
- `copy running-config ftp:``

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

**Example (running-config scp):**

```
Dell#copy running-config scp:
Address or name of remote host [10.10.10.1]: 10.10.10.1
Port number of the server [22]: 99
Destination file name [startup-config]: old_running
User name to login remote host: sburgess
Password to login remote host: dilling
```

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

Related Commands

**copy running-config startup-config**
Copy running configuration to the startup configuration.

**Syntax**
copy running-config startup-config {duplicate}

**Command Modes**
EXEC Privilege

**Command History**
Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**
This command is useful for quickly making a change configuration on one chassis available on external flash to move it to another chassis.

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

**Syntax**
delete flash: ([flash://]filepath) usbflash ([usbflash://]filepath)

**Parameters**

- **flash-url**
  Enter the following location and keywords:
  - For a file or directory on the internal Flash, enter flash:// then the filename or directory name.
  - For a file or directory on an external USB drive, enter usbflash:// then the filename or directory name.

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

**Command Modes**
EXEC Privilege
dir

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

Syntax

dir [filename | directory name:]

Parameters

filename | directory name:

(OPTIONAL) Enter one of the following:

- For a file or directory on the internal Flash, enter flash:// then the filename or directory name.
- For a file or directory on an external USB drive, enter usbflash:// then the filename or directory name.

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

Dell#dir
Directory of flash:

1 drwx 4096 Jan 01 1980 00:00:00 +00:00 .
2 drwx 2048 Mar 06 2010 00:00:00 +00:00 ..
3 drwx 4096 Feb 25 2010 23:32:50 +00:00 TRACE_LOG_DIR
4 drwx 4096 Feb 25 2010 23:32:50 +00:00 CORE_DUMP_DIR
5 d--- 4096 Feb 25 2010 23:32:50 +00:00 ADMIN_DIR
6 -rwx 720969768 Mar 05 2010 03:25:14 +00:00 6gb
7 -rwx 4260 Mar 03 2010 22:04:50 +00:00 prem-23-5-12
8 -rwx 31969685 Mar 05 2010 17:56:26 +00:00 DellS-XL-8-3-16-148.bin
9 -rwx 3951 Mar 06 2010 00:36:18 +00:00 startup-config

flash: 2143281152 bytes total (1389801472 bytes free)
Dell#

Related Commands

cd — Changes the working directory.

format flash

Erase all existing files and reformat the filesystem in the internal flash memory. After the filesystem is formatted, files cannot be restored.

Syntax

format {flash: | usbflash:}
Defaults

Command Modes

Command History

Usage Information

Related Commands

logging coredump stack-unit

Enable the coredump.

Syntax

logging coredump stack-unit all

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

The Kernel core dump can be large and may take up to five to 30 minutes to upload. The Dell Networking OS does not overwrite application core dumps so delete them as necessary to conserve space on the flash; if the flash is out of memory, the coredump is aborted. The Dell Networking OS completes the coredump process and waits until the upload is complete before rebooting the system.

pwd

Display the current working directory.

Syntax

pwd
rename

Rename a file in the local file system.

**Syntax**
```
rename url url
```

**Parameters**
- `url` Enter the following keywords and a filename:
  - For a file on the internal Flash, enter `flash://` then the filename.
  - For a file on an external USB drive, enter `usbflash://` then the filename.

**Command Modes**
- EXEC Privilege

**Command History**
- **Version 8.3.17.0** Supported on the M I/O Aggregator.

**restore factory-defaults**

Restore factory defaults.

**Syntax**
```
restore factory-defaults stack-unit {0-5 | all} {clear-all | nvram}
```

**Parameters**
- `factory-defaults` Return the system to its factory default mode.
- `0-5` Enter the stack member unit identifier to restore only the mentioned stack-unit.
- `all` Enter the keyword `all` to restore all units in the stack.
clear-all Enter the keywords clear-all to reset the NvRAM and the system startup configuration.

nvram Enter the keyword nvram to reset the NvRAM only.

**Command Modes**

EXEC Privilege

**Command History**

**Version 8.3.17.1** Supported on the M I/O Aggregator.

**Usage Information**

Restoring factory defaults deletes the existing startup configuration and all persistent settings (stacking, fanout, and so forth).

When restoring all units in a stack, all the units in the stack are placed into stand-alone mode.

When restoring a single unit in a stack, that unit placed in stand-alone mode. No other units in the stack are affected.

When restoring units in stand-alone mode, the units remain in stand-alone mode after the restoration. After the restore is complete, the units power cycle immediately.

⚠️ **CAUTION:** There is no undo for this command.

**Example (all stack units)**

```
Dell#restore factory-defaults stack-unit all clear-all
*******************************
* Warning - Restoring factory defaults will delete the existing *
* startup-config and all persistent settings (stacking, fanout, etc.)*
* All the units in the stack will be split into standalone units. *
* After restoration the unit(s) will be powercycled immediately. *
* Proceed with caution ! *
*******************************
Proceed with factory settings? Confirm [yes/no]:yes
-- Restore status --
Unit Nvram Config
------------------------
0    Success    Success
1    Success    Success
2    Success    Success
3    Not present
4    Not present
5    Not present
Power-cycling the unit(s).
Dell#
```

**Example (single stack)**

```
Dell#restore factory-defaults stack-unit 0 clear-all
*******************************
* Warning - Restoring factory defaults will delete the existing *
* startup-config and all persistent settings (stacking, fanout, etc.)*
* After restoration the unit(s) will be powercycled
```
immediately. *
* Proceed with caution ! *
************************************************************************************************
Proceed with factory settings? Confirm [yes/no]:yes
-- Restore status --
Unit Nvram      Config
------------------------
0    Success  Success

Power-cycling the unit(s).
Dell#

Example
(NvRAM all stack units)

Dell#restore factory-defaults stack-unit all nvram
************************************************************************************************
* Warning - Restoring factory defaults will delete the existing *
* persistent settings (stacking, fanout, etc.) *
* All the units in the stack will be split into standalone units. *
* After restoration the unit(s) will be powercycled immediately. *
* Proceed with caution ! *
************************************************************************************************
Proceed with factory settings? Confirm [yes/no]:yes
-- Restore status --
Unit Nvram      Config
------------------------
0    Success
1    Success
2    Success
3    Not present
4    Not present
5    Not present
Power-cycling the unit(s).
Dell#

Example
(NvRAM, single unit)

Dell#restore factory-defaults stack-unit 1nvram
************************************************************************************************
* Warning - Restoring factory defaults will delete the existing *
* persistent settings (stacking, fanout, etc.) *
* After restoration the unit(s) will be powercycled immediately. *
* Proceed with caution ! *
************************************************************************************************
Proceed with factory settings? Confirm [yes/no]:yes
-- Restore status --
Unit Nvram      Config
------------------------
1    Success
Power-cycling the unit(s).
Dell#
show boot system

Displays information about boot images currently configured on the system.

Syntax

```
show boot system stack-unit {0-5 | all}
```

Parameters

- **0–5**
  - Enter this information to display the boot image information of only the entered stack-unit.
- **all**
  - Enter the keyword all to display the boot image information of all the stack-units in the stack.

Defaults

- none

Command Modes

- EXEC
- EXEC Privilege

Command History

- **Version 8.3.17.0**
  - Supported on the M I/O Aggregator.

Example

```
Dell#show boot system stack-unit all
Current system image information in the system:
=============================================
Type      Boot Type         A             B
---------------------------------------------
Stack-unit 0 is not present.
Stack-unit 1 DOWNLOAD BOOT 9-1-0-218 9-1-0-202
Stack-unit 2 is not present.
Stack-unit 3 is not present.
Stack-unit 4 is not present.
Stack-unit 5 is not present.
```

show file

Displays contents of a text file in the local filesystem.

Syntax

```
show file url
```

Parameters

- **url**
  - Enter one of the following:
    - For a file on the internal Flash, enter `flash://` then the filename.
    - For a file on the external Flash, enter `usbflash://` then the filename.

Command Modes

- EXEC Privilege
Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Example

Dell#show file flash://startup-config
  ! Version E8-3-17-38
  boot system stack-unit 1 primary tftp://10.11.9.21/dv-m1000e-2-b2
  boot system stack-unit 1 default system: A:
  boot system gateway 10.11.209.62
  !
  hostname FTOS
  --More--
  Dell#

Related Commands

format flash — erases all the existing files and reformats the filesystem in the internal flash memory.

show file-systems — displays information about the file systems on the system.

show file-systems

Displays information about the file systems on the system.

Syntax

show file-systems

Command Modes
EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Example

Dell#show file-systems

<table>
<thead>
<tr>
<th>Size(b)</th>
<th>Free(b)</th>
<th>Feature</th>
<th>Type</th>
<th>Flags</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2143281152</td>
<td>836874240</td>
<td>FAT32</td>
<td>USERFLASH</td>
<td>rw</td>
<td>flash:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>network</td>
<td>rw</td>
<td>ftp:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>network</td>
<td>rw</td>
<td>tftp:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>network</td>
<td>rw</td>
<td>scp:</td>
</tr>
</tbody>
</table>

Dell#

Command Fields

Field          Description
size(b)        Lists the size in bytes of the storage location. If the location is remote, no size is listed.
Free(b)         Lists the available size in bytes of the storage location. If the location is remote, no size is listed.
Feature         Displays the formatted DOS version of the device.
Type            Displays the type of storage. If the location is remote, the word network is listed.
### Field Description

**Flags**
Displays the access available to the storage location. The following letters indicate the level of access:
- **r** = read access
- **w** = write access

**Prefixes**
Displays the name of the storage location.

### Related Commands
- **format flash** — erases all the existing files and reformats the filesystem in the internal flash memory.
- **show file** — displays the contents of a text file in the local filesystem.

### show os-version
Displays the release and software image version information of the image file specified.

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

#### Parameters
- **file-url** (OPTIONAL) Enter the following location keywords and information:
  - For a file on the internal Flash, enter `flash://` then the filename.
  - For a file on an FTP server, enter `ftp://user:password@hostip/filepath`.
  - For a file on a TFTP server, enter `tftp://hostip/filepath`.
  - For a file on the external Flash, enter `usbflash://filepath` then the filename.

#### Defaults
none

#### Command Modes
- EXEC Privilege

#### Command History
- **Version 8.3.17.0** Supported on the M I/O Aggregator.

#### Usage Information
- **NOTE:** A filepath that contains a dot (.) is not supported.

#### Example
```
Dell#show os-version

RELEASE IMAGE INFORMATION :
--------------------------------------------------------------
Platform        Version        Size           ReleaseTime
--------------------------------------------------------------
```
show running-config

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

**Syntax**

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

**Parameters**

- **entity**  
  (OPTIONAL) To display that entity’s current (non-default) configuration, enter one of the following keywords:
  - `boot` for the current boot configuration
  - `ftp` for the current FTP configuration
  - `igmp` for the current IGMP configuration
  - `interface` for the current interface configuration
  - `line` for the current line configuration
  - `lldp` for the current lldp configuration
  - `logging` for the current logging configuration
  - `management-route` for the current Management port forwarding configuration
  - `monitor` for the current Monitor configuration
  - `snmp` for the current SNMP configuration
  - `uplink-state-group` for the uplink state group configuration
  - `users` for the current users configuration

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

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

Displays the current Dell Networking OS version information on the system.

Syntax

show version

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

Dell#show version
Dell Force10 Real Time Operating System Software
Dell Force10 Operating System Version: 1.0
Dell Force10 Application Software Version: E8-3-17-38
Build Time: Thu Jul 19 05:59:59 PDT 2012
Build Path: /sites/sjc/work/swsystems01-2/ravisubramani/ravis-8317/SW/SRC/
Cp_src/Tacacs
FTOS uptime is 4 day(s), 4 hour(s), 3 minute(s)
System image file is "dv-m1000e-2-b2" System Type: I/O-
Aggregator
Control Processor: MIPS RMI XLP with 2147483648 bytes of memory.

256M bytes of boot flash memory.

1 34-port GE/TE (XL)
56 Ten GigabitEthernet/IEEE 802.3 interface(s)

### Command Fields

<table>
<thead>
<tr>
<th>Lines Beginning With</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Force10 Network...</td>
<td>Name of the operating system</td>
</tr>
<tr>
<td>Dell Force10 Operating...</td>
<td>OS version number</td>
</tr>
<tr>
<td>Dell Force10 Application...</td>
<td>Software version</td>
</tr>
<tr>
<td>Copyright (c)...</td>
<td>Copyright information</td>
</tr>
<tr>
<td>Build Time...</td>
<td>Software build’s date stamp</td>
</tr>
<tr>
<td>Build Path...</td>
<td>Location of the software build files loaded on the system</td>
</tr>
<tr>
<td>Dell Force10 uptime is...</td>
<td>Amount of time the system has been up</td>
</tr>
<tr>
<td>System image...</td>
<td>Image file name</td>
</tr>
<tr>
<td>Chassis Type:</td>
<td>System type (M I/O Aggregator)</td>
</tr>
<tr>
<td>Control Processor:</td>
<td>Control processor information and amount of memory on processor</td>
</tr>
<tr>
<td>256M bytes...</td>
<td>Amount of boot flash memory on the system</td>
</tr>
<tr>
<td>1 34 Port</td>
<td>Hardware configuration of the system, including the number and type of physical interfaces available</td>
</tr>
</tbody>
</table>

### upgrade boot

Upgrade the bootflash image or bootselector image.

**Syntax**

```
upgrade boot {all | bootflash-image | bootselector-image}
stack-unit {0-5 | all} {booted | flash: | ftp: | tftp: | usbflash:} {A: | B:}
```

**Parameters**

| all | Enter the keyword all to change both the bootflash and bootselector images. |
bootflash-image

Enter the keywords bootflash-image to change the bootflash image.

bootselector-image

Enter the keywords bootselector-image to change the bootselector image.

0–5

Enter the keyword 0–5 to upgrade only the mentioned stack-unit.

all

Enter the keyword all to upgrade all the member stack-units.

booted

Enter the keyword booted to upgrade from the current image in the M I/O Aggregator.

ftp:

After entering the keyword ftp:, you can either follow it with the location of the source file in this form: //userid:password@hostip/filepath or press Enter to launch a prompt sequence.

tftp:

After entering the keyword tftp:, you can either follow it with the location of the source file in this form: //hostlocation/filepath or press Enter to launch a prompt sequence.

flash:

After entering the keyword flash:, you can either follow it with the location of the source file in this form: //filepath or press Enter to launch a prompt sequence.

usbflash:

After entering the keyword usbflash:, you can either follow it with the location of the source file in this form: //filepath or press Enter to launch a prompt sequence.

A:

Enter this keyword to upgrade the bootflash partition A.

B:

Enter this keyword to upgrade the bootflash partition B.

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

You must reload the Dell Networking OS after executing this command.

Example

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

File Management
upgrade system

Upgrade the bootflash image or system image.

Syntax

upgrade system {flash: | ftp: | scp: | tftp: | usbflash: |
stack-unit {0-5 | all} {A: | B:}

Parameters

0–5       Enter the keyword 0-5 to upgrade only the mentioned
stack-unit.

all       Enter the keyword all to upgrade all the member units of
the stack.

ftp       After entering the keyword ftp you can either follow it with
the location of the source file in this form://
userid:password@hostip/filepath, or press Enter to
launch a prompt sequence.

scp       After entering the keyword scp you can either follow it with
the location of the source file in this form://
userid:password@hostip/filepath, or press Enter to
launch a prompt sequence.

tftp       After entering the keyword tftp you can either follow it with
the location of the source file in this form://
hostlocation/filepath, or press Enter to launch a
prompt sequence.

flash     After entering the keyword flash you can either follow it with
the location of the source file in this form://
/filepath, or press Enter to launch a prompt sequence.

usbflash  After entering the keyword usbflash you can either follow
it with the location of the source file in this form://
/filepath, or press Enter to launch a prompt sequence.

A:        Enter this keyword to upgrade the bootflash partition A.

B:        Enter this keyword to upgrade the bootflash partition B.

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0       Supported on the M I/O Aggregator.

Usage Information

You must reload Dell Networking OS after executing this command. Use the
cmd command upgrade system stack-unit to copy Dell Networking OS from the
management unit to one or more stack members.

Example

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

This chapter describes control and monitoring for the M I/O Aggregator.

asset-tag

Assign and store a unique asset-tag to the stack member.

Syntax

```
asset-tag stack-unit unit-id Asset-tag ID
```

To remove the asset tag, use the `no stack-unit unit-id Asset-tag ID` command.

Parameters

- **stack-unit unit-id**
  - Enter the keywords `stack-unit` then the `unit-id` to assign a tag to the specific member. The range is from 0 to 5.

- **Asset-tag ID**
  - Enter a unique asset-tag ID to assign to the stack member. This option accepts a maximum of 10 characters, including all special characters except double quotes. To include a space in the asset-tag, enter a space within double quotes.

Defaults

No asset-tag is assigned.

Command Modes

- EXEC Privilege

Command History

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator.

Related Commands

- `show system`— Displays the current status of all stack members or a specific member.

clear alarms

Clear the alarms on the system.

Syntax

```
clear alarms
```

Command Modes

- EXEC Privilege
clear command history

Clear the command history log.

**Syntax**

```plaintext
clear command history
```

**Command Modes**

EXEC Privilege

**Example**

```
Dell#configure
Dell(conf)#
```

configure

Enter CONFIGURATION mode from EXEC Privilege mode.

**Syntax**

```plaintext
configure [terminal]
```

**Parameters**

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

**Command Modes**

EXEC Privilege

**Example**

```
Dell#configure
Dell(conf)#
```

debug cpu-traffic-stats

Enable the collection of computer processor unit (CPU) traffic statistics.

**Syntax**

```plaintext
debug cpu-traffic-stats
```
Defaults
Disabled

Command Modes
EXEC Privilege

Command History
Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information
This command enables (and disables) the collection of CPU traffic statistics from
the time this command is executed (not from system boot). However, excessive
traffic a CPU receives automatically triggers (turn on) the collection of CPU traffic
statistics.
To view the traffic statistics, use the show cpu-traffic-stats command.

If the CPU receives excessive traffic, traffic is rate controlled.

NOTE: You must enable this command before the show cpu-traffic-stats command displays traffic statistics. Dell Networking recommends disabling debugging (no debug cpu-traffic-stats) after troubleshooting is complete.

Related Commands
show cpu-traffic-stats — displays the cpu traffic statistics.

---

### debug ifm trace-flags

Turn on the IFM internal trace-flags.

**Syntax**

```
debug ifm trace-flags trace-flags
```

To disable this command, use the no debug ifm trace-flags command.

**Parameters**

**trace-flags**

Enter a hexadecimal number representing the trace-flag.

**Defaults**

None

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

NOTE: Use this command only when you are working directly with a technical support representative to troubleshoot a problem. Do not use this command unless a technical support representative instructs you to do so.
disable

Return to EXEC mode.

Syntax disable [level]

Parameters

.level

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

Defaults 1

Command Modes EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

enable

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

Syntax enable [level]

Parameters

.level

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

Defaults 15

Command Modes EXEC

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

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

Related Commands

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

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

Syntax
end

Command Modes
- CONFIGURATION
- LINE
- INTERFACE
- MONITOR SESSION
- PROTOCOL LLDP

Command History
Version 8.3.17.0  Supported on the M I/O Aggregator.

Related Commands
exit — returns to the lower command mode.

exit

Return to the lower command mode.

Syntax
exit

Command Modes
- EXEC Privilege
- CONFIGURATION
- LINE
- INTERFACE
- PROTOCOL LLDP

Command History
Version 8.3.17.0  Supported on the M I/O Aggregator.

Related Commands
end — returns to EXEC Privilege mode.

ftp-server enable

Enable FTP server functions on the system.

Syntax
ftp-server enable

Defaults
Disabled
Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

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

Related Commands

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

ftp-server todir

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

Syntax

ftp-server todir directory

Parameters

directory

Enter the directory path.

Defaults

The internal flash is the default directory.

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

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

- **ftp-server enable** — enables FTP server functions on the M I/O Aggregator.
- **ftp-server username** — sets a username and password for incoming FTP connections to the M I/O Aggregator.

### ftp-server username

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

**Syntax**

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

**Parameters**

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

**Defaults**

Not enabled.

**Command Modes**

CONFIGURATION

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

### hostname

Set the host name of the system.

**Syntax**

```
hostname name
```

**Parameters**

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

**Defaults**

Dell Networking Operating System (OS)

**Command Modes**

CONFIGURATION
ip telnet server enable

Enable the Telnet server on the switch.

Syntax

```
ip telnet server enable
```

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

Defaults

Enabled

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

ip telnet source-interface

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

Syntax

```
ip telnet source-interface interface
```

Parameters

`interface`

Enter the following keyword and slot/port or number information:

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

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

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.
Related Commands
							
ettelnet — telnets to another device.

line

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

Syntax

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

Parameters

- **console 0**
  - Enter the keyword `console 0` to configure the console port. The console option is <0-0>.

- **vty number**
  - Enter the keyword `vty` followed by a number from 0 to 9 to configure a virtual terminal line for Telnet sessions. The system supports 10 Telnet sessions.

- **end-number**
  - (OPTIONAL) Enter a number from 1 to 9 as the last virtual terminal line to configure. You can configure multiple lines at one time.

Defaults

Not configured

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

You cannot delete a terminal connection.

Related Commands

- `show memory` — View current memory usage on the M I/O Aggregator.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>host</strong></td>
<td>(OPTIONAL) Enter the host name of the device to which you are testing connectivity.</td>
</tr>
<tr>
<td><strong>ip-address</strong></td>
<td>(OPTIONAL) Enter the IPv4 address of the device to which you are testing connectivity. The address must be in the dotted decimal format.</td>
</tr>
</tbody>
</table>
| **count**         | Enter the number of echo packets to be sent. The default is 5.  
|                   | • number: from 1 to 2147483647  
|                   | • continuous: transmit echo request continuously  
| **datagram size** | Enter the ICMP datagram size. The range is from 36 to 15360 bytes. The default is 100. |
| **timeout**       | Enter the interval to wait for an echo reply before timing out. The range is from 0 to 3600 seconds. The default is 2 seconds. |
| **source**        | Enter the IPv4 source ip address or the source interface. Enter the IP address in A.B.C.D format.  
|                   | • For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.  
|                   | • For a VLAN interface, enter the keyword vlan then a number from 1 to 4094. |
| **tos**           | Enter the type of service required. The range is from 0 to 255. The default is 0. |
| **df-bit**        | Enter Y or N for the "don't fragment" bit in IPv4 header.  
|                   | • N: Do not set the "don't fragment" bit.  
|                   | • Y: Do set "don't fragment" bit  
|                   | The default is No. |
| **validate-reply**| Enter Y or N for reply validation.  
|                   | • N: Do not validate reply data.  
|                   | • Y: Do validate reply data.  
|                   | The default is No. |
| **pattern pattern** | Enter the IPv4 data pattern. The range is from 0 to FFFF. The default is 0xABCD. |
| **sweep-min-size** | Enter the minimum size of datagram in sweep range. The range is from 52 to 15359 bytes. |
| **sweep-max-size** | Enter the maximum size of datagram in sweep range. The range is from 53 to 15359 bytes. |
| **sweep-interval** | Enter the incremental value for sweep size. The range is from 1 to 15308 seconds. |
**interface**

Enter the outgoing interface for multicast packets. Enter the IP address in A.B.C.D format.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

**Defaults**

See parameters above.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

When you enter the `ping` command without specifying an IP address (Extended Ping), you are prompted for a target IP address, a repeat count, a datagram size (up to 1500 bytes), a timeout (in seconds), and for Extended Commands. For information on the ICMP message codes that return from a `ping` command, refer to [Internet Control Message Protocol (ICMP) Message Types](#).

**Example (IPv4)**

```
Dell#ping 172.31.1.255
Type Ctrl-C to abort.
Sending 5, 100-byte ICMP Echos to 172.31.1.255, timeout is 2 seconds:
Reply to request 1 from 172.31.1.208 0 ms
Reply to request 1 from 172.31.1.216 0 ms
Reply to request 1 from 172.31.1.205 16 ms
::
Reply to request 5 from 172.31.1.209 0 ms
Reply to request 5 from 172.31.1.66 0 ms
Reply to request 5 from 172.31.1.87 0 ms
Dell#
```

**reload**

Reboot the Dell Networking OS.

**Syntax**

`reload`

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.
If there is a change in the configuration, the Dell Networking OS prompts you to save the new configuration. Or you can save your running configuration with the `copy running-config` command.

**Related Commands**

`reset stack-unit` — resets any designated stack member except the management unit.

## service timestamps

Add time stamps to debug and log messages. This command adds either the uptime or the current time and date.

**Syntax**

```
service timestamps [debug | log] [datetime [localtime] [msec] [show-timezone] | uptime]
```

**Parameters**

- `debug` (OPTIONAL) Enter the keyword `debug` to add timestamps to debug messages.
- `log` (OPTIONAL) Enter the keyword `log` to add timestamps to log messages with severity from 0 to 6.
- `datetime` (OPTIONAL) Enter the keyword `datetime` to have the current time and date added to the message.
- `localtime` (OPTIONAL) Enter the keyword `localtime` to include the localtime in the timestamp.
- `msec` (OPTIONAL) Enter the keyword `msec` to include milliseconds in the timestamp.
- `show-timezone` (OPTIONAL) Enter the keyword `show-timezone` to include the time zone information in the timestamp.
- `uptime` (OPTIONAL) Enter the keyword `uptime` to have the timestamp based on time elapsed since system reboot.

**Defaults**

Not configured.

**Command Modes**

CONFIGURATION

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

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

To view the current options set for the `service timestamps` command, use the `show running-config` command.
show alarms
Display the active major and minor alarms on the system.

**Syntax**

```
show alarms
```

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Example**

```
Dell# show alarms

-- Minor Alarms --
Alarm Type                 Duration
---------------------------------------
No minor alarms

-- Major Alarms --
Alarm Type                 Duration
----------------------------------------
No major alarms

Dell#
```

show command-history
Display a buffered log of all commands all users enter along with a time stamp.

**Syntax**

```
show command-history
```

**Defaults**

None

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Usage Information**

One trace log message is generated for each command. No password information is saved to this file.

**Example**

```
Dell#show command-history
[4/20 10:27:23]: CMD-(CLI):[enable]by default from console
[4/20 10:27:23]: CMD-(CLI):[configure terminal]by default from console
- Repeated 1 time.
[4/20 10:27:23]: CMD-(CLI):[snmp-server community public ro]by default from console
[4/20 10:27:23]: CMD-(CLI):[logging 172.16.1.162]by default from console
```

Control and Monitoring 63
show configuration lock

Display the configuration lock status.

Syntax

```
show configuration lock
```

Related Commands

clear command history — clears the command history log.
show cpu-traffic-stats

Display the CPU traffic statistics.

**Syntax**

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

**Parameters**

- **port number**  
  (OPTIONAL) Enter the port number to display traffic statistics on that port only. The range is from 1 to 1568.

- **all**  
  (OPTIONAL) Enter the keyword all to display traffic statistics on all the interfaces receiving traffic, sorted based on the traffic.

**Defaults**

```
all
```

**Command Modes**

```
EXEC
```

**Command History**

```
Version 8.3.17.0  
Supported on the M I/O Aggregator.
```

**Usage Information**

Traffic statistics are sorted on a per-interface basis; the interface receiving the most traffic is displayed first. All CPU and port information is displayed unless a specific port or CPU is specified. Traffic information is displayed for router ports only; not for management interfaces. The traffic statistics are collected only after the `debug cpu-traffic-stats` command is executed; not from the system bootup.
NOTE: After debugging is complete, use the no debug cpu-traffic-stats command to shut off traffic statistics collection.

Example

Dell#show cpu-traffic-stats
Processor : CP
-------------
  Received 100% traffic on TenGigabitEthernet 8/2 Total
   packets:100
    LLC:0, SNAP:0, IP:100, ARP:0, other:0
    Unicast:100, Multicast:0, Broadcast:0
Dell#

Related Commands

debug cpu-traffic-stats — enables CPU traffic statistics for debugging.

show debugging

View a list of all enabled debugging processes.

Syntax

show debugging

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

Dell#show debug
Generic IP: (Access List: test)
  IP packet debugging is on for (Access List: test)
    TenGigabitEthernet 0/16
  ICMP packet debugging is on for
    TenGigabitEthernet 0/16
OSPF:1
  OSPF packet debugging is on
DHCP:
  DHCP debugging is on
Dell#

show diag

Display the diagnostics information.

Syntax

show diag {information | stack-unit number [detail | summary] | testcase}

Parameters

information Enter the keyword information to view current diagnostics information in the system.
show environment

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

**Syntax**

```plaintext
show environment [all | stack-unit unit-id]
```

**Parameters**

- `all` Enter the keyword `all` to view all components.
- `stack-unit unit-id` Enter the keywords `stack-unit` then the `unit-id` to display information on a specific stack member. The range is from 0 to 5.
- `thermal sensor` Enter the keywords `thermal-sensor` to view all components.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example (all)**

```plaintext
Dell#show environment all

-- Unit Environment Status --
Unit Status Temp Voltage TempStatus
-----------------------------------------------
---------
* 1 online 66C ok 2
* Management Unit
-- Thermal Sensor Readings (deg C) --
Unit Sensor0 Sensor1 Sensor2 Sensor3 Sensor4 Sensor5 Sensor6
```

Control and Monitoring 67
show inventory

Displays the switch type, components (including media), and Dell Networking OS version including hardware identification numbers and configured protocols.

Syntax

show inventory [media slot] [optional-module]

Parameters

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

optional-module  OPTIONAL) Enter the keyword optional-module to display optional module information.

Defaults

none

Command Modes

EXEC
Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

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

Example

Dell#show inventory
System Type           : PE-FN-410S-IOA
System Mode           : 1.0
Software Version      : 1-0(0-1859)

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Serial Number</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev Piece Part ID</td>
<td>Rev Svc Tag</td>
<td>Exprs Svc Code</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td>* 0  PowerEdge-FN-410S-IOA</td>
<td>TW000000000020</td>
<td>07NVPVX01</td>
</tr>
<tr>
<td>X01  TW-07NVPV-00000-000-0020</td>
<td>X01</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* - Management Unit

Software Protocol Configured
- DCBX
- FIP Snooping
- IGMP
- iSCSI
- LLDP
- SNMP

Example (media)

Dell#show inventory media ?
- Slot number
  - Pipe through a command

Dell#show inventory media
<table>
<thead>
<tr>
<th>Slot Port</th>
<th>Type</th>
<th>Media</th>
<th>Serial Number</th>
<th>F10Qualified</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 9</td>
<td>SFP+</td>
<td>10GBASE-CU1M</td>
<td>APF11380028XGQ</td>
<td>Yes</td>
</tr>
<tr>
<td>0 10</td>
<td>SFP+</td>
<td>10GBASE-CU2M</td>
<td>APF12090032HDL</td>
<td>Yes</td>
</tr>
<tr>
<td>0 11</td>
<td>SFP+</td>
<td>10GBASE-CU2M</td>
<td>APF12090032HFB</td>
<td>Yes</td>
</tr>
<tr>
<td>0 12</td>
<td>SFP+</td>
<td>10GBASE-CU0.5M</td>
<td>APF12490013FP2</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Example (optional-module)

Dell#show inventory optional-module
<table>
<thead>
<tr>
<th>Unit Slot Expected Inserted</th>
<th>Next Boot</th>
<th>Status/Power (On/Off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0  SFP+</td>
<td>SFP+</td>
<td>AUTO</td>
</tr>
<tr>
<td>1 1  QSFP+</td>
<td>QSFP+</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
show memory

Display current memory usage on the M I/O Aggregator.

**Syntax**

```
show memory [stack-unit 0-5]
```

**Parameters**

- `stack-unit 0-5` (OPTIONAL) Enter the keywords `stack-unit` then the stack unit ID of the stack member to display memory information on the designated stack member.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

- **Version 8.3.17.0**  
  Supported on the M I/O Aggregator.

**Usage Information**

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

**Example**

```
Dell#show memory
Statistics On Unit 0 Processor
================================
Total(b)   Used(b)  Free(b)   Lowest(b)   Largest(b)
268435456  4010354  264425102  264375410   264425102
```

show processes cpu

Display CPU usage information based on processes running.

**Syntax**

```
show processes cpu [management-unit 1-99 [details] | stack-unit 0-5 | summary | ipc | memory [stack-unit 0-5]]
```

**Parameters**

- `management-unit 1-99 [details]` (OPTIONAL) Display processes running in the control processor. The 1-99 variable sets the number of tasks to display in order of the highest CPU usage in the past five (5) seconds. Add the keyword `details` to display all running processes (except sysdlp). Refer to Example (management-unit).

Related Commands

- `show config (from INTERFACE VLAN mode)` — displays information on a specific physical interface or virtual interface.
stack-unit 0–5 (OPTIONAL) Enter the keywords stack-unit then the stack member ID. The range is from 0 to 5.
As an option of the show processes cpu command, this option displays CPU usage for the designated stack member. Or, as an option of memory, this option limits the output of memory statistics to the designated stack member. Refer to Example (stack-unit).

summary (OPTIONAL) Enter the keyword summary to view a summary view CPU utilization of processes related to line card processing. Refer to Example (summary).

ipc (OPTIONAL) Enter the keyword ipc to display interprocess communication statistics.

memory (OPTIONAL) Enter the keyword memory to display memory statistics. Refer to Example (memory).

Command Modes
• EXEC
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example (summary)
Dell#show processes cpu summary
CPU utilization 5Sec 1Min 5Min
-------------------------------------------
UNIT1 4% 3% 2%

Example (management-unit)
Dell#show processes cpu management-unit 5
CPU utilization for five seconds: 4%/0%; one minute: 4%; five minutes: 4%
PID Runtime(ms) Invoked uSecs 5Sec 1Min 5Min TTY
Process
0x00000000 2120 212 10000 3.77% 3.77% 3.77% 0
system
0x00000112 2472940 247294 10000 0.79% 0.61% 0.65% 0
sysdlp
0x000000e4 495560 49556 10000 0.20% 0.25% 0.24% 0
sysd
0x0000013d 34310 3431 10000 0.00% 0.02% 0.00% 0
lacp
0x000000121 4190 419 10000 0.00% 0.02% 0.00% 0
iscsiOpt

Example (stack-unit)
Dell#show process cpu stack-unit 1
CPU utilization for five seconds: 4%/0%; one minute: 3%; five minutes: 2%
PID Runtime(ms) Invoked uSecs 5Sec 1Min 5Min TTY
Process

Control and Monitoring 71
Dell#show processes memory

Memory Statistics Of Stack Unit 1 (bytes)

<table>
<thead>
<tr>
<th>TaskName</th>
<th>TotalAllocated</th>
<th>TotalFreed</th>
<th>MaxHeld</th>
<th>CurrentHolding</th>
</tr>
</thead>
<tbody>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>fcoecntrl</td>
<td>270336</td>
<td>0</td>
<td>0</td>
<td>9277440</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>iscsiOpt</td>
<td>114688</td>
<td>0</td>
<td>0</td>
<td>7380992</td>
</tr>
<tr>
<td>dhclient</td>
<td>552960</td>
<td>0</td>
<td>0</td>
<td>1626112</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>ndpm</td>
<td>618496</td>
<td>0</td>
<td>0</td>
<td>7389184</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>vrrp</td>
<td>335872</td>
<td>0</td>
<td>0</td>
<td>7712768</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>frrp</td>
<td>180224</td>
<td>0</td>
<td>0</td>
<td>7192576</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>xstp</td>
<td>2740224</td>
<td>0</td>
<td>0</td>
<td>9445376</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>pim</td>
<td>1007616</td>
<td>0</td>
<td>0</td>
<td>7585792</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>igmp</td>
<td>417792</td>
<td>0</td>
<td>0</td>
<td>14774272</td>
</tr>
</tbody>
</table>

Control and Monitoring
### Example (stack-unit)

Dell#show process memory stack-unit 1

<table>
<thead>
<tr>
<th>TaskName</th>
<th>TotalAllocated</th>
<th>TotalFreed</th>
<th>MaxHeld</th>
<th>CurrentHolding</th>
</tr>
</thead>
<tbody>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>mrtm</td>
<td>12636160</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12mgr</td>
<td>42471424</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>l2mgr</td>
<td>1040384</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>l2pm</td>
<td>176128</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>arpm</td>
<td>6955008</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>otm</td>
<td>184320</td>
<td>0</td>
<td>0</td>
<td>7127040</td>
</tr>
</tbody>
</table>

---More---

Dell#
show processes ipc flow-control

Display the single window protocol queue (SWPQ) statistics.

**Syntax**

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

**Parameters**

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

**Defaults**

- none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

- **Version 8.3.17.0**  
  Supported on the M I/O Aggregator.

**Usage Information**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source QID /Tx Process</td>
<td>Source Service Identifier</td>
</tr>
<tr>
<td>Destination QID/Rx Process</td>
<td>Destination Service Identifier</td>
</tr>
<tr>
<td>Cur Len</td>
<td>Current number of messages enqueued</td>
</tr>
<tr>
<td>High Mark</td>
<td>Highest number of packets in the queue at any time</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>#of to / Timeout</td>
<td>Timeout count</td>
</tr>
<tr>
<td>#of Retr /Retries</td>
<td>Number of retransmissions</td>
</tr>
<tr>
<td>#msg Sent/Msg Sent/</td>
<td>Number of messages sent</td>
</tr>
<tr>
<td>#msg Ackd/Ack Rcvd</td>
<td>Number of messages acknowledged</td>
</tr>
<tr>
<td>Retr /Available Retra</td>
<td>Number of retries left</td>
</tr>
<tr>
<td>Total/ Max Retra</td>
<td>Number of retries allowed</td>
</tr>
</tbody>
</table>

**Important Points:**

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

**Example**

Dell#show processes ipc flow-control

Q Statistics on CP Processor

<table>
<thead>
<tr>
<th>TxProcess</th>
<th>RxProcess</th>
<th>Cur</th>
<th>High</th>
<th>Time</th>
<th>Retr</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACL0</td>
<td>RTM0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ACL0</td>
<td>DIFFSERVO</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ACL0</td>
<td>IGMP0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ACL0</td>
<td>PIM0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>LACP0</td>
<td>IFMGR0</td>
<td>34</td>
<td>34</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>STP0</td>
<td>L2PM0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>L2PM0</td>
<td>STP0</td>
<td>2</td>
<td>2</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>FRRP0</td>
<td>L2PM0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DHCP0</td>
<td>ACL0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>DHCP0</td>
<td>IPMGR0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>DHCP0</td>
<td>IPMGR0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>SMUX0</td>
<td>IPMGR0</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Control and Monitoring
show processes memory

Display memory usage information based on processes running in the system.

Syntax

show processes memory {management-unit | stack unit {0–5 | all | summary}}

Parameters

management-unit Enter the keywords management-unit for CPU memory usage of the stack management unit.

stack unit 0–5 Enter the keywords stack unit then a stack unit ID of the member unit for which to display memory usage on the forwarding processor.

all Enter the keyword all for detailed memory usage on all stack members.

summary Enter the keyword summary for a brief summary of memory availability and usage on all stack members.

Command Modes

• EXEC
• EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

show processes memory output

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
<td>Total system memory available</td>
</tr>
<tr>
<td>MaxUsed:</td>
<td>Total maximum memory used ever (history indicated with time stamp)</td>
</tr>
<tr>
<td>CurrentUsed:</td>
<td>Total memory currently in use</td>
</tr>
<tr>
<td>CurrentFree:</td>
<td>Total system memory available</td>
</tr>
<tr>
<td>SharedUsed:</td>
<td>Total used shared memory</td>
</tr>
<tr>
<td>SharedFree:</td>
<td>Total free shared memory</td>
</tr>
<tr>
<td>PID</td>
<td>Process ID</td>
</tr>
<tr>
<td>Process</td>
<td>Process Name</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ResSize</td>
<td>Actual resident size of the process in memory</td>
</tr>
<tr>
<td>Size</td>
<td>Process test, stack, and data size</td>
</tr>
<tr>
<td>Allocs</td>
<td>Total dynamic memory allocated</td>
</tr>
<tr>
<td>Frees</td>
<td>Total dynamic memory freed</td>
</tr>
<tr>
<td>Max</td>
<td>Maximum dynamic memory allocated</td>
</tr>
<tr>
<td>Current</td>
<td>Current dynamic memory in use</td>
</tr>
</tbody>
</table>

The output for the `show process memory` command displays the memory usage statistics running on CP part (sysd) of the system. The sysd is an aggregate task that handles all the tasks running on the M I/O Aggregator’s CP.

The output of the `show memory` command and this command differ based on which the Dell Networking OS processes are counted.

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

### Example

```plaintext
Dell#show processes memory stack-unit 1
Total: 2147483648, MaxUsed: 499040256, CurrentUsed: 499040256, CurrentFree: 1648443392

<table>
<thead>
<tr>
<th>TaskName</th>
<th>TotalAllocated</th>
<th>TotalFreed</th>
<th>MaxHeld</th>
</tr>
</thead>
<tbody>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>192512</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fcoecntrl</td>
<td>270336</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9277440</td>
<td></td>
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<td></td>
</tr>
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<td>0</td>
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<td>0</td>
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</table>
```

Control and Monitoring
<table>
<thead>
<tr>
<th>PID</th>
<th>Process</th>
<th>ResSize</th>
<th>Size</th>
<th>Allocs</th>
<th>Frees</th>
<th>Max</th>
<th>Current</th>
</tr>
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<tr>
<td>633</td>
<td>fcoecntrl</td>
<td>9277440</td>
<td>270336</td>
<td>1380528</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>132512</td>
<td>fcoecntrl 132512</td>
<td>1281144</td>
<td>1248016</td>
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<td>frrp 62256 318</td>
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<td>1007616</td>
<td>62168</td>
<td>0</td>
<td>62168</td>
<td></td>
</tr>
</tbody>
</table>

**Example**

```
show processes memory management-unit
Total     : 2147483648, MaxUsed    :   499093504 [07/23/2012 17:42:16]
CurrentUsed: 499093504, CurrentFree: 1648390144
SharedUsed : 18470440, SharedFree : 2501104
```

**show revision**

Displays the revision numbers of all stack-units.

**Syntax**

`show revision`

**Command Modes**

- EXEC Privilege

**Command History**

**Version 8.3.17.0** Supported on the M I/O Aggregator.
show server-interfaces

Displays server port information.

Syntax

show server-interfaces{brief|detail}

Command Modes

• EXEC Privilege

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Example (brief Command)

Dell#show server-interfaces brief

---------------- show server ports brief ---------------------
Interface                OK  Status     Protocol    Description
TenGigabitEthernet 0/1   YES up         up
TenGigabitEthernet 0/2   YES up         up
TenGigabitEthernet 0/3   YES up         up
TenGigabitEthernet 0/4   NO  up         down
TenGigabitEthernet 0/5   YES up         up
TenGigabitEthernet 0/6   NO  up         down
TenGigabitEthernet 0/7   YES up         up
TenGigabitEthernet 0/8   NO  up         down

----------------------------------- show lacp
---------------------------
Interface                OK  Status     Protocol    Description
Port-channel 1           YES up         up
Dell#

Example (detail Command)

Dell#show server-interfaces detail

---------------- show server ports detail

TenGigabitEthernet 0/1 is up, line protocol is up
Hardware is DellEth, address is 00:1e:c9:de:03:79
    Current address is 00:1e:c9:de:03:79
Server Port AdminState is N/A
Pluggable media not present
Interface index is 33886978
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :001ec9de0379
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed 10000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 2d16h24m
Queueing strategy: fifo
Input Statistics:
10701 packets, 1123557 bytes
  0 64-byte pkts, 10701 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
10701 Multicasts, 0 Broadcasts
0 runts, 0 giants, 0 throttles
0 CRC, 0 overrun, 0 discarded

Output Statistics:
442113 packets, 46047526 bytes, 0 underruns
  870 64-byte pkts, 362829 over 64-byte pkts, 55411 over 127-byte pkts

--More--

show system

Displays the current status of all stack members or a specific stack member.

Syntax
show system [brief | stack-unit unit-id]

Parameters
- brief (OPTIONAL) Enter the keyword brief to view an abbreviated list of system information.
- stack unit unit-id (OPTIONAL) Enter the keywords stack unit then the stack member ID for information on the stack member. The range is from 0 to 5.

Command Modes
- EXEC
- EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example (show system brief command)
Dell#show system brief
Stack MAC : 00:01:e8:00:ab:03
-- Stack Info --
Unit UnitType Status ReqTyp CurTyp Version Ports
---------------------------------------------------------------
----
0 Member not present
1 Management online I/O-Aggregator I/O-Aggregator 8-3-17-38 56
2 Member not present
3 Member not present
4 Member not present
5 Member not present
Dell#

Example (stack-unit command)
Dell#show system stack-unit 1
-- Unit 1 --
Unit Type : Management Unit
Status : online
Next Boot : online
Required Type : I/O-Aggregator - 34-port GE/TE (XL)
Current Type : I/O-Aggregator - 34-port GE/TE (XL)
Master priority : 0
Hardware Rev : 01
Num Ports : 56
Up Time : 4 day, 7 hr, 9 min
FTOS Version : 8-3-17-38
Jumbo Capable : yes
POE Capable : no
Boot Flash : A: 4.0.1.0bt [booted] B: 4.0.1.0bt1
Boot Selector : 4.0.0.0bt
Memory Size : 2147483648 bytes
Temperature : 67C
Voltage : ok
Switch Power : GOOD
Product Name : I/O Aggregator
Mfg By : DELL
Mfg Date :
Serial Number : 00000000000000
Part Number : NVH81X01
Piece Part ID : 00-NVH81X-00000-000-0000
PPID Revision : 01
Service Tag : N/A
Expr Svc Code : N/A
Chassis Svce Tag: RTWB200
Fabric Id : C2
Asset tag : test
PSOC FW Rev : 0xb
ICT Test Date : 0-0-0
ICT Test Info : 0x0
Max Power Req : 31488
Fabric Type : 0x3
Fabric Maj Ver : 0x1
Fabric Min Ver : 0x0
SW Manageability: 0x4
HW Manageability: 0x1
Max Boot Time : 3 minutes
Link Tuning : unsupported
Auto Reboot : enabled
Burned In MAC : 00:01:e8:00:ab:03
No Of MACs : 3
Dell#

Related Commands

asset-tag—Assign and store unique asset-tag to the stack member.
show version—Displays the Dell version.
show processes memory—Displays the memory usage based on the running processes.
show system stack-ports—Displays information about the stack ports on all switches in the stack.
show diag—Displays the data plane and management plane input and output statistics of a particular stack member.
**show tech-support**

Displays a collection of data from other show commands, necessary for Dell Networking technical support to perform troubleshooting on M I/O Aggregators.

**Syntax**

```
show tech-support [stack-unit unit-id | page]
```

**Parameters**

- **stack-unit**
  (OPTIONAL) Enter the keyword `stack-unit` to view CPU memory usage for the stack member designated by `unit-id`. The range is 0 to 5.

- **page**
  (OPTIONAL) Enter the keyword `page` to view 24 lines of text at a time. Press the SPACE BAR to view the next 24 lines. Press the ENTER key to view the next line of text. When using the pipe command (|), enter one of these keywords to filter command output. Refer to [CLI Basics](#) for details on filtering commands.

- **save**
  Enter the keyword `save` to save the command output.
  
  *flash:* Save to local flash drive `(flash://filename (max 20 chars))`

**Command Modes**

- EXEC Privilege

**Command History**

- **Version 8.3.17.0**
  Supported on the M I/O Aggregator.

**Usage Information**

Without the `page` or `stack-unit` option, the command output is continuous, use Ctrl-z to interrupt the command output.

The `save` option works with other filtering commands. This allows you to save specific information of a show command. The `save` entry must always be the last option.

For example: `Dell#show tech-support | grep regular-expression | except regular-expression | find regular-expression | save flash://result`

This display output is an accumulation of the same information that is displayed when you execute one of the following `show` commands:

- show cam
- show clock
- show environment
- show file
- show interfaces
- show inventory
- show processes cpu
- show processes memory
- show running-conf
- show version

Example (save)

Dell#show tech-support ?
page Page through output
stack-unit Unit Number
| Pipe through a command
<cr>
Dell#show tech-support stack-unit 1 ?
page Page through output
| Pipe through a command
<cr>
Dell#show tech-support stack-unit 1 | ?
except S how only text that does not match a pattern
find Search for the first occurrence of a pattern
grep Show only text that matches a pattern
no-more Don’t paginate output
save Save output to a file
Dell#show tech-support stack-unit 1 | save ?
flash: Save to local file system (flash://filename (max 20 chars) )
usbflash: Save to local file system (usbflash://filename (max 20 chars) )
Dell#show tech-support stack-unit 1 | save flash://LauraSave
Start saving show command report .......
Dell#

Example (support)

Dell#dir
Directory of flash:
Directory of flash:
1 drwx 4096 Jan 01 1980 01:00:00 +01:00 .
2 drwx 2048 May 16 2012 10:49:01 +01:00 ..
3 drwx 4096 Jan 24 2012 19:38:32 +01:00 TRACE_LOG_DIR
4 drwx 4096 Jan 24 2012 19:38:32 +01:00 CORE_DUMP_DIR
5 d--- 4096 Jan 24 2012 19:38:34 +01:00 ADMIN_DIR
6 -rwx 10303 Mar 15 2012 18:37:20 +01:00 startup-config.bak
7 -rwx 7366 Apr 20 2012 10:57:02 +01:00 startup-config
8 -rwx 4 Feb 19 2012 07:05:02 +01:00 dhcpBindConflict
9 -rwx 12829 Feb 18 2012 02:24:14 +01:00 startup-config.backup
10 drwx 4096 Mar 08 2012 22:58:54 +01:00 WJ running-config
11 -rwx 7689 Feb 21 2012 04:45:40 +01:00 stBkup
flash: 2143281152 bytes total (2131476480 bytes free)
Dell

Dell Networking Real Time Operating System Software
Dell Networking Operating System Version: 1.0
Dell Networking Application Software Version: E8-3-17-38
Copyright (c) 1999-2012 by Dell Inc. All Rights Reserved.
Build Time: Thu Jul 19 05:59:59 PDT 2012
Build Path: /sites/sjc/work/swsystems01-2/ravisubramani/
ravis-8317/SW/SRC/Cp_src/
Tacacs
FTOS uptime is 4 day(s), 7 hour(s), 14 minute(s)
System image file is "dv-m1000e-2-b2"
System Type: I/O-Aggregator
Control Processor: MIPS RMI XLP with 2147483648 bytes of memory.
256M bytes of boot flash memory.
1 34-port GE/TE (XL)
56 Ten GigabitEthernet/IEEE 802.3 interface(s)

show clock

17:49:37.2 UTC Mon Jul 23 2012

show running-config

Current Configuration ...
! Version E8-3-17-38
! Last configuration change at Mon Jul 23 17:10:18 2012 by default
! boot system stack-unit 1 primary tftp://10.11.9.21/dv-m1000e-2-b2
boot system stack-unit 1 default system: A:
boot system gateway 10.11.209.62
! redundancy auto-synchronize full
! service timestamps log datetime
! hostname FTOS

show ip management route

Destination Gateway State
----------- ------- -----
1

--More--
Dell#

Related Commands

- **show version** — displays the Dell Networking OS version.
- **show system** — displays the current switch status.
- **show environment** — displays system component status.
- **show processes memory** — displays memory usage based on the running processes.

**show uplink brief**

Displays the uplink port information.

**Syntax**

```
show uplink {brief|detail}
```

**Parameters**

- **brief**
  - Enter the keyword **brief** to display a brief summary of the uplink port information.

- **detail**
  - Enter the keyword **detail** to display uplink port information with description.
• EXEC Privilege

Version 9.4(0.0)  Supported on the FN I/O aggregator.

Example (brief)

Dell#show uplink brief

---------------- show uplink brief ---------------------

<table>
<thead>
<tr>
<th>Interface</th>
<th>OK</th>
<th>Status</th>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TenGigabitEthernet 0/9</td>
<td>NO</td>
<td>up</td>
<td>down</td>
<td></td>
</tr>
<tr>
<td>TenGigabitEthernet 0/10</td>
<td>YES</td>
<td>up</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>TenGigabitEthernet 0/11</td>
<td>YES</td>
<td>up</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>TenGigabitEthernet 0/12</td>
<td>YES</td>
<td>up</td>
<td>up</td>
<td></td>
</tr>
</tbody>
</table>

--------------------------- show lacp

<table>
<thead>
<tr>
<th>Interface</th>
<th>OK</th>
<th>Status</th>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port-channel 128</td>
<td>YES</td>
<td>up</td>
<td>up</td>
<td></td>
</tr>
</tbody>
</table>

----------------show uplink state group

Uplink State Group: 1  Status: Enabled, Up

Dell#

Example (detail)

Dell#show uplink detail

---------------- show uplink detail ---------------------

TenGigabitEthernet 0/1 is up, line protocol is up
Hardware is DellEth, address is 00:1e:c9:de:03:79
  Current address is 00:1e:c9:de:03:79
Server Port AdminState is N/A
Pluggable media not present
Interface index is 33886978
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :001ec9de0379
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed 10000 Mbit
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 2d16h54m
Queueing strategy: fifo
Input Statistics:
  10761 packets, 1129857 bytes
  0 64-byte pkts, 10761 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
  10761 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  447767 packets, 46578148 bytes, 0 underruns
  1029 64-byte pkts, 367502 over 64-byte pkts, 55962 over 127-byte pkts
  21161 over 255-byte pkts, 630 over 511-byte pkts, 1483 over 1023-byte pkts
  426647 Multicasts, 18490 Broadcasts, 2630 Unicasts
0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 3 packets/sec, 0.00% of line-rate
Time since last interface status change: 2d16h51m

TenGigabitEthernet 0/2 is up, line protocol is up
Hardware is DellEth, address is 00:1e:c9:de:03:79
  Current address is 00:1e:c9:de:03:79
Server Port AdminState is N/A
Pluggable media not present
Interface index is 34149122
Internet address is not set
Mode of IPv4 Address Assignment : NONE
--More--

show util-threshold cpu
Displays the set CPU utilization threshold values.

Syntax
show util-threshold cpu

Command Modes
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
This command displays all CPU utilization thresholds of the management, standby, and stack-units.

show util-threshold memory
Displays the set memory utilization threshold values.

Syntax
show util-threshold memory

Command Modes
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
This command displays all memory utilization thresholds of the management, standby, and stack-units.
**ssh-peer-stack-unit**

Open an SSH connection to the peer stack-unit.

**Syntax**

```
ssh-peer-stack-unit [-| username]
```

**Parameters**

- `-| username`  
  (OPTIONAL) Enter the keyword `-|` followed by your username.  
  Default: The username associated with the terminal.

**Defaults**

Not configured.

**Command Modes**

- EXEC Privilege

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

---

**telnet**

Connect through Telnet to a server. The Telnet client and server in Dell Networking OS support IPv4 and IPv6 connections. You can establish a Telnet session directly to the router or a connection can be initiated from the router.

**Syntax**

```
telnet {host | ip-address [/source-interface]}
```

**Parameters**

- `host`  
  Enter the name of a server.

- `ip-address`  
  Enter the IPv4 address in dotted decimal format or the IPv6 address in the x:x:x::x format of the server.

  **NOTE:** The :: notation specifies successive hexadecimal fields of zeros. Only one occurrence of this notation is permitted in an IPv6 address.

- `source-interface`  
  (OPTIONAL) Enter the keywords `/source-interface` then the interface information to include the source interface. Enter the following keywords and slot/port or number information:

  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.
  - For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

**Defaults**

Not configured.
telnet-peer-stack-unit

Open a telnet connection to the peer stack-unit.

Syntax

telnet-peer-stack-unit

Defaults

Not configured.

Command Modes

• EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

terminal length

Configure the number of lines displayed on the terminal screen.

Syntax

terminal length screen-length

To return to the default values, use the no terminal length command.

Parameters

screen-length

Enter a number of lines. Entering zero will cause the terminal to display without pausing. The range is from 0 to 512.

Default: 24 lines

Defaults

24 lines

Command Modes

• EXEC

• EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.
terminal monitor

Configure the Dell Networking OS to display messages on the monitor/terminal.

Syntax

```
terminal monitor
```

To return to default settings, use the `no terminal monitor` command.

Defaults

Disabled

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 

Supported on the M I/O Aggregator.

---

terminal xml

Enable XML mode in Telnet and SSH client sessions.

Syntax

```
terminal xml
```

To exit the XML mode, use the `no terminal monitor` command.

Defaults

Disabled

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 

Supported on the M I/O Aggregator.

Usage Information

This command enables XML input mode where you can either cut and paste XML requests or enter the XML requests line-by-line.

---

trace route

View the packet path to a specific device.

Syntax

```
traceroute {host | ip-address}
```

Parameters

- `host` Enter the name of device.
- `ip-address` Enter the IP address of the device in dotted decimal format.
Defaults

Timeout = 5 seconds; Probe count = 3; 30 hops max; 40 byte packet size; UDP port = 33434

Command Modes

• EXEC
• EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

When you enter the traceroute command without specifying an IP address (Extended Traceroute), you are prompted for a target and source IP address, timeout in seconds (default is 5), a probe count (default is 3), minimum TTL (default is 1), maximum TTL (default is 30), and port number (default is 33434). To keep the default setting for those parameters, press the ENTER key.

Example (IPv4)

Dell#traceroute www.force10networks.com
Translating "www.force10networks.com"...domain server (10.11.0.1) [OK]
Type Ctrl-C to abort.
------------------------------------------
---
Tracing the route to www.force10networks.com (10.11.84.18), 30 hops max, 40 byte packets
------------------------------------------
TTL Hostname Probe1 Probe2 Probe3
1 10.11.199.190 001.000 ms 001.000 ms 002.000 ms
2 gwegress-sjc-02.force10networks.com (10.11.30.126) 005.000 ms 001.000 ms 001.000 ms
3 fw-sjc-01.force10networks.com (10.11.127.254) 000.000 ms 000.000 ms 000.000 ms
4 www.force10networks.com (10.11.84.18) 000.000 ms 000.000 ms 000.000 ms
Dell#

Related Commands

ping — Tests the connectivity to a device.

undebug all

Disable all debug operations on the system.

Syntax

undebug all

Defaults

none

Command Modes

• EXEC Privilege
write

Copy the current configuration to either the startup-configuration file or the terminal.

Syntax

write {memory | terminal}

Parameters

- **memory**
  
  Enter the keyword `memory` to copy the current running configuration to the startup configuration file. This command is similar to the `copy running-config startup-config` command.

- **terminal**
  
  Enter the keyword `terminal` to copy the current running configuration to the terminal. This command is similar to the `show running-config` command.

Command Modes

- EXEC Privilege

Command History

- **Version 8.3.17.0**
  
  Supported on the M I/O Aggregator.

Usage Information

The `write memory` command saves the running-configuration to the file labeled startup-configuration. When using a LOCAL CONFIG FILE other than the startup-config not named "startup-configuration", the running-config is not saved to that file; use the `copy` command to save any running-configuration changes to that local file.
**u-Boot**

All commands in this chapter are in u-Boot mode. These commands are supported on the Dell Networking Aggregator only.

To access this mode, hit Esc key when the following line appears on the console during a system boot:

Hit Esc key to interrupt autoboot:

You enter u-Boot immediately, as indicated by the `BOOT_USER#` prompt.

> **NOTE:** Only the most frequently used commands available in uBoot mode are described in this chapter.

In uBoot mode, you cannot use the Tab key for command completion.

---

### boot change

Change the operating system boot parameters.

**Syntax**

`boot change [primary | secondary | default]`

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

---

### boot selection

Change the ROM bootstrap bootflash partition.

**Syntax**

`boot selection[a | b]`

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.
**boot show net config retries**

Show the number of retries for network boot configuration failure.

**Syntax**

```
boot show net config retries
```

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Example**

```
BOOT_USER# boot show net config retries
Number of Network Boot Config Retries is : 0
BOOT_USER#
```

---

**boot write net config retries**

Set the number of retries for network boot configuration failure.

**Syntax**

```
boot write net config retries <int>
```

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Example**

```
BOOT_USER# boot write net config retries 2
Updated number of Network Boot Config retries to 2.
BOOT_USER#
```

---

**boot zero**

Clears the primary, secondary, or default boot parameters.

**Syntax**

```
boot zero [primary| secondary| default]
```

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.
default gateway
Set the default gateway IP address.

Syntax                   default-gateway <ip-address>
Command Modes           • uBoot
Command History         Version 8.3.17.0   Supported on the M I/O Aggregator.

enable
Change the access privilege level.

Syntax                   enable [user| admin]
Command Modes           • uBoot
Command History         Version 8.3.17.0   Supported on the M I/O Aggregator.

help
Displays the help menu.

Syntax                   help
Command Modes           • uBoot
Command History         Version 8.3.17.0   Supported on the M I/O Aggregator.
Example
BOOT USER # help
***** Dell Force10 Boot Interface Help Information *****
Current access level: USER LEVEL
Use "syntax help" for more information on syntax.
Available command list (22 commands total):
  boot change [primary|secondary|default]
  change operating system boot parameters
  boot selection [a|b]
  change the rom bootstrap bootflash partition
  boot show net config retries
  show number of retries for network boot config failure
  boot write net config retries <int>
  write number of retries for network boot config failure
  boot zero [primary|secondary|default]
  zero operating system boot parameters
default-gateway <ip-address>
default-gateway - set the default gateway ip address
enable [user|admin]
change access privilege level
help
display help menu
-(36%)-Use <CR> to continue, q to stop:
BOOT_USER #

ignore enable password
Ignore the enabled password.
Syntax: ignore enable-password
Command Modes:
- uBoot

Command History:
Version 8.3.17.0  Supported on the M I/O Aggregator.

ignore startup-config
Ignore the system startup configuration.
Syntax: ignore startup-config
Command Modes:
- uBoot

Command History:
Version 8.3.17.0  Supported on the M I/O Aggregator.

interface management ethernet ip address
Set the management port IP address and mask.
Syntax: interface management ethernet ip address <ip/mask>
Command Modes:
- uBoot

Command History:
Version 8.3.17.0  Supported on the M I/O Aggregator.
no default gateway
Clear the default gateway IP address.

Syntax  
no default-gateway

Command Modes  
• uBoot

Command History  
Version 8.3.17.0  
Supported on the M I/O Aggregator.

no interface management ethernet ip address
Clear the management port IP address and mask.

Syntax  
no interface management ethernet ip address

Command Modes  
• uBoot

Command History  
Version 8.3.17.0  
Supported on the M I/O Aggregator.

reload
Reload the M I/O Aggregator.

Syntax  
reload

Command Modes  
• uBoot

Command History  
Version 8.3.17.0  
Supported on the M I/O Aggregator.

show boot blc
Show the boot loop counter value.

Syntax  
show boot blc

Command Modes  
• uBoot
show boot selection

Displays the ROM bootstrap bootflash partition.

Syntax

```
show boot selection
```

Command Modes

- uBoot

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Example

```
BOOT_USER # show boot selection
ROM BOOTSTRAP SELECTOR PARAMETERS:
================================
Next ROM bootstrap set to occur from Bootflash partition B.
Last ROM bootstrap occurred from Bootflash partition B.
BOOT_USER #
```

show bootflash

Show the summary of boot flash information.

Syntax

```
show bootflash
```

Command Modes

- uBoot

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

```
BOOT_USER # show bootflash
GENERAL BOOTFLASH INFO
```
show bootvar

Show the summary of operating system boot parameters.

Syntax

```
show bootvar
```

Command Modes

- uBoot

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Example

```
BOOT_USER # show bootvar

PRIMARY OPERATING SYSTEM BOOT PARAMETERS:
==========================================
boot device                        : tftp
file name                          : stomp-ben
Management Etherenet IP address    : 10.16.150.160/16
Server IP address                  : 10.16.127.35
No Default Gateway IP address specified!
Management Etherenet MAC address   : 00:1E:C9:DE:03:79

SECONDARY OPERATING SYSTEM BOOT PARAMETERS:
==========================================
boot device                        : flash
file name                          : systema (system://A Partition)

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:
=========================================
boot device                        : tftp
file name                          : FTOS-FN-1-0-0-1344.bin
Management Etherenet IP address    : 10.16.150.160/16
Server IP address                  : 10.16.127.35
No Default Gateway IP address specified!
Management Etherenet MAC address   : 00:1E:C9:DE:03:79
```
show default gateway

Displays the default gateway IP address.

**Syntax**

```
show default-gateway
```

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Example**

```
BOOT_USER # show default-gateway
Gateway IP address: 15.0.0.1
BOOT_USER #
```

show interface management ethernet

Show the management port IP address and mask.

**Syntax**

```
show interface management ethernet
```

**Command Modes**

- uBoot

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Example**

```
BOOT_USER # show interface management ethernet
Management ethernet IP address: 10.16.130.134/16
BOOT_USER #
```

show interface management port config

Show the management port boot characteristics.

**Syntax**

```
show interface management port config
```

**Command Modes**

- uBoot
syntax help

Show the syntax information.

Syntax

help

Command Modes

- uBoot

Command History

Version 8.3.17.0   Supported on the M I/O Aggregator.

Example

BOOT_USER # show interface management port config
Management ethernet Port Configuration: no Auto Negotiate
Management ethernet Port Configuration: 100M
Management ethernet Port Configuration: full duplex
BOOT_USER #
Data Center Bridging (DCB)

Data center bridging (DCB) refers to a set of IEEE Ethernet enhancements that provide data centers with a single, robust, converged network to support multiple traffic types, including local area network (LAN), server, and storage traffic. DCB features are auto-configured in standalone mode and supported in stacking mode.

The Dell Networking OS commands for DCB features include 802.1Qbb priority-based flow control (PFC), 802.1Qaz enhanced transmission selection (ETS), and the data center bridging exchange (DCBX) protocol.

CLI commands for individual DCB features are as follows:

**DCB commands**
- `dcb enable auto-detect on-next-reload`
- `dcb-map`
- `dcb-policy input stack-unit stack-ports all`

**PFC Commands**
- `clear pfc counters`
- `show interface pfc`
- `show interface pfc statistics`
- `show stack-unit stack-ports pfc details`
- `pfc no-drop queues`

**ETS Commands**
- `clear ets counters`
- `show interface ets`
- `show stack-unit stack-ports ets details`
- `gos-policy-output ets`
- `priority-group`
- `ets mode on`

**DCBX Commands**
- `dcbx version`
- `show dcb`
- `show interface dcbx detail`
clear ets counters

Clear ETS TLV counters.

Syntax

```
clear ets counters [tengigabitethernet slot/port]
```

Parameters

- **slot/port**
  Enter the slot/port number.

Command Modes

- EXEC Privilege

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

---

clear pfc counters

Clear the PFC TLV counters and PFC statistics on an interface or stack unit.

Syntax

```
clear pfc counters [port-type slot/port [statistics]]| [stack-unit {unit-number | all} stack-ports all]
```

Parameters

- **port-type**
  Enter the keywords **port-type** then the slot/port information.

- **stack-unit unit number**
  Enter the keywords **stack-unit** then the stack-unit number to clear. The range is from 0 to 5.

- **all stack-ports all**
  Enter the keywords **all stack-ports all** to clear the counters on all interfaces.

- **statistics**
  Enter the keyword **statistics** to clear only the hardware PFC counters.

Defaults

None

Command Modes

- EXEC Privilege

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

Usage information

If you do not use the **statistics** parameter, both hardware and DCBx counters clear.
**dcb enable auto-detect on-next-reload**

Enables or disables global DCB on a subsequent reload. This command also internally configures PFC buffers based on DCB enable/disable. Save and reload is mandatory for the configurations to take effect. Auto-detect keyword can be used to re-enable IOA with port wise DCB auto detect feature.

**Syntax**

dcb enable {on-next-reload | auto-detect on-next-reload}

To disable global DCB on a subsequent reload, use the no dcb enable on-next-reload command.

**Parameters**

- **auto-detect**
  Enter the keyword auto-detect to re-enable the Aggregator with port wise DCB auto detect feature.

**Defaults**

DCB is globally enabled with auto-detect feature.

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 8.3.17.3**
  Added auto-detect parameter.

- **Version 8.3.17.0**
  Supported on the M I/O Aggregator.

**Example**

```
Dell#show dcb stack-unit 0 port-set 0
DCB Status : Enabled
Dell#
Dell(conf)#dcb enable ?
on-next-reload Apply DCB configs on subsequent reload
Dell(conf)#no dcb enable on-next-reload
Dell(conf)#00:03:11: %STKUNIT0-M:CP %DIFFSERV-6-DCB_DISABLE_CFG_ON_RELOAD:
Global DCB will be disabled on subsequent reload, All reserved PFC buffers will be deleted from each stack unit. For the pfc-buffering change to take effect, please save the config and reload the system.
Dell(conf)#end
Dell#00:03:23: %STKUNIT0-M:CP %SYS-5-CONFIG_I: Configured from console
Dell#write memory
00:03:28: %STKUNIT0-M:CP %FILEMGR-5-FILESAVED: Copied running-config to startup-config in flash by default
Dell#reload
Proceed with reload [confirm yes/no]: yes
00:04:13: %STKUNIT0-M:CP %CHMGR-5-RELOAD: User request to reload the chassis
syncing disks... done
unmounting file systems...
unmounting /f10/flash (/dev/1d0e)...
unmounting /usr (mfs:31)....
unmounting /lib (mfs:23)....
unmounting /f10 (mfs:20)...
unmounting /tmp (mfs:15)...
unmounting /kern (kernfs)...
unmounting / (/dev/md0a).... done
rebooting...
Dell#
```
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status : Disabled
PFC Port Count : 0 (current), 0 (configured)
PFC Queue Count : 0 (current), 0 (configured)
Dell#

Example
(Enable)

Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status : Disabled
Dell#
Dell#
Dell#conf
Dell(conf)#dcb enable on-next-reload
Dell(conf)#00:02:35: %STKUNIT0-M:CP %DIFFSERV-6-
DCB_ENABLE_CFG_ON_RELOAD:
Global DCB will be enabled on subsequent reload, PFC buffers
will be reserved
for all pfc ports and max loss less queues supported for each
stack unit. For
the pfc-buffering change to take effect, please save the
config and reload the
system.
Dell(conf)#end
Dell#00:02:38: %STKUNIT0-M:CP %SYS-5-CONFIG_I: Configured from
console
Dell#write memory
00:02:41: %STKUNIT0-M:CP %FILEMGR-5-FILESAVED: Copied running-
config to
startup-config in flash by default
Dell#reload
Proceed with reload [confirm yes/no]: yes
syncing disks... done
unmounting file systems...
unmounting /f10/flash (/dev/ld0e)...
unmounting /usr (mfs:31)...
unmounting /lib (mfs:23)....
unmounting /tmp (mfs:15)...
unmounting /kern (kernfs)...
unmounting / (/dev/md0a).... done
rebooting...
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status : Enabled
PFC Port Count : 56 (current), 56 (configured)
PFC Queue Count : 2 (current), 2 (configured)
Dell#

Example
(Enable DCB
with Auto-
Detect)

Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status : Disabled
Dell#
Dell#
Dell#conf
Dell(conf)#dcb enable on-next-reload
Dell(conf)#00:02:35: %STKUNIT0-M:CP %DIFFSERV-6-
DCB_ENABLE_CFG_ON_RELOAD:
Global DCB will be enabled on subsequent reload, PFC buffers
will be reserved
for all pfc ports and max loss less queues supported for each
stack unit. For
the pfc-buffering change to take effect, please save the
config and reload the
dcb-map

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

**I/O Aggregator**

**Syntax**

```
dcb-map map-name
```

**Parameters**

- **map-name**
  
  Enter a DCB map name. The maximum number of alphanumeric characters is 32.

**Defaults**

None. There are no pre-configured PFC and ETS settings on S5000 Ethernet interfaces.

**Command Modes**

- CONFIGURATION
- INTERFACE

**Command History**

- **Version 9.3(0.0)**
  
  Introduced on the FC Flex IO module installed in the M I/O Aggregator.

**Usage Information**

A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).
To display the PFC and ETS settings in DCB maps, enter the `show qos dcb-map` command.

Use the `dcb-map` command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The `dcb-map` command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the `no dcb-map map-name` command in Interface configuration mode.

**Related Commands**

- `show qos dcb-map` – displays the dcb-map profiles configured on the system.
- `dcb-map stack-unit all stack-ports all` – applies a DCB map on all ports of a switch stack.

---

**dcb-map stack-unit all stack-ports all**

Apply the specified DCB map on all ports of the switch stack.

**FC Flex IO Modules with I/O Aggregator**

**Syntax**

```
dcb-map stack-unit all stack-ports all dcb-map-name
```

To remove the PFC and ETS settings in a DCB map from all stack units, use the `no dcb-map stack-unit all stack-ports all command`.

**Parameters**

- `dcb-map-name` Enter the name of the DCB map.

**Defaults**

None

**Command Modes**

CONFIGURATION

**Command History**

Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator.

**Usage Information**

The `dcb-map stack-unit all stack-ports all command` overwrites any previous DCB maps applied to stack ports.

**Related Commands**

- `dcb-map` – creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.
**dcbx version**

Configure the DCBX version used on the interface.

**Syntax**

dcbx version {auto | cee | cin | ieee-v2.5}

To remove the DCBX version, use the no dcbx version {auto | cee | cin | ieee-v2.5} command.

**Parameters**

auto | cee | cin | ieee-v2.5  
Enter the DCBX version type used on the interface, where:

- **auto**: configures the port to operate using the DCBX version received from a peer.
- **cee**: configures the port to use CEE (Intel 1.01).
- **cin**: configures the port to use Cisco-Intel-Nuova (DCBX 1.0).
- **ieee-v2.5**: configures the port to use IEEE 802.1az (Draft 2.5).

**Defaults**  
Auto

**Command Modes**

PROTOCOL LLDP

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Usage Information**

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the show interface dcbx detail command.

---

**pfc mode on**

Enable the PFC configuration on the port so that the priorities are included in DCBX negotiation with peer PFC devices.

**Syntax**

pfc mode on

To disable the PFC configuration, use the no pfc mode on command.

**Defaults**  
PFC mode is on.

**Command Modes**

DCB INPUT POLICY

**Command History**

Version 9.3(0.0)  
Introduced on the M I/O Aggregator.
By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to `pfc no-drop queues`).

To disable PFC operation on an interface, enter the `no pfc mode on` command in DCB Input Policy Configuration mode. PFC is enabled and disabled as global DCB operation is enabled (`dcb-enable`) or disabled (`no dcb-enable`).

You cannot enable PFC and link-level flow control at the same time on an interface.

**Related Commands**

- `dcb-input` — creates a DCB input policy.

---

**priority-pgid**

Assign 802.1p priority traffic to a priority group in a DCB map.

**FC Flex IO Modules I/O Aggregator**

**Syntax**

```
priority-pgid dot1p0_group-num dot1p1_group-num dot1p2_group-num dot1p3_group-num dot1p4_group-num dot1p5_group-num dot1p6_group-num dot1p7_group-num
```

**Parameters**

- `dot1p0_group-num`  
  - Enter the priority group number for each 802.1p class of traffic in a DCB map.

**Defaults**

None
PFC and ETS settings are not pre-configured on Ethernet ports. You must use the dcb-map command to configure different groups of 802.1p priorities with PFC and ETS settings.

Using the priority-pgid command, you assign each 802.1p priority to one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group. For example, the `priority-pgid 0 0 0 1 2 4 4 4` command creates the following groups of 802.1p priority traffic:

- Priority group 0 contains traffic with dot1p priorities 0, 1, and 2.
- Priority group 1 contains traffic with dot1p priority 3.
- Priority group 2 contains traffic with dot1p priority 4.
- Priority group 4 contains traffic with dot1p priority 5, 6, and 7.

To remove a priority-pgid configuration from a DCB map, enter the `no priority-pgid` command.

Related Commands

- dcb-map — Creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.
- priority-group bandwidth pfc — Configures the ETS bandwidth allocation and the PFC setting used to manage the port traffic in an 802.1p priority group.

priority-group bandwidth pfc

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

I/O Aggregator

Syntax

```
priority-group group-num {bandwidth percentage| strict-priority} pfc {on | off}
```

Parameters

- `priority-group group-num` Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.
Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.

**strict-priority**

Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.

**pfc (on | off)**

Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.

Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.
Related Commands

dcb-map – Creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

priority-pgid – Configures the 802.1p priority traffic in a priority group for a DCB map.

qos-policy-output ets
To configure the ETS bandwidth allocation and scheduling for priority traffic, create a QoS output policy.

Syntax

```
quos-policy-output  policy-name  ets
```

To remove the QoS output policy, use the no qos-policy-output ets command.

Parameters

```
policy-name
```
Enter the policy name. The maximum is 32 characters.

Command Modes

CONFIGURATION

Command History

- **Version 9.2(0.0)**
  - Supported on the M I/O Aggregator.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

This command is supported in Programmable-Mux (PMUX) mode only.

If an error occurs in an ETS output-policy configuration, the configuration is ignored and the scheduler and bandwidth allocation settings are reset to the ETS default values (all priorities are in the same ETS priority group and bandwidth is allocated equally to each priority).

If an error occurs when a port receives a peer’s ETS configuration, the port’s configuration is reset to the previously configured ETS output policy. If no ETS output policy was previously applied, the port is reset to the default ETS parameters.

You can only associate output QoS policy profiles with the priority groups in the DCB output profile context; output QoS policy profiles are not permitted on output policy-maps.

Weighted random early detection (WRED), Explicit congestion notification (ECN), rate shaping, and rate limiting are not supported in output policies because DCBx does not negotiate these parameters with peer devices. You can apply a QoS output policy with WRED and/or rate shaping on a DCBx CIN-enabled interface (refer to Configuring Port-Based Rate Shaping and Weighted Random Early Detection).
show dcb

Displays the data center bridging status, the number of PFC-enabled ports, and the number of PFC-enabled queues.

Syntax

```
show dcb [stack-unit unit-number]
```

Parameters

- `unit number`: Enter the DCB unit number. The range is from 0 to 5.

Command Modes

EXEC Privilege

Command History

- **Version 8.3.17.0**: Supported on M I/O Aggregator.

Usage Information

Specify a stack-unit number on the Master switch in a stack.

Example

```
Dell# show dcb
stack-unit 0 port-set 0
  DCB Status : Enabled
  PFC Port Count : 56 (current), 56 (configured)
  PFC Queue Count : 2 (current), 2 (configured)
```

show interface dcbx detail

Displays the DCBX configuration on an interface.

Syntax

```
show interface port-type slot/port dcbx detail
```

Parameters

- `port-type`: Enter the port type.
- `slot/port`: Enter the slot/port number.

Command Modes

EXEC Privilege

Command History

- **Version 8.3.17.0**: Supported on M I/O Aggregator.

Usage Information

The following describes the show interface dcbx detail command shown in the following example.
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with chassis slot and port number.</td>
</tr>
<tr>
<td>Port-Role</td>
<td>Configured DCBX port role: auto-upstream or auto-downstream.</td>
</tr>
<tr>
<td>DCBX Operational Status</td>
<td>Operational status (enabled or disabled) used to elect a configuration source and internally propagate a DCB configuration. The DCBX operational status is the combination of PFC and ETS operational status.</td>
</tr>
<tr>
<td>Configuration Source</td>
<td>Specifies whether the port serves as the DCBX configuration source on the switch: true (yes) or false (no).</td>
</tr>
<tr>
<td>Local DCBX Compatibility mode</td>
<td>DCBX version accepted in a DCB configuration as compatible. In auto-detection mode, a port can only operate on a DCBX version supported on the remote peer.</td>
</tr>
<tr>
<td>Local DCBX Configured mode</td>
<td>DCBX version configured on the port: CEE, CIN, IEEE v2.5, or Auto (port auto-configures to use the DCBX version received from a peer).</td>
</tr>
<tr>
<td>Peer Operating version</td>
<td>DCBX version that the peer uses to exchange DCB parameters.</td>
</tr>
<tr>
<td>Local DCBX TLVs Transmitted</td>
<td>Transmission status (enabled or disabled) of advertised DCB TLVs (see TLV code at the top of the show command output).</td>
</tr>
<tr>
<td>Local DCBX Status: DCBX Operational Version</td>
<td>DCBX version advertised in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: DCBX Max Version Supported</td>
<td>Highest DCBX version supported in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: Sequence Number</td>
<td>Sequence number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: Acknowledgment Number</td>
<td>Acknowledgement number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: Protocol State</td>
<td>Current operational state of the DCBX protocol: Waiting for ACK or IN-SYNC.</td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX Operational Version</td>
<td>DCBX version advertised in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX Max Version Supported</td>
<td>Highest DCBX version supported in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Peer DCBX Status: Sequence Number</td>
<td>Sequence number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Peer DCBX Status: Acknowledgment Number</td>
<td>Acknowledgement number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Total DCBX Frames transmitted</td>
<td>Number of DCBX frames sent from the local port.</td>
</tr>
<tr>
<td>Total DCBX Frames received</td>
<td>Number of DCBX frames received from the remote peer port.</td>
</tr>
<tr>
<td>Total DCBX Frame errors</td>
<td>Number of DCBX frames with errors received.</td>
</tr>
<tr>
<td>Total DCBX Frames unrecognized</td>
<td>Number of unrecognizable DCBX frames received.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Input PFC TLV pkts</td>
<td>Number of PFC TLVs received.</td>
</tr>
<tr>
<td>PFC Pause TX pkts</td>
<td>Number of PFC pause frames transmitted.</td>
</tr>
<tr>
<td>PFC Pause Rx pkts</td>
<td>Number of PFC pause frames received.</td>
</tr>
<tr>
<td>PG TLV Statistics: Input PG TLV pkts</td>
<td>Number of PG TLVs received.</td>
</tr>
<tr>
<td>PG TLV Statistics: Output PG TLV pkts</td>
<td>Number of PG TLVs transmitted.</td>
</tr>
<tr>
<td>PG TLV Statistics: Error PG TLV pkts</td>
<td>Number of PG error packets received.</td>
</tr>
<tr>
<td>Application Priority TLV Statistics:</td>
<td></td>
</tr>
<tr>
<td>Input Appln Priority TLV pkts</td>
<td>Number of Application TLVs received.</td>
</tr>
<tr>
<td>Output Appln Priority TLV pkts</td>
<td>Number of Application TLVs transmitted.</td>
</tr>
</tbody>
</table>
### Field Description

**Error Appln Priority TLV**
Number of Application TLV error packets received.

**Example**

```
Dell#show int te 0/34 dcbx detail
E-ETS Configuration TLV enabled e-ETS
Configuration TLV disabled
R-ETS Recommendation TLV enabled r-ETS
Recommendation TLV disabled
P-PFC Configuration TLV enabled p-PFC
Configuration TLV disabled
F-Application priority for FCOE enabled f-Application
Priority for FCOE disabled
I-Application priority for iSCSI enabled i-Application
Priority for iSCSI disabled
```

```
---------------------------------------------------------------
-------
Interface TenGigabitEthernet 0/34
Port Role is Auto-Upstream
DCBX Operational Status is Disabled
Reason: Port Shutdown
Is Configuration Source? FALSE
Local DCBX Compatibility mode is IEEEv2.5
Local DCBX Configured mode is IEEEv2.5
Peer Operating version is Not Detected
Local DCBX TLVs Transmitted: ErPfi
0 Input PFC TLV pkts, 0 Output PFC TLV pkts, 0 Error PFC pkts
0 PFC Pause Tx pkts, 0 Pause Rx pkts
0 Input ETS Conf TLV pkts, 0 Output ETS Conf TLV pkts, 0 Error
ETS Conf TLV pkts
0 Input ETS Reco TLV pkts, 0 Output ETS Reco TLV pkts, 0 Error
ETS Reco TLV pkts
0 Input Appln Priority TLV pkts, 0 Output Appln Priority TLV pkts, 0 Error
Appln Priority TLV pkts
Total DCBx Frames transmitted 0
Total DCBx Frames received 0
Total DCBx Frames errors 0
Total DCBx Frames unrecognized 0
Dell#
```
Enter the port-type slot and port ETS information.

Enter the keyword summary for a summary list of results or enter the keyword detail for a full list of results.

**Command Modes**

- EXEC Privilege

**Command History**

- **Version 8.3.17.0**
  - Supported on the M I/O Aggregator.

**Usage Information**

To clear ETS TLV counters, use the `clear ets counters interface port-type slot/port` command.

The following describes the `show interface summary` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Max Supported TC Group</td>
<td>Maximum number of priority groups supported.</td>
</tr>
<tr>
<td>Number of Traffic Classes</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Admin mode</td>
<td>ETS mode: on or off. When on, the scheduling and bandwidth allocation configured in an ETS output policy or received in a DCBX TLV from a peer can take effect on an interface.</td>
</tr>
<tr>
<td>Admin Parameters</td>
<td>ETS configuration on local port, including priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Remote Parameters</td>
<td>ETS configuration on remote peer port, including admin mode (enabled if a valid TLV was received or disabled), priority groups, assigned dot1p priorities, and bandwidth allocation. If ETS admin mode is enabled on the remote port for DCBX exchange, the Willing bit received in ETS TLVs from the remote peer is included.</td>
</tr>
<tr>
<td>Local Parameters</td>
<td>ETS configuration on local port, including admin mode (enabled when a valid TLV is received from a peer), priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Operational status (local port)</td>
<td>Port state for current operational ETS configuration:</td>
</tr>
<tr>
<td></td>
<td>• Initialize: Local ETS configuration parameters were exchanged with the peer.</td>
</tr>
<tr>
<td></td>
<td>• Recommend: Remote ETS configuration parameters were received from the peer.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Internally propagated (ETS configuration parameters)</td>
<td>ETS configuration parameters were received from the configuration source.</td>
</tr>
<tr>
<td>ETS DCBX Oper status</td>
<td>Operational status of the ETS configuration on the local port: match or mismatch.</td>
</tr>
<tr>
<td>State Machine Type</td>
<td>Type of state machine used for DCBX exchanges of ETS parameters: Feature — for legacy DCBX versions; Asymmetric — for an IEEE version.</td>
</tr>
<tr>
<td>Conf TLV Tx Status</td>
<td>Status of ETS Configuration TLV advertisements: enabled or disabled.</td>
</tr>
<tr>
<td>Reco TLV Tx Status</td>
<td>Status of ETS Recommendation TLV advertisements: enabled or disabled.</td>
</tr>
<tr>
<td>ETS TLV Statistic: Input Conf TLV pkts</td>
<td>Number of ETS Configuration TLVs received.</td>
</tr>
<tr>
<td>ETS TLV Statistic: Output Conf TLV pkts</td>
<td>Number of ETS Configuration TLVs transmitted.</td>
</tr>
<tr>
<td>ETS TLV Statistic: Error Conf TLV pkts</td>
<td>Number of ETS Error Configuration TLVs received.</td>
</tr>
<tr>
<td>ETS Reco TLV Statistic: Input Reco TLV pkts</td>
<td>Number of ETS Recommendation TLVs received.</td>
</tr>
<tr>
<td>ETS Reco TLV Statistic: Output Reco TLV pkts</td>
<td>Number of ETS Recommendation TLVs transmitted.</td>
</tr>
<tr>
<td>ETS Reco TLV Statistic: Error Reco TLV pkts</td>
<td>Number of ETS Error Recommendation TLVs received.</td>
</tr>
</tbody>
</table>

**Example (Detail)**

```
Dell#show interface tengigabitethernet 1/1 ets detail

Interface TenGigabitEthernet 1/1
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters:
------------------
Admin is enabled
TC-grp    Priority#    Bandwidth  TSA
-------------------------------
  0      0,1,2,3,4,5,6,7    100%     ETS
  1                        -        -
  2                        -        -
  3                        -        -
```

Data Center Bridging (DCB)
show interface pfc

Displays the PFC configuration applied to ingress traffic on an interface, including priorities and link delay.

Syntax

```
show interface port-type slot/port pfc {summary | detail}
```

Parameters

- `port-type slot/port pfc`: Enter the port-type slot and port PFC information.
- `{summary | detail}`: Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results.

Command Modes

EXEC Privilege

Command History

- **Version 8.3.17**: Supported on the M I/O Aggregator.
The following describes the `show interface pfc summary` field descriptions.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Admin mode is on, Admin is enabled</td>
<td>PFC mode: on or off. Priority list: list of the configured PFC priorities (if any). When the PFC admin mode is on, PFC advertisements are enabled to be sent and received from peers.</td>
</tr>
<tr>
<td>Remote is enabled, Priority list, Remote Willing Status is enabled</td>
<td>Remote Admin mode: (enabled if a valid TLV was received or disabled). Priority list: list of the configured PFC priorities (if any). Remote Willing Status: Willing bit received in PFC TLVs from the remote peer.</td>
</tr>
<tr>
<td>Local is enabled</td>
<td>Local PFC configuration including the mode and the list of PFC priorities configured.</td>
</tr>
</tbody>
</table>
| Operational status (local port) | Port state for current operational PFC configuration:  
  - Init: Local PFC configuration parameters were exchanged with the peer.  
  - Recommend: Remote PFC configuration parameters were received from the peer.  
  - Internally propagated: PFC configuration parameters were received from the configuration source. |
<p>| PFC DCBX Oper status | Operational status for the exchange of the PFC configuration on the local port: match (up) or mismatch (down). |
| State Machine Type | Type of state machine used for DCBX exchanges of the PFC parameters: Feature — for legacy DCBX versions; Symmetric — for an IEEE version. |
| TLV Tx Status | Status of the PFC TLV advertisements: enabled or disabled. |
| PFC Link Delay | Link delay (in quanta) used to pause specified priority traffic. |
| Application Priority TLV: FCOE TLV Tx Status | Status of FCoE advertisements in application priority TLVs from the local DCBX port: enabled or disabled. |
| Application Priority TLV: SCSI TLV Tx Status | Status of iSCSI advertisements in application priority TLVs from the local DCBX port: enabled or disabled. |
| Application Priority TLV: Local FCOE Priority Map | Priority bitmap used by the local DCBX port in FCoE advertisements in application priority TLVs. |</p>
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Priority TLV: Local ISCSI Priority Map</td>
<td>Priority bitmap used by the local DCBX port in ISCSI advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote FCoE Priority Map</td>
<td>Priority bitmap received from the remote DCBX port in FCoE advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote iSCSI Priority Map</td>
<td>Priority bitmap received from the remote DCBX port in iSCSI advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Input TLV pkts</td>
<td>Number of PFC TLVs received.</td>
</tr>
<tr>
<td>Output TLV pkts</td>
<td>Number of PFC TLVs transmitted.</td>
</tr>
<tr>
<td>Error pkts</td>
<td>Number of PFC error packets received.</td>
</tr>
<tr>
<td>Pause Tx pkts</td>
<td>Number of PFC pause frames transmitted.</td>
</tr>
<tr>
<td>Pause Rx pkts</td>
<td>Number of PFC pause frames received.</td>
</tr>
<tr>
<td>Input Appln Priority TLV</td>
<td>Number of Application Priority TLVs received.</td>
</tr>
<tr>
<td>Output Appln Priority TLV pkts</td>
<td>Number of Application Priority TLVs transmitted.</td>
</tr>
<tr>
<td>Error Appln Priority TLV</td>
<td>Number of Application Priority error packets received.</td>
</tr>
</tbody>
</table>

**Example (detail)**

```bash
Dell# show interfaces tengigabitethernet 0/49 pfc detail
Interface TenGigabitEthernet 0/49
  Admin mode is on
  Admin is enabled
  Remote is enabled
  Remote Willing Status is enabled
  Local is enabled
  Oper status is recommended
  PFC DCBX Oper status is Up
  State Machine Type is Feature
  TLV Tx Status is enabled
  PFC Link Delay 45556 pause quanta
  Application Priority TLV Parameters :
                             -----------------------------
  FCoE TLV Tx Status is disabled
  iSCSI TLV Tx Status is disabled
  Local FCOE PriorityMap is 0x8
  Local iSCSI PriorityMap is 0x10
  Remote FCOE PriorityMap is 0x8
```

Data Center Bridging (DCB)
Remote ISCSI PriorityMap is 0x8

0 Input TLV pkts, 1 Output TLV pkts, 0 Error pkts, 0 Pause Tx pkts, 0 Pause Rx pkts
0 Input Appln Priority TLV pkts, 1 Output Appln Priority TLV pkts, 0 Error Appln Priority TLV Pkts

**show interface pfc statistics**

Displays counters for the PFC frames received and transmitted (by dot1p priority class) on an interface.

**Syntax**

```
show interface port-type slot/port pfc statistics
```

**Parameters**

- `port-type` Enter the port type.
- `slot/port` Enter the slot/port number.

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

```
Dell#show interfaces te 0/3 pfc statistics
Interface TenGigabitEthernet 0/3
Priority Rx XOFF Frames Rx Total Frames Tx Total Frames
----------------------------------------
0         0              0               0
1         0              0               0
2         0              0               0
3         0              0               0
4         0              0               0
5         0              0               0
6         0              0               0
7         0              0               0
```

**show qos dcb-map**

Display the DCB parameters configured in a specified DCB map.

**FC Flex IO Modules with I/O Aggregator**

**Syntax**

```
show qos dcb-map map-name
```

**Parameters**

- `map-name` Displays the PFC and ETS parameters configured in the specified map.
Command Modes

• EXEC
• EXEC Privilege

Command History

Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator.

Usage Information

Use the show qos dcb-map command to display the enhanced transmission selection (ETS) and priority-based flow control (PFC) parameters used to configure server-facing Ethernet ports. S5000 Ethernet ports are DCBx-enabled by default.

The following table describes the show qos dcb-map output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Complete: All mandatory DCB parameters are correctly configured. In progress: The DCB map configuration is not complete. Some mandatory parameters are not configured.</td>
</tr>
<tr>
<td>PFC Mode</td>
<td>PFC configuration in DCB map: On (enabled) or Off.</td>
</tr>
<tr>
<td>PG</td>
<td>Priority group configured in the DCB map.</td>
</tr>
<tr>
<td>TSA</td>
<td>Transmission scheduling algorithm used by the priority group: Enhanced Transmission Selection (ETS).</td>
</tr>
<tr>
<td>BW</td>
<td>Percentage of bandwidth allocated to the priority group.</td>
</tr>
<tr>
<td>PFC</td>
<td>PFC setting for the priority group: On (enabled) or Off.</td>
</tr>
<tr>
<td>Priorities</td>
<td>802.1p priorities configured in the priority group.</td>
</tr>
</tbody>
</table>

Example

Dell# show qos dcb-map dcbmap2
State :Complete
PfcMode:ON
---------------------
PG:0 TSA:ETS  BW:50  PFC:OFF
Priorities:0 1 2 4 5 6 7

PG:1 TSA:ETS  BW:50  PFC:ON
Priorities:3

Related Commands

dcb-map — creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.
Dynamic Host Configuration Protocol

Dynamic host configuration protocol (DHCP) is an application layer protocol that dynamically assigns IP addresses and other configuration parameters to network end-stations (hosts) based on configuration policies determined by network administrators.

An Aggregator can operate as a DHCP client. As a DHCP client, the Aggregator requests an IP address from a DHCP server.

The following types of DHCP commands are described in this chapter:

- DHCP Client Commands
- Other Commands supported by DHCP Client

### DHCP Client Commands

- ip address dhcp
- release dhcp interface
- renew dhcp interface
- show ip dhcp client statistics
- show ip dhcp lease

### Other Commands supported by DHCP Client

- debug ip dhcp client events
- debug ip dhcp client packets

### ip address dhcp

Acquire an IP address dynamically on an interface from the DHCP server.

**Syntax**

```
ip address dhcp
```

To disable DHCP Client on an interface, use the `no ip address dhcp` command.

**Command Modes**

INTERFACE

**Default**

Enabled

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.
In the M I/O Aggregator, the DHCP client is enabled only on the default vlan and management interface 0/0. Use the ip address command to assign a static ip address that overwrites the dynamically assigned IP address.

**clear ip dhcp client statistics**

Displays DHCP client statistics, including the number of DHCP messages sent and received on an interface.

**Syntax**

```
clear ip dhcp client statistics {all|interface type slot/port}
```

**Parameters**

- `all`
  
  Clear DHCP client statistics on all DHCP client-enabled interfaces on the switch.

- `interface type slot/port`
  
  Clear DHCP client statistics on the specified interface.

  - For the management interface on the stack-unit, enter the keyword `managementethernet` followed by slot/port information. The slot and port range is 0.
  
  - For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

EXEC Privilege

**Default**

None

**Command History**

Version 8.3.17.0   Supported on the M I/O Aggregator.

**debug ip dhcp client events**

Enable the display of log messages for the following events on DHCP client interfaces:

- IP address acquisition
- IP address release
- Renewal of IP address and lease time
- Release of an IP address

**Syntax**

```
debug ip dhcp client events [interface type slot/port]
```
Parameters

**interface type slot/port**
Display log messages for DHCP packets sent and received on the specified interface.

- For the management interface on the stack-unit, enter the keyword `managementethernet` followed by slot/port information. The slot and port range is 0.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**
EXEC Privilege

**Default**
None

**Command History**
Version 8.3.17.0  Supported on the M I/O Aggregator.

---

**debug ip dhcp client packets**
Enable the display of log messages for all DHCP packets sent and received on DHCP client interfaces.

**Syntax**
`debug ip dhcp client packets [interface type slot/port]`

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface type slot/port</td>
<td>Display log messages for DHCP packets sent and received on the specified interface.</td>
</tr>
</tbody>
</table>
- For the management interface on the stack-unit, enter the keyword `managementethernet` followed by slot/port information. The slot and port range is 0.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**
EXEC Privilege

**Default**
None

**Command History**
Version 8.3.17.0  Supported on the M I/O Aggregator.
**release dhcp interface**

Release the dynamically-acquired IP address on an Ethernet interface while retaining the DHCP client configuration on the interface.

**Syntax**

```plaintext
release dhcp interface type slot/port
```

**Parameters**

- **interface type slot/port**
  - For the management interface on the stack-unit, enter the keyword management ethernet followed by slot/port information. The slot and port range is 0.
  - For a VLAN, enter the keyword vlan followed by a number from 1 to 4094.

**Command Modes**

EXEC Privilege

**Default**

None

**Command History**

Version 9.2 (0.0)

Supported on the M I/O Aggregator.

**Usage Information**

When you enter the `release dhcp` command, although the IP address that was dynamically-acquired from a DHCP server is released from an interface, the ability to acquire a new DHCP server-assigned address remains in the running configuration for the interface. To acquire a new IP address, enter either the `renew dhcp` command at the EXEC privilege level or the `ip address dhcp` command at the interface configuration level.

---

**renew dhcp interface**

Re-acquire a dynamic IP address on an Ethernet interface enabled as a DHCP client.

**Syntax**

```plaintext
renew dhcp interface type slot/port
```

**Parameters**

- **interface type slot/port**
  - Enter any of the following keywords and slot/port or number to clear counters from a specified interface:
    - For the management interface on the stack-unit, enter the keyword `management ethernet` followed by slot/port information. The slot and port range is 0.
    - For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

EXEC Privilege

**Default**

None

**Usage Information**

When you enter the `renew dhcp` command, the ability to acquire a new DHCP server-assigned address remains in the running configuration for the interface. To acquire a new IP address, enter either the `release dhcp` command at the EXEC privilege level or the `ip address dhcp` command at the interface configuration level.
The `renew dhcp` command is used to renew the lease of IP address obtained through dhcp.

To display the currently configure dynamic IP address and lease time, enter the `show ip dhcp lease` command.

**show ip dhcp client statistics**

Displays DHCP client statistics, including the number of DHCP messages sent and received on an interface.

**Syntax**

```
show ip dhcp client statistics {all | interface type slot/port}
```

**Parameters**

- `all` Display DHCP client statistics on all DHCP client-enabled interfaces on the switch.
- `interface type slot/port` Display DHCP client statistics on the specified interface.
  - For the management interface on the stack-unit, enter the keyword `management ethernet` followed by slot/port information. The slot and port range is 0.
  - For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

EXEC Privilege

**Default**

None.

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**show ip dhcp lease**

Displays lease information about the dynamic IP address currently assigned to a DHCP client-enabled interface.

**Syntax**

```
show ip dhcp lease[interface type slot/port]
```

**Parameters**

- `interface type slot/port` Display DHCP client statistics on the specified interface.
• For the management interface on the stack-unit, enter the keyword `management ethernet` followed by slot/port information. The slot and port range is 0.
• For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

<table>
<thead>
<tr>
<th>Command Modes</th>
<th>EXEC Privilege</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>Display DHCP lease information on all DHCP client-enabled interfaces on the switch.</td>
</tr>
</tbody>
</table>

**Command History**

| Version 8.3.17.0 | Supported on the M I/O Aggregator. |
FIP Snooping

In a converged Ethernet network, an MXL Switch can operate as an intermediate Ethernet bridge to snoop on Fibre Channel over Ethernet initialization protocol (FIP) packets during the login process on Fibre Channel over Ethernet (FCoE) forwarders (FCFs).

Acting as a transit FIP snooping bridge, the switch uses dynamically-created ACLs to permit only authorized FCoE traffic to be transmitted between an FCoE end-device and an FCF. The following Dell Networking Operating System (OS) commands are used to configure and verify the FIP snooping feature.

clear fip-snooping statistics

Clear the statistics on the FIP packets snooped on all VLANs, a specified VLAN, or a specified port interface.

Syntax

```
clear fip-snooping statistics [interface vlan Vlan-id | interfaceport-type port/slot | interface port-channel port-channel-number]
```

Parameters

- `vlan-id` Enter the VLAN ID of the FIP packet statistics to be cleared.
- `port type port/slot` Enter the port-type and slot number of the FIP packet statistics to be cleared.
- `port-channel-number` Enter the port channel number of the FIP packet statistics to be cleared.

Command Modes

- EXEC Privilege

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

debug fip-snooping

Enable the debug FIP protocol specific messages.

```
dump fip-snooping [all | acl | error | ifm | info | ipc | rx | packet-type { all | discovery | virtual-link-instantiation | virtual-link-maintenance | vlan-discovery } | fortyGigE | port-channel | tengigabitethernet } | tx ]
```
show fip-snooping config

Displays the FIP snooping status and configured FC-MAP values.

**Syntax**

```
show fip-snooping config
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Enable all the debug options.</td>
</tr>
<tr>
<td>acl</td>
<td>Enable for ACL specific debugs.</td>
</tr>
<tr>
<td>error</td>
<td>Enable for Error specific debugs.</td>
</tr>
<tr>
<td>ifm</td>
<td>Enable for IFM specific debugs.</td>
</tr>
<tr>
<td>info</td>
<td>Enable for Information specific debugs.</td>
</tr>
<tr>
<td>ipc</td>
<td>Enable for IPC specific debugs.</td>
</tr>
<tr>
<td>rx</td>
<td>Enable for packet receive specific debugs.</td>
</tr>
<tr>
<td>packet-type</td>
<td>Specify the packet type. Options are:</td>
</tr>
<tr>
<td></td>
<td>- all</td>
</tr>
<tr>
<td></td>
<td>- discovery</td>
</tr>
<tr>
<td></td>
<td>- virtual-link-instantiation</td>
</tr>
<tr>
<td></td>
<td>- virtual-link-maintenance</td>
</tr>
<tr>
<td></td>
<td>- vlan-discovery</td>
</tr>
<tr>
<td>all</td>
<td>Enable for all the packet types.</td>
</tr>
<tr>
<td>discovery</td>
<td>Enable for FIP discovery solicits (enodes) and adverts (fcf).</td>
</tr>
<tr>
<td>virtual-link-instantiation</td>
<td>Enable for flogi, fdisc and flogo packets.</td>
</tr>
<tr>
<td>virtual-link-maintenance</td>
<td>Enable for clear virtual link and keepalive packets.</td>
</tr>
<tr>
<td>vlan-discovery</td>
<td>Enable for FIP VLAN requests and notifications.</td>
</tr>
<tr>
<td>fortyGigE</td>
<td>FortyGigabit Ethernet interface.</td>
</tr>
<tr>
<td>port-channel</td>
<td>Port-channel interface.</td>
</tr>
<tr>
<td>tengigabitether</td>
<td>TenGigabit Ethernet interface.</td>
</tr>
<tr>
<td>tx</td>
<td>Enable for packet transmit specific debugs.</td>
</tr>
</tbody>
</table>

**Command Modes**

- EXEC Privilege

**Command History**

- **Version 9.4(0.0)** Supported on the FN I/O aggregator.
show fip-snooping enode

Displays information on the ENodes in FIP-snooped sessions, including the ENode interface and MAC address, FCF MAC address, VLAN ID, and FC-ID.

Syntax

show fip-snooping enode [enode-mac-address]

Parameters

enode-mac-address
Enter the MAC address of the ENodes to be displayed.

Command Modes

• EXEC
• EXEC Privilege

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Usage Information

The following describes the show fip-snooping enode command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENode MAC</td>
<td>MAC address of the ENode</td>
</tr>
<tr>
<td>ENode Interface</td>
<td>Slot/ port number of the interface connected to the ENode.</td>
</tr>
<tr>
<td>FCF MAC</td>
<td>MAC address of the FCF</td>
</tr>
<tr>
<td>VLAN</td>
<td>VLAN ID number used by the session</td>
</tr>
<tr>
<td>FC-ID</td>
<td>Fibre Channel session ID assigned by the FCF.</td>
</tr>
</tbody>
</table>

Example

Dell# show fip-snooping enode
Enode MAC Enode Interface FCF MAC VLAN FC-ID
-------- ----------- -----------
--------- ------- ---------
show fip-snooping fcf

Displays information on the FCFs in FIP-snooped sessions, including the FCF interface and MAC address, FCF interface, VLAN ID, FC-MAP value, FKA advertisement period, and number of ENodes connected.

**Syntax**

```
show fip-snooping fcf [fcf-mac-address]
```

**Parameters**

- `fcf-mac-address`: Enter the MAC address of the FCF to be displayed.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**

The following describes the `show fip-snooping fcf` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCF MAC</td>
<td>MAC address of the FCF</td>
</tr>
<tr>
<td>FCF Interface</td>
<td>Slot/ port number of the interface to which the FCF is connected.</td>
</tr>
<tr>
<td>VLAN</td>
<td>VLAN ID number used by the session</td>
</tr>
<tr>
<td>FC-MAP</td>
<td>FC-MAP value advertised by the FCF</td>
</tr>
<tr>
<td>FKA_ADV_PERIO</td>
<td>Period of time (in milliseconds) during which FIP keep-alive advertisements are transmitted.</td>
</tr>
<tr>
<td>No of ENodes</td>
<td>Number of ENodes connected to the FCF</td>
</tr>
</tbody>
</table>

**Example**

```
Dell# show fip-snooping fcf
FCF MAC             FCF Interface    VLAN    FC-MAP     FKA_ADV_PERIOD  No. of ENodes
-------             -------------    ----     ------     ---------------  ------------
54:7f:ee:37:34:40   Po 128           100     0e:fc:00   4000              1
```
show fip-snooping sessions

Displays information on FIP-snooped sessions on all VLANs or a specified VLAN, including the ENode interface and MAC address, the FCF interface and MAC address, VLAN ID, FCoE MAC address and FCoE session ID number (FC-ID), worldwide node name (WWNN) and the worldwide port name (WWPN).

Syntax

show fip-snooping sessions[interface vlan vlan-id]

Parameters

vlan-id
Enter the vlan-id of the specified VLAN to be displayed.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 9.4(0.0) Supported on the FN I/O aggregator.

Usage Information

The following describes the show fip-snooping sessions command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENode MAC</td>
<td>MAC address of the ENode.</td>
</tr>
<tr>
<td>ENode Interface</td>
<td>Slot/ port number of the interface connected to the ENode.</td>
</tr>
<tr>
<td>FCF MAC</td>
<td>MAC address of the FCF.</td>
</tr>
<tr>
<td>FC Interface</td>
<td>Slot/ port number of the interface to which the FCF is connected.</td>
</tr>
<tr>
<td>VLAN</td>
<td>VLAN ID number used by the session.</td>
</tr>
<tr>
<td>FCoE MAC</td>
<td>MAC address of the FCoE session assigned by the FCF.</td>
</tr>
<tr>
<td>FC-ID</td>
<td>Fibre Channel ID assigned by the FCF.</td>
</tr>
<tr>
<td>Port WWPN</td>
<td>Worldwide port name of the CNA port.</td>
</tr>
<tr>
<td>Port WWNN</td>
<td>Worldwide node name of the CNA port.</td>
</tr>
</tbody>
</table>

Example

Dell#show fip-snooping sessions
Enode MAC      ENode Intf  FCF MAC      FCF Intf  VLAN
FCoE MAC        FC-ID
00:0e:1e:0c:54:a6 Te 0/1 00:05:73:f2:4f:ae Po128 100 0e:fc:00:9a:00:27 9a:00:27 20:01:00:0e:1e:0c:54:a6
00:0e:1e:06:01:5e Te 0/3 00:05:73:f2:4f:af Po128 100 0e:fc:00:9a:01:18 9a:01:18 20:01:00:0e:1e:06:01:5
Port WWNN
20:00:00:0e:1e:0c:54:a6
20:00:00:0e:1e:0c:54:a6
show fip-snooping statistics

Displays statistics on the FIP packets snooped on all interfaces, including VLANs, physical ports, and port channels.

Syntax

```
show fip-snooping statistics [interface vlan vlan-id | interface port-type port/slot | interface port-channel port-channel-number]
```

Parameters

- **vlan-id**: Enter the VLAN ID of the FIP packet statistics to be displayed.
- **port-type port/slot**: Enter the port-type and slot number of the FIP packet statistics to be displayed.
- **port-channel-number**: Enter the port channel number of the FIP packet statistics to be displayed.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

The following describes the `show fip-snooping statistics` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Vlan Requests</td>
<td>Number of FIP-snooped VLAN request frames received on the interface.</td>
</tr>
<tr>
<td>Number of VLAN Notifications</td>
<td>Number of FIP-snooped VLAN notification frames received on the interface.</td>
</tr>
<tr>
<td>Number of Multicast Discovery Solicits</td>
<td>Number of FIP-snooped multicast discovery solicit frames received on the interface.</td>
</tr>
<tr>
<td>Number of Unicast Discovery</td>
<td>Number of FIP-snooped unicast discovery solicit frames received on the interface.</td>
</tr>
<tr>
<td>Number of FLOGI</td>
<td>Number of FIP-snooped FLOGI request frames received on the interface.</td>
</tr>
<tr>
<td>Number of FDISC</td>
<td>Number of FIP-snooped FDISC request frames received on the interface.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Number of FLOGO</td>
<td>Number of FIP-snooped FLOGO frames received on the interface</td>
</tr>
<tr>
<td>Number of ENode Keep Alives</td>
<td>Number of FIP-snooped ENode keep-alive frames received on the interface</td>
</tr>
<tr>
<td>Number of VN Port Keep Alives</td>
<td>Number of FIP-snooped VN port keep-alive frames received on the interface</td>
</tr>
<tr>
<td>Number of Multicast Discovery</td>
<td>Number of FIP-snooped multicast discovery advertisements received on the interface</td>
</tr>
<tr>
<td>Advertisements</td>
<td>Number of FIP-snooped unicast discovery advertisements received on the interface</td>
</tr>
<tr>
<td>Number of FLOGI Accepts</td>
<td>Number of FIP FLOGI accept frames received on the interface</td>
</tr>
<tr>
<td>Number of FLOGI Rejects</td>
<td>Number of FIP FLOGI reject frames received on the interface</td>
</tr>
<tr>
<td>Number of FDISC Accepts</td>
<td>Number of FIP FDISC accept frames received on the interface</td>
</tr>
<tr>
<td>Number of FDISC Rejects</td>
<td>Number of FIP FDISC reject frames received on the interface</td>
</tr>
<tr>
<td>Number of FLOGO Accepts</td>
<td>Number of FIP FLOGO accept frames received on the interface</td>
</tr>
<tr>
<td>Number of FLOGO Rejects</td>
<td>Number of FIP FLOGO reject frames received on the interface</td>
</tr>
<tr>
<td>Number of CVLs</td>
<td>Number of FIP clear virtual link frames received on the interface</td>
</tr>
<tr>
<td>Number of FCF Discovery</td>
<td>Number of FCF discovery timeouts that occurred on the interface</td>
</tr>
<tr>
<td>Number of VN Port Session</td>
<td>Number of VN port session timeouts that occurred on the interface</td>
</tr>
<tr>
<td>Number of Session failures</td>
<td>Number of session failures due to hardware configuration that occurred on the interface</td>
</tr>
</tbody>
</table>
Example

Dell# show fip-snooping statistics interface vlan 100
Number of Vlan Requests :0
Number of Vlan Notifications :0
Number of Multicast Discovery Solicits :2
Number of Unicast Discovery Solicits :0
Number of FLOGI :2
Number of FDISC :16
Number of FLOGO :0
Number of Enode Keep Alive :9021
Number of VN Port Keep Alive :3349
Number of Multicast Discovery Advertisement :4437
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts :2
Number of FLOGI Rejects :0
Number of FDISC Accepts :16
Number of FDISC Rejects :0
Number of FLOGO Accepts :0
Number of FLOGO Rejects :0
Number of CVL :0
Number of FCF Discovery Timeouts :0
Number of VN Port Session Timeouts :0
Number of Session failures due to Hardware Config :0
Dell(conf)#

Dell# show fip-snooping statistics int tengigabitethernet 0/11
Number of Vlan Requests :1
Number of Vlan Notifications :0
Number of Multicast Discovery Solicits :1
Number of Unicast Discovery Solicits :0
Number of FLOGI :1
Number of FDISC :16
Number of FLOGO :0
Number of Enode Keep Alive :4416
Number of VN Port Keep Alive :3136
Number of Multicast Discovery Advertisement :0
Number of Unicast Discovery Advertisement :0
Number of FLOGI Accepts :0
Number of FLOGI Rejects :0
Number of FDISC Accepts :0
Number of FDISC Rejects :0
Number of FLOGO Accepts :0
Number of FLOGO Rejects :0
Number of CVL :0
Number of FCF Discovery Timeouts :0
Number of VN Port Session Timeouts :0
Number of Session failures due to Hardware Config :0

Example (port channel)

Dell# show fip-snooping statistics interface port-channel 22
Number of Vlan Requests :0
Number of Vlan Notifications :2
Number of Multicast Discovery Solicits :0
Number of Unicast Discovery Solicits :0
Number of FLOGI :0
Number of FDISC :0
Number of FLOGO :0
Number of Enode Keep Alive :0
Number of VN Port Keep Alive :0
Number of Multicast Discovery Advertisement :4451
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts :2
Number of FLOGI Rejects :0
**show fip-snooping system**

Displays information on the status of FIP snooping on the switch (enabled or disabled), including the number of FCoE VLANs, FCFs, ENodes, and currently active sessions.

**Syntax**

```
show fip-snooping system
```

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

Dell# show fip-snooping system
Global Mode : Enabled
FCOE VLAN List (Operational) : 1, 100
FCFs : 1
Enodes : 2
Sessions : 17
Internet Group Management Protocol (IGMP)

The Dell Networking OS supports IGMP snooping version 2 and 3 on all Dell Networking systems.

IGMP Commands

The Dell Networking OS supports the following IGMP commands:

- `clear ip igmp groups`
- `debug ip igmp`
- `ip igmp snooping flood`
- `show ip igmp groups`
- `show ip igmp interface`
- `show ip igmp snooping mrouter`

Important Points to Remember

- Dell Networking OS supports version 1, version 2, and version 3 hosts.
- Dell Networking OS IGMP snooping implementation is based on IP multicast address (not based on Layer 2 multicast mac-address) and the IGMP snooping entries are in Layer 3 flow table not in Layer 2 forwarding information base (FIB).
- Dell Networking OS IGMP snooping implementation is based on draft-ietf-magma-snoop-10.
- IGMP snooping is supported on all M I/O Aggregator stack members.
- IGMP snooping is enabled by default on the switch.
- A maximum of 8k groups and 4k virtual local area networks (VLAN) are supported.
- IGMP snooping is not supported on default VLAN interface.
- Flooding of unregistered multicast traffic is enabled by default.
- Queries are not accepted from the server side ports and are only accepted from the uplink LAG.
- Reports and Leaves are flooded by default to the uplink LAG irrespective of whether it is an mrouter port or not.

`clear ip igmp groups`

Clear entries from the group cache table.

```
Syntax clear ip igmp groups [group-address | interface]
```
Parameters

- **group-address** (OPTIONAL) Enter the IP multicast group address in dotted decimal format.
- **interface** (OPTIONAL) Enter the interface type and slot/port information: For a VLAN interface enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

- **EXEC Privilege**

**Command History**

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

### debug ip igmp

Enable debugging of IGMP packets.

**Syntax**

```
debug ip igmp [group address | interface]
```

To disable IGMP debugging, enter the `no ip igmp` command. To disable all debugging, enter the `undebug all` command.

**Defaults**

Disabled

**Parameters**

- **group-address** (OPTIONAL) Enter the IP multicast group address in dotted decimal format.
- **interface** (OPTIONAL) Enter the interface type and slot/port information: For a VLAN interface enter the keyword `vlan` followed by a number from 1 to 4094.

**Command Modes**

- **EXEC Privilege**

**Command History**

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

### ip igmp snooping flood

This command controls the flooding behavior of unregistered multicast data packets. When flooding is disabled, unregistered multicast data traffic is forwarded to only multicast router ports in a VLAN. If there is no multicast router port in a VLAN, unregistered multicast data traffic is dropped.

**Syntax**

```
ip igmp snooping flood
```

**Parameters**

- **Enabled**

**Command Modes**

- **CONFIGURATION**
show ip igmp groups

View the IGMP groups.

Syntax

show ip igmp groups [group-address [detail] | detail | interface [group-address [detail]]]

Parameters

- **group-address** (OPTIONAL) Enter the group address in dotted decimal format to view information on that group only.
- **interface** (OPTIONAL) Enter the interface type and slot/port information:
  - For a VLAN interface enter the keyword vlan followed by a number from 1 to 4094.
- **detail** (OPTIONAL) Enter the keyword detail to display the IGMPv3 source information.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Example

Dell#show ip igmp groups
Total Number of Groups: 5
IGMP Connected Group Membership
Group Address Interface Mode Uptime
Expires Last Reporter
225.0.0.0 Vlan 100 IGMPv2 00:00:05
00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.2 Vlan 100 IGMPv2 00:00:05
00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.3 Vlan 100 IGMPv2 00:00:05
00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.4 Vlan 100 IGMPv2 00:00:05
00:02:04 3.0.0.51
Member Ports: Po 2

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Address</td>
<td>Lists the multicast address for the IGMP group.</td>
</tr>
<tr>
<td>Interface</td>
<td>Lists the interface type, slot and port number.</td>
</tr>
</tbody>
</table>
show ip igmp interface

View information on the interfaces participating in IGMP.

Syntax

show ip igmp interface [interface]

Parameters

interface

(OPTIONAL) Enter any of the following keywords and slot/port or number to clear counters from a specified interface:

- For a Port Channel interface, enter the keyword port-channel followed by a number. Range: 1-128
- For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
- For a VLAN, enter the keyword vlan followed by a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example

Dell#show ip igmp interface
Vlan 2 is up, line protocol is down
Inbound IGMP access group is not set
Interface IGMP group join rate limit is not set
IGMP snooping is enabled on interface
IGMP Snooping query interval is 60 seconds
IGMP Snooping querier timeout is 125 seconds
IGMP Snooping last member query response interval is 1000 ms
IGMP snooping fast-leave is disabled on this interface
IGMP snooping querier is disabled on this interface
Vlan 3 is up, line protocol is down
Inbound IGMP access group is not set

Internet Group Management Protocol (IGMP)
Interface IGMP group join rate limit is not set
IGMP snooping is enabled on interface
IGMP Snooping query interval is 60 seconds
IGMP Snooping querier timeout is 125 seconds
IGMP Snooping last member query response interval is 1000 ms
IGMP snooping fast-leave is disabled on this interface
IGMP snooping querier is disabled on this interface
--More--

**show ip igmp snooping mrouter**

Displays multicast router interfaces.

**Syntax**

`show ip igmp snooping mrouter [vlan number]`

**Parameters**

`vlan number` Enter the keyword vlan followed by the vlan number. Range: 1 to 4094

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

Dell#show ip igmp snooping mrouter vlan 2
Interface Router Ports
Vlan 2 Po 128
Dell#

**Related Commands**

`show ip igmp groups` — Use this IGMP command to view groups.
Interfaces

This chapter defines interface commands and is divided into the following sections:

- Port Interface Commands
- Port Channel Commands
- Time Domain Reflectometer (TDR) Commands

Port Interface Commands

The following commands are for physical, loopback, and null interfaces:

- clear counters
- clear mac-address-table dynamic
- interface range
- interface range macro (define)
- interface range macro name
- interface vlan
- keepalive
- monitor interface
- name
- show config (INTERFACE mode)
- show config (from INTERFACE RANGE mode)
- show config (from INTERFACE VLAN mode)
- show interfaces configured
- show interfaces description
- show interfaces stack-unit
- show interfaces port-channel
- show interfaces status
- show interfaces switchport
- show range
- show vlan
- shutdown
- speed (for 1000/10000 interfaces)
Port Channel Commands

A Link Aggregation Group (LAG) is a group of links that appear to a MAC client as if they were a single link according to IEEE 802.3ad. In Dell Networking OS, a LAG is referred to as a Port Channel.

- For the Aggregator, the maximum port channel ID is 128 and the maximum members per port channel is 16.

Because each port can be assigned to only one Port Channel, and each Port Channel must have at least one port, some of those nominally available Port Channels might have no function because they could have no members if there are not enough ports installed. In the Aggregator, stack members can provide those ports.

The commands in this section are specific to Port Channel interfaces:

- auto vlan
- group
- monitor interface
- show config (from INTERFACE RANGE mode)
- show interfaces port-channel

NOTE: The Dell Networking OS implementation of LAG or Port Channel requires that you configure a LAG on both switches manually. For information about Dell Networking OS link aggregation control protocol (LACP) for dynamic LAGs, refer to the Link Aggregation Control Protocol (LACP) chapter. For more information about configuring and using Port Channels, refer to the Dell PowerEdge M I/O Aggregator Configuration Guide

Time Domain Reflectometer (TDR) Commands

TDR is useful for troubleshooting an interface that is not establishing a link; either it is flapping or not coming up at all. TDR detects open or short conditions of copper cables on 100/1000/10G Base-T modules.

- tdr-cable-test
- show tdr

Important Points to Remember

- The interface and port must be enabled (configured—see the interface command) before running TDR. An error message is generated if you have not enabled the interface.
- The interface on the far-end device must be shut down before running TDR.
- Because TDR is an intrusive test on an interface that is not establishing a link, do not run TDR on an interface that is passing traffic.
- When testing between two devices, do not run the test on both ends of the cable.
Virtual LAN (VLAN) Commands

The following commands configure and monitor virtual local area networks (VLANs). VLANs are a virtual interface and use many of the same commands as physical interfaces.

You can configure an IP address only on the default VLAN and Layer 3 protocols on a VLAN called Inter-VLAN routing. FTP, TFTP, ACLs, and SNMP are not supported on a VLAN.

Occasionally, while sending broadcast traffic over multiple Layer 3 VLANs, state of a VLAN interface may continually switch between Master and Backup.

- `auto vlan`
- `default vlan-id`
- `name`
- `show config (from INTERFACE VLAN mode)`
- `show vlan`
- `vlan tagged`
- `vlan untagged`

### auto vlan

Change the port to auto or admin vlan mode (enable or disable all auto VLANs).

**Syntax**

```
auto vlan <cr>
```

To remove membership from 4K VLAN, use the `no auto vlan` command.

**Defaults**

none

**Parameters**

- `description`
  Enter a text string description to identify the VLAN (80 characters maximum).

**Command Modes**

INTERFACE

**Usage Information**

The `auto vlan` command adds the port as untagged to default vlan and tagged to all other 4094 VLAN.

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

### clear counters

Clear the counters used in the `show interfaces` commands for VLANs, and physical interfaces, or selected ones.

**Syntax**

```
clear counters interface
```

Interfaces
Defaults
Without a specific interface specified, the command clears all interface counters.

Parameters

- **interface** (OPTIONAL) Enter any of the following keywords and slot/port or number to clear counters from a specified interface:
  - For the management interface on the stack-unit, enter the keyword `management ethernet` followed by slot/port information. The slot and port range is 0.
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
  - For a Port Channel interface, enter the keyword port-channel followed by a number. Range: 1-128

Command Modes
EXEC Privilege

Command History
Version 8.3.17.0
Supported on the M I/O Aggregator.

Example
Dell#clear counters
Clear counters on all interfaces [confirm]

---

**clear mac-address-table dynamic**

Clear the MAC address table of all MAC addresses learned dynamically.

Syntax
```
clear mac-address-table dynamic {interface tengigabitethernet slot/port-id}
```

Parameters

- **interface**
  - Enter the keyword `interface range` and one of the interfaces — slot/port, port-channel or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma separated ranges-spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels and physical interfaces.
  - Slot/Port information must contain a space before and after the dash. For example, interface range tengigabitethernet 0/1 - 5 is valid; interface range tengigabitethernet 0/1-5 is not valid.
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.

Command Modes
EXEC Privilege

150 Interfaces
clear mac-address-table dynamic

Clear the MAC address table of all MAC addresses learned dynamically.

Syntax

```
clear mac-address-table dynamic {interface tengigabitethernet slot/port-id}
```

Parameters

- **interface**
  Enter the keyword interface range and one of the interfaces — slot/port, port-channel or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma separated ranges-spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels and physical interfaces. Slot/Port information must contain a space before and after the dash. For example, interface range tengigabitethernet 0/1-5 is valid; interface range tengigabitethernet 0/1-5 is not valid.
  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.

Command Modes

- EXEC Privilege

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

default vlan-id

Set the default VLAN-id.

Syntax

```
default vlan-id <vlan-id>
```

To set the default VLAN-id, use the no default vlan-id command.

Defaults

- none

Command Modes

- CONFIGURATION

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.
description

Assign a descriptive text string to the interface.

Syntax
description desc_text
To delete a description, enter no description command.

Parameters
desc_text Enter a text string up to 240 characters long.

Defaults
No description is defined.

Command Modes
INTERFACE

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
• Spaces between characters are not preserved after entering this command unless you enclose the entire description in quotation marks ("desc_text").
• Entering a text string after the default vlan-id command overwrites any previous text string configured as the description.
• The show tdr and default vlan-id commands are the only commands that you can configure on an interface that is a member of a port-channel.
• Use the show interfaces description command to display descriptions configured for each interface.

Related commands
show interfaces description—Displays the description field of interfaces.

group

Group two LAGs in a supergroup ("fate-sharing group" or "failover group").

Syntax
group group_number port-channel number port-channel number
To remove an existing LAG supergroup, use the no group group_number command.

Parameters
group_number Enter an integer from 1 to 32 that will uniquely identify this LAG fate-sharing group.
Enter the keyword port-channel followed by an existing LAG number.

Enter this keyword/variable combination twice, identifying the two LAGs to be paired.

**Defaults**

none

**Command Modes**

PORT-CHANNEL FAILOVER-GROUP (conf-po-failover-grp)

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

Dell(conf)#port-channel failover-group
Dell(conf-po-failover-grp)#group 1 port-channel 1 port-channel 2
Dell(conf-po-failover-grp)#

**Related commands**

- `show interfaces port-channel` — Displays information on configured Port Channel groups.

### interface range

This command permits configuration of a range of interfaces to which subsequent commands are applied (bulk configuration). Using the interface range command, you can enter identical commands for a range of interface.

**Syntax**

interface range interface, interface,...

To delete a description, enter `no description` command.

**Parameters**

- `interface, interface,...` Enter the keyword interface range and one of the interfaces — slot/port, port-channel or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma separated ranges—spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels and physical interfaces.

Slot/Port information must contain a space before and after the dash. For example, `interface range TenGigabitEthernet 0/1 - 5` is valid; `interface range TenGigabitEthernet 0/1-5` is not valid.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.
<table>
<thead>
<tr>
<th>Command Modes</th>
<th>CONFIGURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defaults</strong></td>
<td>none</td>
</tr>
</tbody>
</table>
| **Command History** | Version 8.3.17.0  
Supported on the M I/O Aggregator. |
| **Usage Information** | When creating an interface range, interfaces appear in the order they are entered; they are not sorted. The command verifies that interfaces are present (physical) or configured (logical). Important things to remember:  
- Bulk configuration is created if at least one interface is valid.  
- Non-existing interfaces are excluded from the bulk configuration with a warning message.  
- The interface range prompt includes interface types with slot/port information for valid interfaces. The prompt allows for a maximum of 32 characters. If the bulk configuration exceeds 32 characters, it is represented by an ellipsis (...).  
- When the interface range prompt has multiple port ranges, the smaller port range is excluded from the prompt.  
- If overlapping port ranges are specified, the port range is extended to the smallest start port and the biggest end port. |
| **Example-Bulk Configuration** | Dell(conf)#interface range tengig 2/0 - 1 , tengig 10/0 , tengig 3/0 , fa 0/0  
% Warning: Non-existing ports (not configured) are ignored by interface-range |
| **Example-Interface Range prompt with Multiple Ports** | Dell(conf)#interface range tengig 2/0 - 23 , tengig 2/1 - 10  
Dell(conf-if-range-tengig-2/0-23# |
| **Example-Interface Range prompt Overlapping Port Ranges** | Dell(conf)#interface range tengig 2/1 - 11 , tengig 2/1 - 23  
Dell(conf-if-range-tengig-2/1-23# |
| **NOTE**: If a range has VLAN, physical, and port-channel interfaces, only commands related to physical interfaces can be bulk configured. To configure commands specific to VLAN or port-channel, only those respective interfaces should be configured in a particular range. |
Example-Single Range Bulk Configuration

Dell(conf)# interface range tengigabitethernet 5/1 - 23
Dell(conf-if-range)# no shutdown
Dell(conf-if-range)#

Example-Multiple Range Bulk Configuration

The following example shows how to use commas to add different interface types to the range enabling all TenGigabit Ethernet interfaces in the range 5/1 to 5/23 and both Ten Gigabit Ethernet interfaces 1/1 and 1/2.

Dell(conf-if)# interface range tengigabitethernet 5/1 - 23, tengigabitethernet 1/1 - 2
Dell(conf-if-range)# no shutdown
Dell(conf-if-range)#

Example-Multiple Range Bulk Configuration with VLAN and port channel

The following example shows how to use commas to add VLAN and port-channel interfaces to the range.

Dell(conf-if)# interface range tengigabitethernet 5/1 - 23, tengigabitethernet 1/1 - 2, Vlan 2 - 100 , Port 1 - 25
Dell(conf-if-range)# no shutdown
Dell(conf-if-range)#

Related commands

- `show config (from INTERFACE RANGE mode)` — Shows the bulk configuration interfaces.
- `show interfaces status` — Displays a summary of interface information.
- `interface range macro (define)` — Defines a macro for an interface-range.

### interface range macro (define)

Defines a macro for an interface range and then saves the macro in the running configuration.

**Syntax**

```
define interface range macroname interface, interface,...
```

**Parameters**

- `name`  
  Enter up to 16 characters for the macro name.

- `interface, interface,...`  
  Enter the `interface` keyword range and one of the interfaces — slot/port, port-channel or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma separated ranges—spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels and physical interfaces.

  Slot/Port information must contain a space before and after the dash. For example, `interface range tengigabitethernet 0/1 - 5` is valid; `interface range tengigabitethernet 0/1-5` is not valid.

  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.

Interfaces 155
For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**Defaults**
none

**Command Modes**
CONFIGURATION

**Command History**

Version 8.3.17.0 
Supported on the M I/O Aggregator.

**Usage Information**
The following example shows how to define an interface range macro named `test`.
To display the macro definition, execute the `show running-config` command.

Example-

Dell(conf)# define interface-range test tengigabitethernet 0/0 - 3, tengigabitethernet 5/0 - 47, tengigabitethernet 13/0 - 89
Dell# show running-config | grep define
define interface-range test tengigabitethernet 0/0 - 3, tengigabitethernet 5/0 - 47, tengigabitethernet 13/0 - 89
Dell(conf)#interface range macro test
Dell(conf-if-range-te-0/0-3,tengig-5/0-47,tengig-13/0-89)#

**Related commands**

`group` — Configures a range of command (bulk configuration)

`interface range macro name` — Runs an interface range macro.

### interface range macro name

Run the interface-range macro to automatically configure the pre-defined range of interfaces.

**Syntax**

```
interface range macro name
```

**Parameters**

`name` 
Enter the name of an existing macro.

**Defaults**
none

**Command Modes**
CONFIGURATION

**Command History**

Version 8.3.17.0 
Supported on the M I/O Aggregator.

**Usage Information**
The following example runs the macro named `test` that was defined earlier.

```
Dell(conf)#interface range macro test
Dell(conf-if-range-te-0/0-3,tengig-5/0-47,tengig-13/0-89)#
```
interface vlan

Configure the default VLAN to enable Static or DCHP IP configuration

Syntax

```
interface vlan def-vlan-id
```

Parameters

- **def-vlan-id**: Enter 1 for the default VLAN.

Defaults

Not configured

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0

Supported on the M I/O Aggregator.

Usage Information

For more information about VLANs and the commands to configure them, refer to Virtual LAN (VLAN) Commands.

Example

```
Dell(conf)#int vlan 1
Dell(conf-if-vl-1)#
```

Related commands

- **show vlan** — Displays the current VLAN configuration on the switch.
- **vlan tagged** — Adds a Layer 2 interface to a VLAN as a tagged interface.
- **vlan untagged** — Adds a Layer 2 interface to a VLAN as an untagged interface.

intf-type cr4 autoneg

Set the interface type as CR4 with auto-negotiation enabled.

Syntax

```
intf-type cr4 autoneg
```

If you configure `intf-type cr4 autoneg`, use the `no intf-type cr4 autoneg` command to set the interface type as cr4 with autonegotiation disabled.

Defaults

Not configured

Command Modes

CONFIGURATION

Interfaces
Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Introduced on</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0.2.0</td>
<td>S6000.</td>
</tr>
<tr>
<td>8.3.19.0</td>
<td>S4820T.</td>
</tr>
<tr>
<td>8.3.11.1</td>
<td>Z9000.</td>
</tr>
<tr>
<td>8.3.7.0</td>
<td>S4810.</td>
</tr>
<tr>
<td>8.3.16.1</td>
<td>MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

Usage Information

If you configure `interface type` as CR4 with auto-negotiation enabled, also configure CR4 with auto-negotiation. Many DAC cable link issues are resolved by setting the interface type as CR4.

Related Commands

- `Interfaces` — configures a physical interface.
- `interface port-channel` — configures a port channel group.

**keepalive**

Keep the interface alive when it is not transmitting data.

**Syntax**

```
keepalive
```

**Parameters**

- `def-vlan-id` Enter 1 for the default VLAN.

**Defaults**

Enabled

**Command Modes**

INTERFACE

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Supported on</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3.17.0</td>
<td>M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

When you configure `keepalive`, the system keeps the link up even if the link is not active at the time.

**monitor interface**

Monitor counters on a single interface or all interfaces on a stack unit. The screen is refreshed every five seconds and the CLI prompt disappears.

**Syntax**

```
monitor interface [interface]
```

To disable monitoring and return to the CLI prompt, press the q key.
Parameters

**interface** (OPTIONAL) Enter the following keywords and slot/port or number information:

- For the management port, enter the keyword `managementethernet` followed by the slot (0 or 1) and the port (0).
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
- For a Port Channel interface, enter the keyword `port-channel` followed by a number. The range is from 1 to 4094.

Command Modes

- **EXEC**
- **EXEC Privilege**

Command History

Version 8.3.17.0 Supported on M I/O Aggregator.

Usage Information

The delta column displays changes since the last screen refresh.

The following are the monitor command menu options.

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>systest-3</td>
<td>Displays the host name assigned to the system.</td>
</tr>
<tr>
<td>monitor time</td>
<td>Displays the amount of time since the monitor interface command was entered.</td>
</tr>
<tr>
<td>time</td>
<td>Displays the amount of time the chassis is up (since last reboot).</td>
</tr>
<tr>
<td>m</td>
<td>Change the view from a single interface to all interfaces on the stack unit or visa-versa.</td>
</tr>
<tr>
<td>c</td>
<td>Refresh the view.</td>
</tr>
<tr>
<td>b</td>
<td>Change the counters displayed from Packets on the interface to Bytes.</td>
</tr>
<tr>
<td>r</td>
<td>Change the [delta] column from change in the number of packets/bytes in the last interval to rate per second.</td>
</tr>
<tr>
<td>l</td>
<td>Change the view to the next interface on the stack unit, or if in the stack unit mode, the next stack unit in the chassis.</td>
</tr>
<tr>
<td>a</td>
<td>Change the view to the previous interface on the stack unit, or if in line stack unit mode, the previous stack unit in the chassis.</td>
</tr>
<tr>
<td>T</td>
<td>Increase the screen refresh rate.</td>
</tr>
<tr>
<td>t</td>
<td>Decrease the screen refresh rate.</td>
</tr>
</tbody>
</table>
Key  Description
q    Return to the CLI prompt.

Example (Single Interface)
systest-3 Monitor time: 00:00:06 Refresh Intvl.: 2s Time: 03:26:26
Interface: tengig 0/3, Enabled, Link is Up, Linespeed is 1000 Mbit

Traffic statistics:  Current   Rate   Delta
                Input bytes: 9069828 43 Bps  86
                Output bytes: 606915800 43 Bps  86
                Input packets: 54001 0 pps  1
                Output packets: 9401589 0 pps  1
                64B packets: 67 0 pps  0
                Over 64B packets: 49166 0 pps  1
                Over 127B packets: 350 0 pps  0
                Over 255B packets: 1351 0 pps  0
                Over 511B packets: 286 0 pps  0
                Over 1023B packets: 2781 0 pps  0

Error statistics:
                Input underruns: 0 0 pps  0
                Input giants: 0 0 pps  0
                Input throttles: 0 0 pps  0
                Input CRC: 0 0 pps  0
                Input IP checksum: 0 0 pps  0
                Input overrun: 0 0 pps  0
                Output underruns: 0 0 pps  0
                Output throttles: 0 0 pps  0

m - Change mode    c - Clear screen
l - Page up         a - Page down
T - Increase refresh interval  t - Decrease refresh interval
q - Quit

Example (All Interfaces)
systest-3 Monitor time: 00:01:31 Refresh Intvl.: 2s Time: 03:54:14

Interface  Link  In Packets  [delta]  Out Packets  [delta]
Gi 0/0  Down  0 0 0 0
Gi 0/1  Down  0 0 0 0
Gi 0/2  Up  61512 52 66160 42
Gi 0/3  Up  63086 20 9405888 24
Gi 0/4  Up  14697471418 2661481 13392989657

2661385
Gi 0/5  Up  3759 3 161959604 832816
Gi 0/6  Up  4070 3 8680346 5
Gi 0/7  Up  61934 34 138734357 72
Gi 0/8  Up  61427 1 59960 1
Gi 0/9  Up  62039 53 104239232 3
Gi 0/10 Up  17740044091 372 7373849244 79
Gi 0/11 Up  18182889225 44 7184747584 138
Gi 0/12 Up  18182682056 0 3682 1
Gi 0/13 Up  18182681434 43 6592378911 144
Gi 0/14 Up  61349 55 868219141 15
Gi 0/15 Up  59808 58 62060 27
Gi 0/16 Up  59889 1 61616 1
Gi 0/17 Up  0 0 14950126 81293
Gi 0/18 Up  0 0 0 0
Gi 0/19 Down  0 0 0 0

Interfaces
name

Assign a name to the Default VLAN.

**Syntax**

```
name vlan-name
```

To remove the name from the VLAN, use the `no name` command.

**Parameters**

- **vlan-name**: Enter up to 32 characters as the name of the VLAN.

**Defaults**

Not configured.

**Command Modes**

- INTERFACE VLAN

**Command History**

- **Version 8.3.17.0**
  Supported on the M I/O Aggregator.

**Usage Information**

This CLI applies only to the Default VLAN.

To display information about a named VLAN, enter the `show vlan` command with the name parameter or the `show interfaces description` command.

**Related commands**

- `default vlan-id`—Assigns a descriptive text string to the interface.
- `interface vlan`—Configures a VLAN.
- `show vlan`—Displays the current VLAN configurations on the switch.

---

**negotiation auto**

Enable auto-negotiation on an interface.

**Syntax**

```
negotiation auto
```

To disable auto-negotiation, enter `no negotiation auto` command.

**Defaults**

Enabled.
Command Modes

Command History

Usage Information

The `no negotiation auto` command is only available if you first manually set the speed of a port to 10Mbits or 100Mbits.

The `negotiation auto` command provides a mode option for configuring an individual port to forced-master/forced slave once auto-negotiation is enabled.

If the mode option is not used, the default setting is slave. If you do not configure forced-master or forced slave on a port, the port negotiates to either a master or a slave state. Port status is one of the following:

- Forced-master
- Force-slave
- Master
- Slave
- Auto-neg Error—typically indicates that both ends of the node are configured with forced-master or forced-slave

⚠️ CAUTION: Ensure that one end of your node is configured as forced-master and one is configured as forced-slave. If both are configured the same (that is forced-master or forced-slave), the show interfaces command will flap between an auto-neg-error and forced-master/slave states.

You can display master/slave settings with the `show interfaces` command.

**Example (Master/Slave)**

Dell(conf)# interface tengig 0/0
Dell(conf-if)#neg auto
Dell(conf-if-autoneg)# ?

end          Exit from configuration mode
exit         Exit from autoneg configuration mode
mode         Specify autoneg mode
no           Negate a command or set its defaults
show         Show autoneg configuration information
Dell(conf-if-autoneg)#mode ?
forced-master Force port to master mode
forced-slave  Force port to slave mode
Dell(conf-if-autoneg)#

**Example (Configured)**

Dell#show interfaces configured
TenGigabitEthernet 13/18 is up, line protocol is up
Hardware is Dell Eth, address is 00:01:e8:05:f7:fc
    Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
Both sides of the link must have auto-negotiation enabled or disabled for the link to come up.

The following details the possible speed and auto-negotiation combinations for a line between two 10/100/1000 Base-T Ethernet interfaces.

**Port 0**
- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled* speed 1000 or auto

**Port 1**
- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100

**Link Status Between Port 1 and Port 2**
- Up at 1000 Mb/s
- Up at 100 Mb/s
- Up at 100 Mb/s
- Down
- Down

* You cannot disable auto-negotiation when the speed is set to 1000 or auto.

**Related Commands**
- speed (for 1000/10000 interfaces) — sets the link speed to 1000, 10000, or auto-negotiate the speed.

**source (port monitoring for 40-Gigabit Ethernet)**

Configure a port monitor source and destination. Starting with Dell Networking OS Release 9.3(0.0), you can also configure a 40-Gigabit Ethernet interface as the destination interface or port to which the monitored traffic is sent.

**Syntax**
```
source interface destination interface direction {rx | tx | both}
```

To disable a monitor source, use the
```
no source interface destination interface direction {rx | tx | both}
```
command.
Parameters

- **interface**
  Enter the one of the following keywords and slot/port information:
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
  - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

- **destination**
  Enter the keyword `destination` to indicate the interface destination.

- **direction (rx | tx | both)**
  Enter the keyword `direction` then one of the packet directional indicators.
  - `rx`: to monitor receiving packets only.
  - `tx`: to monitor transmitting packets only.
  - `both`: to monitor both transmitting and receiving packets.

**Defaults**

- none

**Command Modes**

- MONITOR SESSION (conf-mon-sess-session-ID)

**Command History**

- **Version 9.3(0.0)**
  Added support for the `fortyGigE` keyword on M I/O Aggregator

- **Version 8.3.17.0**
  Supported on M I/O Aggregator

**Example**

```
Dell(conf-mon-sess-11)#source fortygi 10/0 destination gi 10/47 direction rx
Dell(conf-mon-sess-11)#
```

### show config (INTERFACE mode)

Displays the interface configuration.

**Syntax**

```
show config
```

**Command Modes**

- INTERFACE

**Command History**

- **Version 8.3.17.0**
  Supported on the M I/O Aggregator.

**Example**

```
Dell(conf-if)#show conf
!
interface TenGigabitEthernet 1/7
  no ip address
  switchport
```
show config (from INTERFACE RANGE mode)

Display the bulk configured interfaces (group).

**Syntax**

```plaintext
show config
```

**Command Modes**

`CONFIGURATION INTERFACE (conf-if-range)`

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Example**

```plaintext
Dell(conf)#interface range tengigabitethernet 1/1 - 2
Dell(conf-if-range-tengig-1/1-2)#show config
!
interface TenGigabitEthernet 1/1
  no ip address
  switchport
  no shutdown
!
interface TenGigabitEthernet 1/2
  no ip address
  switchport
  no shutdown
Dell(conf-if-range-tengig-1/1-2)#
```

show config (from INTERFACE VLAN mode)

Displays the current configuration of the Default VLAN.

**Syntax**

```plaintext
show config
```

**Command Modes**

`INTERFACE VLAN`

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Example**

```plaintext
Dell(conf-if-vl-1)#show config
!
interface Vlan 1
  description a
  no ip address
  mtu 2500
  shutdown
Dell(conf-if-vl-1)#
```
show config (from PROTOCOL LLDP mode)

Displays the LLDP configuration.

**Syntax**

show config

**Command Modes**

PROTOCOL LLDP

**Example**

Dell(conf-lldp)#show conf
!
protocol lldp
Dell(conf-lldp)#

---

show interfaces

Displays information on a specific physical interface or virtual interface.

**Syntax**

show interfaces interface

**Parameters**

- **interface**
  
Enter one of the following keywords and slot/port or number information:
  
  - For the management interface on the stack-unit, enter the keyword `managementethernet` followed by slot/port information. The slot and port range is 0.
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
  - For a VLAN interface, enter the keyword `vlan` followed by a number from 1 to 4094.
  - For a Port Channel interface, enter the keyword `port-channel` followed by a number. The range is from 1 to 128.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator

**Usage Information**

Use this `show interfaces` command for details on a specific interface. Use the `show interfaces stack-unit` command for details on all interfaces on the designated stack unit.

On the M I/O Aggregator, the show interface output displays incorrect rate information details over time for link monitoring when the rate-interval is configured for 5 seconds. Dell Networking recommends using higher rate-intervals such as 15 to 299 seconds to minimize the errors seen.
NOTE: In the CLI output, the power value will be rounded to a 3-digit value. For receive/transmit power that is less than 0.000, an snmp query will return the corresponding dbm value even though the CLI displays as 0.000.

NOTE: After the counters are cleared, the line-rate continues to increase until it reaches the maximum line rate. When the maximum line rate is reached, there will be no change in the line-rate.

The following describes the `show interfaces` command shown in the 10G example below.

<table>
<thead>
<tr>
<th>Line Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TenGigabitEthernet 2/0...</td>
<td>Displays the interface’s type, slot/port, and administrative and line protocol status.</td>
</tr>
<tr>
<td>Hardware is...</td>
<td>Displays the interface’s hardware information and its assigned MAC address.</td>
</tr>
<tr>
<td>Interface index...</td>
<td>Displays the interface index number used by SNMP to identify the interface.</td>
</tr>
<tr>
<td>Internet address...</td>
<td>States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.</td>
</tr>
<tr>
<td>MTU 1554...</td>
<td>Displays link and IP MTU information. If the chassis is in Jumbo mode, this number can range from 576 to 12000.</td>
</tr>
<tr>
<td>LineSpeed</td>
<td>Displays the interface’s line speed.</td>
</tr>
<tr>
<td>ARP type...</td>
<td>Displays the ARP type and the ARP timeout value for the interface.</td>
</tr>
<tr>
<td>Last clearing...</td>
<td>Displays the time when the <code>show interfaces counters</code> where cleared.</td>
</tr>
<tr>
<td>Queuing strategy...</td>
<td>States the packet queuing strategy. FIFO means first in first out.</td>
</tr>
</tbody>
</table>

**Input Statistics:** Displays all the input statistics including:

- Number of packets and bytes into the interface
- Number of packets with IP headers and VLAN tagged headers.

**NOTE:** The sum of the number of packets may not be as expected since a VLAN tagged IP packet counts as both a VLAN packet and an IP packet.

- Packet size and the number of those packets inbound to the interface
- Number of symbol errors, runts, giants, and throttles packets:
  - symbol errors = number packets containing bad data. That is, the port MAC detected a physical coding error in the packet:
  - runts = number of packets that are less than 64B
### Line Description
- giants = packets that are greater than the MTU size
- throttles = packets containing PAUSE frames

- Number of CRC, IP Checksum, overrun, and discarded packets:
  - CRC = packets with CRC/FCS errors
  - IP Checksum = packets with IP Checksum errors
  - overrun = number of packets discarded due to FIFO overrun conditions
  - discarded = the sum of runts, giants, CRC, IP Checksum, and overrun packets discarded without any processing

### Output Statistics
Displays output statistics sent out of the interface including:
- Number of packets, bytes, and underruns out of the interface
  - packets = total number of packets
  - bytes = total number of bytes
  - underruns = number of packets with FIFO underrun conditions

- Number of Multicast, Broadcast, and Unicast packets:
  - Multicasts = number of MAC multicast packets
  - Broadcasts = number of MAC broadcast packets
  - Unicasts = number of MAC unicast packets

- Number of throttles and discards packets:
  - throttles = packets containing PAUSE frames
  - discarded = number of packets discarded without any processing

### Rate information
Estimate of the input and output traffic rate over a designated interval (30 to 299 seconds). Traffic rate is displayed in bits, packets per second, and percent of line rate.

### Time since
Elapsed time since the last interface status change (hh:mm:ss format).

### Usage Information
The interface counter “over 1023-byte pkts” does not increment for packets in the range 9216 > x <1023.

The Management port is enabled by default (no shutdown). If necessary, use the ip address command to assign an IP address to the Management port.

### Example 10G Port
Dell#show interfaces tengigabitethernet 2/0
TenGigabitEthernet 2/0 is up, line protocol is up
Hardware is Dell Force10Eth, address is 00:01:e8:05:f7:3a
Interface index is 100990998
Interfaces

Example (ManagementEthernet)

```
Dell#show interface managementethernet ?
0/0 Management Ethernet interface number
Dell#show interface managementethernet 0/0
ManagementEthernet 0/0 is up, line protocol is up
Hardware is DellForce10Eth, address is 00:1e:c9:f1:00:05
Current address is 00:1e:c9:f1:00:05
Pluggable media not present
Interface index is 235159752
Internet address is 10.11.209.87/16
Mode of IP Address Assignment : MANUAL
DHCP Client-ID: mgmt001ec9f10005
Virtual-IP is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 100 Mbit, Mode full duplex
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 5d4h57m
Queueing strategy: fifo
Input 3448753 packets, 950008323 bytes, 3442163 multicast
Received 0 errors, 0 discarded
Output 4627 packets, 814226 bytes, 0 multicast
Output 0 errors, 0 invalid protocol
```

Related Commands

- `show interfaces configured` — Displays any interface with a non-default configuration.
- `show interfaces port-channel` — Displays information on all interfaces on a specific stack unit.
- `show interfaces switchport` — Displays Layer 2 information about the interfaces.
- `show inventory` — Displays the M I/O Aggregator type, components (including media), Dell Networking OS version including hardware identification numbers and configured protocols.
**show interfaces configured**

Displays any interface with a non-default configuration.

**Syntax**

```
show interfaces configured
```

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator

**Example**

```
Dell#show interfaces configured
TenGigabitEthernet 1/1 is up, line protocol is down(error-disabled[UDF])
Hardware is DellForce10Eth, address is 00:01:e8:00:ab:01
Current address is 00:01:e8:00:ab:01
Server Port AdminState is Down
Pluggable media not present
Interface index is 67703553
Internet address is not set
Mode of IP Address Assignment : NONE
DHCP Client-ID :tenG2580001e800ab01
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed auto
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 05:15:07
Queueing strategy: fifo
Input Statistics:
0 packets, 0 bytes
0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
0 Multicasts, 0 Broadcasts
0 runts, 0 giants, 0 throttles
0 CRC, 0 overrun, 0 discarded
Output Statistics:
0 packets, 0 bytes, 0 underruns
0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
0 Multicasts, 0 Broadcasts, 0 Unicasts
0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Time since last interface status change: 05:14:12
```
show interfaces description

Display the descriptions configured on the interface.

Syntax

```
show interfaces [interface] description
```

Parameters

- `interface` Enter one of the following keywords and slot/port or number information:
  - For the management interface on the stack unit enter the keyword `ManagementEthernet` followed by the slot/port information. The slot range is 0-0 and the port range is 0.
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
  - For VLAN interfaces, enter the keyword `vlan` followed by a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator

Usage Information

The following describes the `show interfaces description` command shown in the Example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Displays the type of interface and associated slot and port number.</td>
</tr>
<tr>
<td>OK?</td>
<td>Indicates if the hardware is functioning properly.</td>
</tr>
<tr>
<td>Status</td>
<td>States whether the interface is enabled (up) or disabled (administratively down).</td>
</tr>
<tr>
<td>Protocol</td>
<td>States whether IP is enabled (up) or disabled (down) on the interface.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the description (if any) manually configured for the interface.</td>
</tr>
</tbody>
</table>

Example

```
Dell#show interface description
Interface       OK  Status    Protocol   Description
TenGigabitEthernet 0/1 NO admin down down
```
show interfaces port-channel

Display information on configured Port Channel groups.

Syntax

```
show interfaces port-channel [channel-number] [brief|description]
```

Parameters

- `channel-number`
  For a Port Channel interface, enter the keyword `port-channel` followed by a number. The range is from 1 to 128.

- `brief`
  (OPTIONAL) Enter the keyword `brief` to display only the port channel number, the state of the port channel, and the number of interfaces in the port channel.

- `description`
  (OPTIONAL) Enter the keyword `description` to display interface information with description.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0
Supported on the M I/O Aggregator.

Usage Information

The following describes the `show interfaces port-channel` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port-Channel 1...</td>
<td>Displays the LAG’s status. In the Example, the status of the LAG’s LAG fate-sharing group (“Failover-group”) is listed.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hardware is...</td>
<td>Displays the interface’s hardware information and its assigned MAC address.</td>
</tr>
<tr>
<td>Port-channel is part...</td>
<td>Indicates whether the LAG is part of a LAG fate-sharing group (“Failover-group”).</td>
</tr>
<tr>
<td>Internet address...</td>
<td>States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.</td>
</tr>
<tr>
<td>MTU 1554...</td>
<td>Displays link and IP MTU.</td>
</tr>
<tr>
<td>LineSpeed</td>
<td>Displays the interface’s line speed. For a port channel interface, it is the line speed of the interfaces in the port channel.</td>
</tr>
<tr>
<td>Members in this...</td>
<td>Displays the interfaces belonging to this port channel.</td>
</tr>
<tr>
<td>ARP type:...</td>
<td>Displays the ARP type and the ARP timeout value for the interface.</td>
</tr>
<tr>
<td>Last clearing...</td>
<td>Displays the time when the <code>show interfaces counters</code> were cleared.</td>
</tr>
<tr>
<td>Queueing strategy.</td>
<td>States the packet queuing strategy. FIFO means first in first out.</td>
</tr>
<tr>
<td>packets input...</td>
<td>Displays the number of packets and bytes into the interface.</td>
</tr>
<tr>
<td>Input 0 IP packets...</td>
<td>Displays the number of packets with IP headers, VLAN tagged headers, and MPLS headers. The number of packets may not add correctly because a VLAN tagged IP packet counts as both a VLAN packet and an IP packet.</td>
</tr>
<tr>
<td>0 64-byte...</td>
<td>Displays the size of packets and the number of those packets entering that interface. This information is displayed over two lines.</td>
</tr>
<tr>
<td>Received 0...</td>
<td>Displays the type and number of errors or other specific packets received. This information is displayed over three lines.</td>
</tr>
<tr>
<td>Output 0...</td>
<td>Displays the type and number of packets sent out the interface. This information is displayed over three lines.</td>
</tr>
<tr>
<td>Rate information...</td>
<td>Displays the traffic rate information into and out of the interface. Traffic rate is displayed in bits and packets per second.</td>
</tr>
<tr>
<td>Time since...</td>
<td>Displays the time since the last change in the configuration of this interface.</td>
</tr>
</tbody>
</table>

**Example (EtherScale)**

Dell#show interfaces port-channel
Port-channel 1 is down, line protocol is down
Hardware address is 00:1e:c9:f1:00:05, Current address is 00:1e:c9:f1:00:05
Interface index is 1107755009
Minimum number of links to bring Port-channel up is 1
Internet address is not set
Mode of IP Address Assignment : NONE
DHCP Client-ID : lag100lec9f10005
MTU 12000 bytes, IP MTU 1500 bytes
LineSpeed auto
Members in this channel:
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 03:28:00
Queueing strategy: fifo
Input Statistics:
  0 packets, 0 bytes
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  0 packets, 0 bytes, 0 underruns
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts, 0 Unicasts
  0 throttles, 0 discarded, 0 collisions

User Information
The following describes the show interfaces port-channel brief
command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAG</td>
<td>Lists the port channel number.</td>
</tr>
<tr>
<td>Mode</td>
<td>Lists the mode:</td>
</tr>
<tr>
<td></td>
<td>• L3 — for Layer 3</td>
</tr>
<tr>
<td></td>
<td>• L2 — for Layer 2</td>
</tr>
<tr>
<td>Status</td>
<td>Displays the status of the port channel.</td>
</tr>
<tr>
<td></td>
<td>• down — if the port channel is disabled (shutdown)</td>
</tr>
<tr>
<td></td>
<td>• up — if the port channel is enabled (no shutdown)</td>
</tr>
<tr>
<td>Uptime</td>
<td>Displays the age of the port channel in hours:minutes:seconds.</td>
</tr>
<tr>
<td>Ports</td>
<td>Lists the interfaces assigned to this port channel.</td>
</tr>
<tr>
<td>(untitled)</td>
<td>Displays the status of the physical interfaces (up or down).</td>
</tr>
<tr>
<td></td>
<td>• In Layer 2 port channels, an * (asterisk) indicates which interface is the</td>
</tr>
<tr>
<td></td>
<td>primary port of the port channel. The primary port sends out interface PDU.</td>
</tr>
<tr>
<td></td>
<td>• In Layer 3 port channels, the primary port is not indicated.</td>
</tr>
</tbody>
</table>

Example
Dell#show int po 1 brief
Codes: L - LACP Port-channel
LAG Mode Status Uptime Ports

174 Interfaces
show interfaces stack-unit

Display information on all interfaces on a specific M I/O Aggregator stack member.

Syntax
show interfaces stack-unit unit-number

Parameters
unit-number Enter the stack member number (0 to 5).

Command Modes
- EXEC
- EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example
Dell#show interfaces stack-unit 0
TenGigabitEthernet 0/1 is down, line protocol is down
Hardware is DellForce10Eth, address is 00:1e:c9:f1:00:05
Current address is 00:1e:c9:f1:00:05
Server Port AdminState is Down
Pluggable media not present
Interface index is 34148609
Internet address is not set
Mode of IP Address Assignment : NONE
DHCP Client-ID :tenG130001ec9f10005
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 5d5h24m
Queueing strategy: fifo
Input Statistics:
0 packets, 0 bytes
0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
0 Multicasts, 0 Broadcasts
0 runts, 0 giants, 0 throttles
0 CRC, 0 overrun, 0 discarded
Output Statistics:
0 packets, 0 bytes, 0 underruns
0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
0 Multicasts, 0 Broadcasts, 0 Unicasts
0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
show interfaces status

Displays a summary of interface information or specify a stack unit and interface to display status information for that specific interface only.

Syntax

```
show interfaces [interface | stack-unit unit-number] status
```

Parameters

- **interface** (OPTIONAL) Enter one of the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
- **linecard slot-number** (OPTIONAL) Enter the keyword `linecard` then the slot number.

Defaults

```
none
```

Command Modes

```
• EXEC
• EXEC Privilege
```

Command History

```
Version 8.3.17.0   Supported on the M I/O Aggregator
```

Example

```
Dell#show interface status
Port  Description    Status  Speed  Duplex  Vlan  
Te 0/1                  Down     Auto    Auto    --    
Te 0/2                  Down     Auto    Auto    --    
Te 0/3                  Down     Auto    Auto    --    
Te 0/4                  Down     Auto    Auto    --    
Te 0/5                  Down     Auto    Auto    --    
Te 0/6                  Down     Auto    Auto    --    
Te 0/7                  Down     Auto    Auto    --    
Te 0/8                 Up 1   0000 Mbit  Full  --     
Te 0/9                  Down     Auto    Auto    --    
Te 0/10                 Down     Auto    Auto    --    
Te 0/11                 Down     Auto    Auto    --    
Te 0/12                 Down     Auto    Auto    --    
Te 0/13                 Down     Auto    Auto    --    
Te 0/14                 Down     Auto    Auto    --    
Te 0/15                 Down     Auto    Auto    --    
Te 0/16                 Up   10000 Mbit Full --    
```

Related Commands

- **show diag** — Displays data plane and management plane input/output statistics.
show interfaces switchport

Display only virtual and physical interfaces in Layer 2 mode. This command displays the Layer 2 mode interfaces’ IEEE 802.1Q tag status and VLAN membership.

Syntax

```
show interfaces switchport [interface | stack-unit unit-id ]
```

Parameters

- **interface** (OPTIONAL) Enter one of the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
  - Enter the keyword backup to view the backup interface for this interface.
- **stack-unit unit-id** (OPTIONAL) Enter the keywords stack-unit followed by the stack member number. The range is from 0 to 5.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

The following describes the `show interfaces switchport` command for the following example.

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Displays the interface’s type, slot, and port number.</td>
</tr>
<tr>
<td>802.1QTagged</td>
<td>Displays whether if the VLAN tagged (”True”), untagged (”False”), or hybrid (”Hybrid”), which supports both untagged and tagged VLANs by port 13/0.</td>
</tr>
<tr>
<td>Vlan membership</td>
<td>Lists the VLANs to which the interface is a member. Starting with Dell Networking OS version 7.6.1, this field can display native VLAN membership by port 13/0.</td>
</tr>
</tbody>
</table>

Example

```
Dell#show interfaces switchport
Codes: U - Untagged, T - Tagged
x - Dot1x untagged, X - Dot1x tagged
G - GVRP tagged, M - Trunk, H - VSN tagged
i - Internal untagged, I - Internal tagged, v - VLT untagged,
V - VLT tagged
Name: TenGigabitEthernet 1/1
802.1QTagged: Hybrid
10-AGG port mode: Auto VLANs enabled
Vlan membership:
  Q Vlans
  U 1
  T 2-4094
  Native VlanId: 1.
```
Name: TenGigabitEthernet 1/2
802.1QTagged: Hybrid
IO-AGG port mode: Auto VLANs enabled
Vlan membership:
Q Vlans
U 1
T 2-4094
Native VlanId: 1.

Related Commands

show ip interface — displays Layer 3 information about the interfaces.

show range
Display all interfaces configured using the group command.

Syntax
show range

Command Modes INTERFACE RANGE (config-if-range)

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator

Example
Dell(conf-if-range-te-0/16)#show range
interface tengigabitethernet 0/16
Dell(conf-if-range-te-0/16)#

Related Commands

show ip interface — displays Layer 3 information about the interfaces.

show tdr
Displays the TDR test results.

Syntax
show tdr interface

Parameters
interface Enter the keyword TenGigabitEthernet followed by the slot/port information for the 100/1000/10 GbaseT Ethernet interface.

Defaults
none

Command Modes
EXEC

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.
Usage Information

If the TDR test has not been run, an error message is generated:

%Error: Please run the TDR test first

The following describes the TDR test status.

<table>
<thead>
<tr>
<th>Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK Status:</td>
<td>TDR test is complete, no fault is detected on the cable, and the test is terminated.</td>
</tr>
<tr>
<td>Terminated</td>
<td></td>
</tr>
<tr>
<td>Length:</td>
<td>A short is detected on the cable. The location, in this Example is 92 meters. The short is accurate to plus or minus one meter.</td>
</tr>
<tr>
<td>92 (+/- 1)</td>
<td>meters, Status: Shorted</td>
</tr>
<tr>
<td>Length:</td>
<td>An opening is detected on the cable. The location, in this Example is 93 meters. The open is accurate to plus or minus one meter.</td>
</tr>
<tr>
<td>93 (+/- 1)</td>
<td>meters, Status: Open</td>
</tr>
<tr>
<td>Status:</td>
<td>There is an impedance mismatch in the cables.</td>
</tr>
<tr>
<td>Impedance</td>
<td></td>
</tr>
<tr>
<td>Mismatch</td>
<td></td>
</tr>
</tbody>
</table>

Example

Dell#show tdr tengigabitethernet 1/1
Time since last test: 00:00:02
Pair A, Length: OK Status: Terminated
Pair B, Length: 92 (+/- 1) meters, Status: Short
Pair C, Length: 93 (+/- 1) meters, Status: Open
Pair D, Length: 0 (+/- 1) meters, Status: Impedance Mismatch

Related Commands

- `vlan tagged`— Runs the TDR test.

show vlan

Displays the current VLAN configurations on the switch.

Syntax

```
show vlan [brief | id vlan-id | name vlan-name]
```

Parameters

- `brief` (OPTIONAL) Enter the keyword `brief` to display the following information:
  - VLAN ID
  - VLAN name (left blank if none is configured.)
  - Spanning Tree Group ID
  - MAC address aging time
  - IP address

- `id vlan-id` (OPTIONAL) Enter the keyword `id` followed by a number from 1 to 4094. Only information on the VLAN specified is displayed
name vlan-name

(OPTIONAL) Enter the keyword name followed by the name configured for the VLAN. Only information on the VLAN named is displayed.

Command Modes
- EXEC
- EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
The following describes the show vlan command information given in the following example.

<table>
<thead>
<tr>
<th>Column Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUM</td>
<td>Displays existing VLAN IDs.</td>
</tr>
<tr>
<td>Status</td>
<td>Displays the word Inactive for inactive VLANs and the word Active for active VLANs.</td>
</tr>
<tr>
<td>Q</td>
<td>Displays G for GVRP tagged, M for member of a VLAN-Stack VLAN, T for tagged interface, U (for untagged interface), x (uncapitalized x) for Dot1x untagged, or X (capitalized X) for Dot1x tagged.</td>
</tr>
<tr>
<td>Ports</td>
<td>Displays the type, slot, and port information. For the type, Po = port channel, Fo= fortygigabit ethernet, and Te = ten gigabit ethernet.</td>
</tr>
</tbody>
</table>

Example
Dell# show vlan id 40
Codes: * - Default VLAN, G - GVRP VLANs, R - Remote Port Mirroring
VLANs, P - Primary, C - Community, I - Isolated
Q: U - Untagged, T - Tagged
x - Dot1x untagged, X - Dot1x tagged
G - GVRP tagged, M - Vlan-stack, H - VSN tagged
i - Internal untagged, I - Internal tagged, v - VLT untagged, V - VLT tagged
NUM Status Description Q Ports
1 Inactive a

Dell#

Example (Brief)
Dell#show vlan brief
VLAN Name STG MAC Aging IP Address
1 0 0
Example (Using a VLAN Name)

Dellconf)#interface vlan 222
Dell(conf-if-vl-222)#name test
Dell(conf-if-vl-222)#do show vlan name test

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
x - Dot1x untagged, X - Dot1x tagged
G - GVRP tagged, M - Vlan-stack

NUM Status Description Q Ports
222 Inactive U TenGig 1/22

Dell(conf-if-vl-222)#

Related Commands

**interface vlan** — Configures a VLAN.

**shutdown**

Disable an interface.

**Syntax**

```
shutdown
```

To activate an interface, use the `no shutdown` command.

**Defaults**

The interface is disabled.

**Command Modes**

INTERFACE

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

The `show tdr` command marks a physical interface as unavailable for traffic. To discover if an interface is disabled, use the `show ip interface` command. Disabled interfaces are listed as down.

Disabling a VLAN or a port channel causes different behavior. When a VLAN is disabled, the Layer 3 functions within that VLAN are disabled. Layer 2 traffic continues to flow. Entering the `show tdr` command on a port channel disables all traffic on the port channel and the individual interfaces within the port channel. To enable a port channel, you must enter `no show tdr` on the port channel interface and at least one interface within that port channel.

The `show tdr` and `description` commands are the only commands that you can configure on an interface that is a member of a port channel.
speed (for 1000/10000 interfaces)

Set the speed for 1000/10000 Base-T Ethernet interfaces. Both sides of a link must be set to the same speed (1000/10000) or to auto or the link may not come up.

Syntax

```plaintext
speed {1000 | 10000 | auto}
```

To return to the default setting, use the `no speed {1000 | 10000 | auto}` command.

Parameters

- **1000**: Enter the keyword `1000` to set the interface's speed to 1000 Mb/s.
- **10000**: Enter the keyword `10000` to set the interface's speed to 10000 Mb/s. Auto-negotiation is enabled. For more information, refer to `auto`.
- **auto**: Enter the keyword `auto` to set the interface to auto-negotiate its speed. Auto-negotiation is enabled. For more information, refer to `auto`.

Defaults

```
auto
```

Command Modes

```
INTERFACE
```

Command History

```
Version 8.3.17.0  Supported on the M I/O Aggregator.
```

Usage Information

This command is found on the 1000/10000 Base-T Ethernet interfaces.

When you enable `auto`, the system performs and automatic discovery to determine the optics installed and configure the appropriate speed.

When you configure a speed for the 1000/10000 interface, confirm the `negotiation auto` command setting. Both sides of the link must should have auto-negotiation either enabled or disabled. For speed settings of 1000 or auto, the software sets the link to auto-negotiation and you cannot change that setting.
Related Commands

**negotiation auto** — enables or disables auto-negotiation on an interface.

---

**tdr-cable-test**

Test the condition of copper cables on 100/1000/10GBase-T modules.

**Syntax**

tdr-cable-test interface

**Parameters**

- **interface**
  Enter the keyword TenGigabitEthernet followed by the slot/port information for the 100/1000/10GBase-T Ethernet interface.

**Defaults**

none

**Command Modes**

EXEC

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

The interface must be enabled to run the test or an error message is generated:

```
Dell#tdr-cable-test tengigabitethernet 5/2
%Error: Interface is disabled TenGIG 5/2
```

**Related Commands**

- **show tdr** — Displays the results of the TDR test.

---

**vlan tagged (CMC)**

Add a Layer 2 interface to a VLAN as a tagged interface.

**Syntax**

tagged interface

To remove a tagged interface from a VLAN, use the no tagged interface command.

**Parameters**

- **interface**
  Enter the following keywords and slot/port or number information:
  
  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
Defaults

All interfaces in Layer 2 mode are untagged.

Command Modes

INTERFACE

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

When you use the `no tagged` command, the interface is automatically placed in the default VLAN as an untagged interface unless the interface is a member of another VLAN. If the interface belongs to several VLANs, you must remove it from all VLANs to change it to an untagged interface.

Tagged interfaces can belong to multiple VLANs, while untagged interfaces can only belong to one VLAN at a time.

When two or more ports configured for VLANs form a LAG, the resulting LAG is a tagged member of all the configured VLANs and an untagged member of the VLAN to which the port with the lowest port ID belongs.

For example, if port 0/1-32 is an untagged member of VLAN 2 and port 0/41 is an untagged member of VLAN 3, the resulting LAG consisting of the two ports is an untagged member of VLAN 2 and a tagged member of VLAN 3.

Example

Dell(conf-if-te-0/2)#vlan tagged ?
VLAN-RANGE     Comma/Hyphen separated VLAN ID set
Dell(conf-if-te-0/2)#vlan tagged 2,3-4
Dell(conf-if-te-0/2)#show config
!
interface TenGigabitEthernet 0/2
  mtu 12000
  vlan tagged 2-4
!
  port-channel-protocol LACP
  port-channel 1 mode active
!
  protocol lldp
  advertise management-tlv system-name
dcbx port-role auto-downstream
no shutdown
Dell(conf-if-te-0/2)#

Related Commands

`interface vlan` — Configures a VLAN.

`vlan untagged` — Specifies which interfaces in a VLAN are untagged.

**vlan untagged (CMC)**

Add a Layer 2 interface to a VLAN as an untagged interface.

**Syntax**

`untagged interface`
To remove a untagged interface from a VLAN, use the `no untagged interface` command.

**Parameters**

- **interface**
  - Enter the following keywords and slot/port or number information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information

**Defaults**

All interfaces in Layer 2 mode are untagged.

**Command Modes**

INTERFACE VLAN

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

- Untagged interfaces can only belong to one VLAN.
- In the default VLAN, you cannot use the `no untagged interface` command. To remove an untagged interface from all VLANs, including the default VLAN, enter `INTERFACE` mode and use the `no vlan tagged` command.
- Tagged interfaces can belong to multiple VLANs, while untagged interfaces can only belong to one VLAN at a time.
- When two or more ports configured for VLANs form a LAG, the resulting LAG is a tagged member of all the configured VLANs and an untagged member of the VLAN to which the port with the lowest port ID belongs.

- For example, if port 0/33 is an untagged member of VLAN 2 and port 0/41 is an untagged member of VLAN 3, the resulting LAG consisting of the two ports is an untagged member of VLAN 2 and a tagged member of VLANs 2 and 3.

**Example**

Dell(conf-if-te-0/2)#vlan untagged ?
<1-4094> Untagged VLAN id
Dell(conf-if-te-0/2)#
Dell(conf-if-te-0/2)#vlan untagged 4094
Dell(conf-if-te-0/2)#show config
!
interface TenGigabitEthernet 0/2
mtu 12000
vlan untagged 4094
!
port-channel-protocol LACP
port-channel 1 mode active
!
protocol lldp
advertise management-tlv system-name
dcbx port-role auto-downstream
no shutdown
Dell(conf-if-te-0/2)#
Related Commands

- `interface vlan` — Configures a VLAN.
- `vlan tagged` — Specifies which interfaces in a VLAN are tagged.
IPv4 Routing

IP Commands
This chapter describes the IPv4-related commands. They are:

- clear tcp statistics
- debug ip dhcp
- debug ip icmp
- ip route
- management route
- show arp
- show ip management-route
- show ip multicast-cam stack-unit
- show ip interface
- show ip route
- show ip management-route

clear tcp statistics
Clear the TCP counters.

**Syntax**

```text
clear tcp statistics
```

**Command Modes**
EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

debug ip dhcp
Enable debug information for dynamic host configuration protocol (DHCP) relay transactions and display the information on the console.

**Syntax**

```text
d debug ip dhcp
```

To disable debug, use the no debug ip dhcp command.

**Defaults**
Debug disabled
debug ip icmp

View information on the internal control message protocol (ICMP).

Syntax

```
debug ip icmp [interface] [count value]
```

To disable debugging, use the no debug ip icmp command.

Parameters

- **interface** (OPTIONAL) Enter the following keywords and slot/port or number information:

Example

```
Dell#debug ip dhcp
00:12:21 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at interface 113.3.3.17 BOOTP Request, hops = 0, XID = 0xbf05140f, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:21 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for 00:60:CF:20:7B:8C to 14.4.4.2
00:12:26 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at interface 113.3.3.17 BOOTP Request, hops = 0, XID = 0xbf05140f, secs = 5, hwaddr = 00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:26 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for 00:60:CF:20:7B:8C to 14.4.4.2
00:12:40 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at interface 113.3.3.17 BOOTP Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:40 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for 00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at interface 14.4.4.1 BOOTP Reply, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr = 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for 00:60:CF:20:7B:8C to 113.3.3.254
00:12:42 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received at interface 113.3.3.17 BOOTP Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:42 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for 00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at interface 14.4.4.1 BOOTP Reply, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:8C, giaddr = 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for 00:60:CF:20:7B:8C to 113.3.3.254
Dell#

IPv4 Routing
For the Management interface, enter the keyword ManagementEthernet followed by the slot/port information. The slot range is 0 and the port range is 0.

For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.

For a VLAN, enter the keyword vlan followed by a number from 1 to 4094.

**count value** (OPTIONAL) Enter the keyword count followed by the count value. The range is from 1 to 65534. The default is Infinity.

**Command Modes**
EXEC Privilege

**Command History**
Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40

**Usage Information**
Use the count option to stop packets from flooding the user terminal when debugging is turned on.

**ip route**
Assign a static route to the switch.

**Syntax**
```
ip route destination mask {ip-address | interface [ip-address]} [distance] [permanent] [tag tag-value]
```

To delete a specific static route, use the no ip route destination mask command.

To delete all routes matching a certain route, use the no ip route destination mask command.

**Parameters**
- **destination**: Enter the IP address in dotted decimal format of the destination device.
- **mask**: Enter the mask in the slash prefix format (/x) of the destination device’s IP address.
- **ip-address**: Enter the IP address in dotted decimal format of the forwarding router.
**interface**

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

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` followed by the slot/port information.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

**distance**

(Optional) Enter a number as the distance metric assigned to the route. The range is from 1 to 255.

**permanent**

(Optional) Enter the keyword `permanent` to specify the route is not removed, even if the interface assigned to that route goes down. The route must be up initially to install it in the routing table.

If you disable the interface with an IP address associated with the keyword `permanent`, the route disappears from the routing table.

**tag tag-value**

(Optional) Enter the keyword `tag` followed by a number to assign to the route. The range is from 1 to 4294967295.

**Defaults**

Not configured.

**Command Modes**

- **CONFIGURATION**

**Command History**

**Version 8.3.17.0**

Supported on the M I/O Aggregator.

**Usage Information**

Using the following example of a static route: `ip route 33.33.33.0 /24 tengigabitethernet 0/0 172.31.5.43`

- The software installs a next hop that is not on the directly connected subnet but which recursively resolves to a next hop on the interface’s configured subnet. In the example, if gig 0/0 has an ip address on subnet 2.2.2.0 and if 172.31.5.43 recursively resolves to 2.2.2.0, Dell Networking OS installs the static route.
- When the interface goes down, Dell Networking OS withdraws the route.
- When the interface comes up, Dell Networking OS re-installs the route.
- When recursive resolution is “broken,” Dell Networking OS withdraws the route.
- When recursive resolution is satisfied, Dell Networking OS re-installs the route.

**Related Commands**

- `show ip route` — views the switch routing table.
**management route**

Configure a static route that points to the Management interface or a forwarding router.

**Syntax**

```
management route {ipv4-address}/mask{forwarding-router-address
| managementethernet}
```

**Parameters**

- **(ipv4-address)/mask**
  - Enter an IPv4 address (A.B.C.D) followed by the prefix-length for the IP address of the management interface.
- **forwarding-router-address**
  - Enter an IPv4 address of a forwarding router.
- **managementethernet**
  - Enter the keyword managementethernet for the Management interface.

**Defaults**

Not configured.

**Command Modes**

CONFIGURATION

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Usage Information**

When a static route (or a protocol route) overlaps with Management static route, the static route (or a protocol route) is preferred over the Management Static route. Also, Management static routes and the Management Connected prefix are not reflected in the hardware routing tables. Separate routing tables are maintained for IPv4 management routes. This command manages both tables.

---

**show arp**

Displays the ARP table.

**Syntax**

```
show arp [interface interface | ip ip-address [mask] | macaddress mac-address [mac-address mask]] [static | dynamic] [summary]
```

**Parameters**

- **interface**
  - (OPTIONAL) Enter the following keywords and slot/port or number information:
    - For the Management interface, enter the keyword managementethernet followed by the slot/port information.
    - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
    - For a VLAN, enter the keyword vlan followed by a number from 1 to 4094.
**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0  
Supported on the M I/O Aggregator.

**Usage Information**

The following describes the `show arp` command shown in the following example.

<table>
<thead>
<tr>
<th>Row Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Displays the protocol type.</td>
</tr>
<tr>
<td>Address</td>
<td>Displays the IP address of the ARP entry.</td>
</tr>
<tr>
<td>Age(min)</td>
<td>Displays the age (in minutes) of the ARP entry.</td>
</tr>
<tr>
<td>Hardware Address</td>
<td>Displays the MAC address associated with the ARP entry.</td>
</tr>
<tr>
<td>Interface</td>
<td>Displays the first two letters of the interfaces type and the slot/port associated with the ARP entry.</td>
</tr>
<tr>
<td>VLAN</td>
<td>Displays the VLAN ID, if any, associated with the ARP entry.</td>
</tr>
<tr>
<td>CPU</td>
<td>Lists which CPU the entries are stored on.</td>
</tr>
</tbody>
</table>

**Example**

Dell# show arp

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Address</th>
<th>Age(min)</th>
<th>Hardware Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>VLAN</td>
<td>CPU</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>------------------</td>
</tr>
<tr>
<td>Internet</td>
<td>10.11.8.6</td>
<td>167</td>
<td>00:01:e9:45:00:03</td>
</tr>
<tr>
<td></td>
<td>10.11.68.14</td>
<td>124</td>
<td>00:01:e9:45:00:03</td>
</tr>
</tbody>
</table>

IPv4 Routing
Example
(Private VLAN)

NOTE: In this example, Line 1 shows community VLAN 200 (in primary VLAN 10) in a PVLAN. Line 2 shows primary VLAN 10.

Dell#show arp

<table>
<thead>
<tr>
<th>Protocol Address</th>
<th>Age(min)</th>
<th>Hardware Address</th>
<th>Interface</th>
<th>VLAN</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet 5.5.5.1</td>
<td>-</td>
<td>00:01:e8:43:96:5e</td>
<td>-</td>
<td>Vl 10 pv 200</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 5.5.5.10</td>
<td>-</td>
<td>00:01:e8:44:99:55</td>
<td>-</td>
<td>Vl 10</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 10.1.2.4</td>
<td>1</td>
<td>00:01:e8:d5:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 10.10.10.4</td>
<td>1</td>
<td>00:01:e8:d5:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 10.16.127.53</td>
<td>1</td>
<td>00:01:e8:d5:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 10.16.134.254</td>
<td>20</td>
<td>00:01:e8:d5:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet 133.33.33.4</td>
<td>1</td>
<td>00:01:e8:d5:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
</tbody>
</table>

Usage Information

The following describes the show arp summary command shown in the following example.

<table>
<thead>
<tr>
<th>Row Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Entries</td>
<td>Lists the total number of ARP entries in the ARP table.</td>
</tr>
<tr>
<td>Static Entries</td>
<td>Lists the total number of configured or static ARP entries.</td>
</tr>
<tr>
<td>Dynamic Entries</td>
<td>Lists the total number of learned or dynamic ARP entries.</td>
</tr>
<tr>
<td>CPU</td>
<td>Lists which CPU the entries are stored on.</td>
</tr>
</tbody>
</table>

Example (Summary)

Dell#show arp summary

<table>
<thead>
<tr>
<th>TotalEntries</th>
<th>Static Entries</th>
<th>Dynamic Entries</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
<td>CP</td>
</tr>
</tbody>
</table>

show ip interface

View IP-related information on all interfaces.

Syntax

show ip interface [interface | brief | configuration]

Parameters

interface (OPTIONAL) Enter the following keywords and slot/port or number information:
• For the Management interface, enter the keyword ManagementEthernet followed by zero (0).
• For a Port Channel interface, enter the keywords port-channel followed by a number. The range is from 1 to 128.
• For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
• For a VLAN, enter the keyword vlan followed by a number from 1 to 4094.

brief (OPTIONAL) Enter the keyword brief to view a brief summary of the interfaces and whether an IP address is assigned.

configuration (OPTIONAL) Enter the keyword configuration to display the physical interfaces with non-default configurations only.

Command Modes
• EXEC
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
The following describes the show ip interface command shown in the following example.

<table>
<thead>
<tr>
<th>Lines</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TenGigabitEthernet 0/0</td>
<td>Displays the interface's type, slot/port and physical and line protocol</td>
</tr>
<tr>
<td>Internet address...</td>
<td>States whether an IP address is assigned to the interface. If one is, that address is displayed.</td>
</tr>
<tr>
<td>IP MTU...</td>
<td>Displays IP MTU value.</td>
</tr>
<tr>
<td>Inbound access...</td>
<td>Displays the name of the any configured incoming access list. If none is configured, the phrase “not set” is displayed.</td>
</tr>
<tr>
<td>Proxy ARP...</td>
<td>States whether proxy ARP is enabled on the interface.</td>
</tr>
<tr>
<td>Split horizon...</td>
<td>States whether split horizon for RIP is enabled on the interface.</td>
</tr>
<tr>
<td>Poison Reverse...</td>
<td>States whether poison for RIP is enabled on the interface.</td>
</tr>
<tr>
<td>ICMP redirects...</td>
<td>States if ICMP redirects are sent.</td>
</tr>
<tr>
<td>ICMP unreachable...</td>
<td>States if ICMP unreachable messages are sent.</td>
</tr>
</tbody>
</table>

Example
Dell#show ip int te 0/0
TenGigabitEthernet 0/0 is down, line protocol is down
Internet address is not set
IP MTU is 1500 bytes
Inbound access list is not set
Proxy ARP is enabled
Split Horizon is enabled
Poison Reverse is disabled
ICMP redirects are not sent
ICMP unreachables are not sent
Dell#

Usage

The following describes the `show ip interface brief` command shown in the following example.

<table>
<thead>
<tr>
<th>Fields</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Displays type of interface and the associated slot and port number.</td>
</tr>
<tr>
<td>IP-Address</td>
<td>Displays the IP address for the interface, if configured.</td>
</tr>
<tr>
<td>Ok?</td>
<td>Indicates if the hardware is functioning properly.</td>
</tr>
<tr>
<td>Method</td>
<td>Displays &quot;Manual&quot; if the configuration is read from the saved configuration.</td>
</tr>
<tr>
<td>Status</td>
<td>States whether the interface is enabled (up) or disabled (administratively down).</td>
</tr>
<tr>
<td>Protocol</td>
<td>States whether IP is enabled (up) or disabled (down) on the interface.</td>
</tr>
</tbody>
</table>

Example (Brief)

```bash
dell# show ip int brief
Interface IP-Address OK? Method Status Protocol
TenGigabitEthernet 0/1 unassigned NO None up down
TenGigabitEthernet 0/2 unassigned YES None up up
TenGigabitEthernet 0/3 unassigned YES None up up
TenGigabitEthernet 0/4 unassigned NO None up down
TenGigabitEthernet 0/5 unassigned NO None up down
TenGigabitEthernet 0/6 unassigned NO None up down
TenGigabitEthernet 0/7 unassigned NO None up down
TenGigabitEthernet 0/8 unassigned NO None up down
TenGigabitEthernet 0/9 unassigned NO None up down
```

show ip management-route

View the IP addresses assigned to the Management interface.

**Syntax**

```
show ip management-route [all | connected | summary | static]
```

**Parameters**

- `all` (OPTIONAL) Enter the keyword `all` to view all IP addresses assigned to all Management interfaces on the switch.
- `connected` (OPTIONAL) Enter the keyword `connected` to view only routes directly connected to the Management interface.
- `summary` (OPTIONAL) Enter the keyword `summary` to view a table listing the number of active and non-active routes and their sources.
show ip multicast-cam stack-unit

Displays content-addressable memory (CAM) entries.

Syntax

```
show ip multicast-cam stack-unit 0-5 port-set pipe-number [ip-address mask [longer-prefixes] | detail | member-info | summary]
```

Parameters

- **0-5**: Enter the stack-unit ID, from 0 to 5.
- **pipe-number**: Enter the number of the Port-Pipe number. The range is from 0 to 0.
- **ip-address mask [longer-prefixes]**: (OPTIONAL) Enter the IP address and mask of a route to CAM entries for that route only. Enter the keyword longer-prefixes to view routes with a common prefix.
- **detail**: Enter the keyword detail to display the group index ID used by the ecmp routes in the CAM.
- **member-info**: Enter the keyword member-info to display the group index used by the ecmp, the number of egress ports (members) for the ecmp, and the port details of each member. The detail information under member-info will give the MAC address, VLAN ID and gateway of every member port of the ecmp.
- **summary**: (OPTIONAL) Enter the keyword summary to view a table listing route prefixes and the total number routes which can be entered in to CAM.
Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

The following describes the `show ip fib stack-unit` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination</td>
<td>Displays the destination route of the index.</td>
</tr>
<tr>
<td>CG</td>
<td>Displays 0.</td>
</tr>
<tr>
<td>V</td>
<td>Displays a 1 if the entry is valid and a 0 otherwise.</td>
</tr>
<tr>
<td>C</td>
<td>Displays the CPU bit. 1 indicates that a packet hitting this entry is forwarded to the control processor, depending on Egress port.</td>
</tr>
<tr>
<td>V Id</td>
<td>Displays the VLAN ID. If the entry is 0, the entry is not part of a VLAN.</td>
</tr>
<tr>
<td>Mac Addr</td>
<td>Displays the next-hop router’s MAC address.</td>
</tr>
<tr>
<td>Port</td>
<td>Displays the egress interface. Use the second half of the entry to determine the interface. For example, in the entry 17cl CP, the CP is the pertinent portion.</td>
</tr>
</tbody>
</table>

- CP = control processor
- Fo = 40 Gigabit Ethernet interface
- Te = 10 Gigabit Ethernet interface

Example

Dell#show ip multicast-cam stack-unit 0 port-set 0 longer-prefixes
10.10.10.10/32
Destination    EC    CG    V    C  VId   Mac-Addr        Port
----------------- -- -- - - ----- ----------------- --------
10.10.10.10          0     0   1   1 0 00:00:00:00:00:00 3f01 CP
Dell#

**show ip route**

View information, including how they were learned, about the IP routes on the switch.

Syntax

```
show ip route [hostname | ip-address [mask] [longer-prefixes] | list prefix-list [process-id] | connected | static | summary]
```
Parameters

**ip-address**  (OPTIONAL) Specify a name of a device or the IP address of the device to view more detailed information about the route.

**mask**  (OPTIONAL) Specify the network mask of the route. Use this parameter with the IP address parameter.

**longer-prefixes**  (OPTIONAL) Enter the keywords longer-prefixes to view all routes with a common prefix.

**list prefix-list**  (OPTIONAL) Enter the keyword list and the name of a configured prefix list.

**process-id**  (OPTIONAL) Specify that only OSPF routes with a certain process ID must be displayed.

**connected**  (OPTIONAL) Enter the keyword connected to view only the directly connected routes.

**static**  (OPTIONAL) Enter the keyword static to view only routes configured by the ip route command.

**summary**  (OPTIONAL) Enter the keyword summary.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**

The following describes the show ip route all command in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(undefined)</td>
<td>Identifies the type of route:</td>
</tr>
<tr>
<td>C</td>
<td>connected</td>
</tr>
<tr>
<td>S</td>
<td>static</td>
</tr>
<tr>
<td>R</td>
<td>RIP</td>
</tr>
<tr>
<td>B</td>
<td>BGP</td>
</tr>
<tr>
<td>IN</td>
<td>internal BGP</td>
</tr>
<tr>
<td>EX</td>
<td>external BGP</td>
</tr>
<tr>
<td>LO</td>
<td>Locally Originated</td>
</tr>
<tr>
<td>O</td>
<td>OSPF</td>
</tr>
<tr>
<td>IA</td>
<td>OSPF inter area</td>
</tr>
<tr>
<td>N1</td>
<td>OSPF NSSA external type 1</td>
</tr>
<tr>
<td>N2</td>
<td>OSPF NSSA external type 2</td>
</tr>
<tr>
<td>E1</td>
<td>OSPF external type 1</td>
</tr>
<tr>
<td>E2</td>
<td>OSPF external type 2</td>
</tr>
<tr>
<td>i</td>
<td>IS-IS</td>
</tr>
</tbody>
</table>
Field | Description
--- | ---
• L1 = IS-IS level-1
• L2 = IS-IS level-2
• IA = IS-IS inter-area
• * = candidate default
• > = non-active route
• + = summary routes

Destination | Identifies the route’s destination IP address.
Gateway | Identifies whether the route is directly connected and on which interface the route is configured.
Dist/Metric | Identifies if the route has a specified distance or metric.
Last Change | Identifies when the route was last changed or configured.

Example
```
Dell#show ip route summary
Route Source Active Routes Non-active Routes
connected 2 0
static 1 0
Total 3 0
Total 3 active route(s) using 612 bytes
Dell#show ip route static ?
| Pipe through a command
<cr>
Dell#show ip route static
    Destination Gateway Dist/Metric Last Change
--- --------------- ----------- ------------
    *S  0.0.0.0/0 via 10.10.91.9, Te 1/2 1/0 3d2h
Dell#
```

**show tcp statistics**

View information on TCP traffic through the switch.

**Syntax**
```
show tcp statistics
```

**Command Modes**
EXEC Privilege

**Command History**
Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**
The following describes the `show tcp statistics` command shown in the following example.
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rcvd:</td>
<td>Displays the number and types of TCP packets received by the switch.</td>
</tr>
<tr>
<td></td>
<td>• Total = total packets received</td>
</tr>
<tr>
<td></td>
<td>• no port = number of packets received with no designated port</td>
</tr>
<tr>
<td>0 checksum error...</td>
<td>Displays the number of packets received with the following:</td>
</tr>
<tr>
<td></td>
<td>• checksum errors</td>
</tr>
<tr>
<td></td>
<td>• bad offset to data</td>
</tr>
<tr>
<td></td>
<td>• too short</td>
</tr>
<tr>
<td>329 packets...</td>
<td>Displays the number of packets and bytes received in sequence.</td>
</tr>
<tr>
<td>17 dup...</td>
<td>Displays the number of duplicate packets and bytes received.</td>
</tr>
<tr>
<td>0 partially...</td>
<td>Displays the number of partially duplicated packets and bytes received.</td>
</tr>
<tr>
<td>7 out-of-order...</td>
<td>Displays the number of packets and bytes received out of order.</td>
</tr>
<tr>
<td>0 packets with data after window</td>
<td>Displays the number of packets and bytes received that exceed the switch's window size.</td>
</tr>
<tr>
<td>0 packets after close</td>
<td>Displays the number of packet received after the TCP connection was closed.</td>
</tr>
<tr>
<td>0 window probe packets...</td>
<td>Displays the number of window probe and update packets received.</td>
</tr>
<tr>
<td>41 dup ack...</td>
<td>Displays the number of duplicate acknowledgement packets and acknowledgement packets with data received.</td>
</tr>
<tr>
<td>10184 ack...</td>
<td>Displays the number of acknowledgement packets and bytes received.</td>
</tr>
<tr>
<td>Sent:</td>
<td>Displays the total number of TCP packets sent and the number of urgent packets sent.</td>
</tr>
<tr>
<td>25 control packets...</td>
<td>Displays the number of control packets sent and the number retransmitted.</td>
</tr>
<tr>
<td>11603 data packets...</td>
<td>Displays the number of data packets sent.</td>
</tr>
<tr>
<td>24 data packets retransmitted</td>
<td>Displays the number of data packets resent.</td>
</tr>
<tr>
<td>355 ack...</td>
<td>Displays the number of acknowledgement packets sent and the number of packet delayed.</td>
</tr>
</tbody>
</table>
### Field | Description
--- | ---
0 window probe... | Displays the number of window probe and update packets sent.
7 Connections initiated... | Displays the number of TCP connections initiated, accepted, and established.
14 Connections closed... | Displays the number of TCP connections closed, dropped.
20 Total rxmt... | Displays the number of times the switch tried to re-send data and the number of connections dropped during the TCP retransmit timeout period.
0 Keepalive... | Lists the number of keepalive packets in timeout, the number keepalive probes and the number of TCP connections dropped during keepalive.

**Example**

```
Dell#show tcp statistics
Rcvd: 9849 Total, 0 no port
  0 checksum error, 0 bad offset, 0 too short
  5735 packets (7919 bytes) in sequence
  20 dup packets (2 bytes)
  0 partially dup packets (0 bytes)
  1 out-of-order packets (0 bytes)
  0 packets (0 bytes) with data after window
  0 packets after close
  0 window probe packets, 0 window update packets
  0 dup ack packets, 0 ack packets with unsend data
  6671 ack packets (152813 bytes)
Sent: 6778 Total, 0 urgent packets
  7 control packets
  6674 data packets (152822 bytes)
  12 data packets (1222 bytes) retransmitted
  85 ack only packets (5677 delayed)
  0 window probe packets, 0 window update packets
  0 Connections initiated, 7 connections accepted, 7 connections established
  8 Connections closed (including 4 dropped, 0 embryonic dropped)
  12 Total rxmt timeout, 1 connections dropped in rxmt timeout
  26 Keepalive timeout, 25 keepalive probe, 1 Connections dropped in keepalive
Dell#
```
iSCSI Optimization

Internet small computer system interface (iSCSI) optimization enables quality-of-service (QoS) treatment for iSCSI storage traffic on an Aggregator.

NOTE: When iSCSI storage devices are detected on the server-ports, storm-control is disabled on those ports. When the iSCSI devices are off the ports, storm-control is enabled again.

The following commands are used to verify the iSCSI Optimization feature:

- `show iscsi`
- `show iscsi sessions`
- `show iscsi sessions detailed`

show iscsi

Display the currently configured iSCSI settings.

**Syntax**

```
show iscsi
```

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

`show iscsi`
`Version 8.3.17.0` Supported on the M I/O Aggregator.

**Example**

```
Dell#show iscsi
iSCSI is enabled
iSCSI COS : dot1p is 4 no-remark
Session aging time: 10
Maximum number of connections is 256
------------------------------------------------
iSCSI Targets and TCP Ports:
------------------------------------------------
TCP Port Target IP Address
3260
860
Dell#
```

**Related Commands**

- `show iscsi sessions` — displays information on active iSCSI sessions on the switch.
- `show iscsi session detailed` — displays detailed information on active iSCSI sessions on the switch.
show iscsi sessions
Display information on active iSCSI sessions on the switch.

Syntax
show iscsi sessions

Command Modes
• EXEC
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example
Dell# show iscsi sessions
Session 0:
Target: iqn.2001-05.com.equallogic:0-8a0906-0e70c2002-10a0018426a48c94-iom010
Initiator: iqn.1991-05.com.microsoft:win-x9l8v27yajg
ISID: 400001370000

Session 1:
Target: iqn.2001-05.com.equallogic:0-8a0906-0f60c2002-0360018428d48c94-iom011
Initiator: iqn.1991-05.com.microsoft:win-x9l8v27yajg
ISID: 400001370000.

Related Commands
• show iscsi — displays the currently configured iSCSI settings.
• show iscsi sessions detailed — displays detailed information on active iSCSI sessions on the switch.

show iscsi sessions detailed
Displays detailed information on active iSCSI sessions on the switch.

Syntax
show iscsi sessions detailed [session isid]

Parameters
isid Enter the session's iSCSI ID to display detailed information on specified iSCSI session.

Command Modes
• EXEC
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example
Dell# show iscsi sessions detailed
Session 0:
---------------------------------------------------------------
Up Time: 00:00:01:28 (DD:HH:MM:SS)
Time for aging out: 00:00:09:34 (DD:HH:MM:SS)
ISID: 806978696102

<table>
<thead>
<tr>
<th>Initiator IP Address</th>
<th>TCP Port</th>
<th>Target IP Address</th>
<th>TCPPort</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.10.0.44</td>
<td>33345</td>
<td>10.10.0.101</td>
<td>3260</td>
<td>0</td>
</tr>
</tbody>
</table>

Session 1:

Up Time: 00:00:01:22 (DD:HH:MM:SS)
Time for aging out: 00:00:09:31 (DD:HH:MM:SS)
ISID: 806978696102

<table>
<thead>
<tr>
<th>Initiator IP Address</th>
<th>TCP Port</th>
<th>Target IP Address</th>
<th>TCPPort</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.10.0.53</td>
<td>33432</td>
<td>10.10.0.101</td>
<td>3260</td>
<td>0</td>
</tr>
</tbody>
</table>

Related Commands

- `show iscsi` — displays the currently configured iSCSI settings.
- `show iscsi sessions` — displays information about active iSCSI sessions on the switch.
Link Aggregation Control Protocol (LACP)

This chapter contains commands for Dell Networking’s implementation of the link aggregation control protocol (LACP) for the creation of dynamic link aggregation groups (LAGs — called port-channels in Dell Networking OS parlance).

**clear lacp counters**

Clear Port Channel counters.

**Syntax**

```
clear lacp port-channel-number counters
```

**Parameters**

- **port-channel-number**
  - Enter a port-channel number:
  - The range is from 1 to 128.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

- Version 8.3.17.0
  - Supported on the M I/O Aggregator.

**Related Commands**

- `show lacp` — displays the LACP configuration.

**debug lacp**

Debug LACP (events).

**Syntax**

```
debug lacp [events | pdu interface [in | out]]
```

To disable LACP debugging, use the `no debug lacp [events | pdu interface [in | out]]` command.

**Parameters**

- **events**
  - (OPTIONAL) Enter the keyword `events` to debug the LACP event information.

- **pdu in | out**
  - (OPTIONAL) Enter the keyword `pdu` to debug the LACP Protocol Data Unit information. Optionally, enter an `in` or `out` parameter to:
Receive enter in
Transmit enter out

interface in | out

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

- For a Ten-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.

Defaults none
Command Modes EXEC
EXEC Privilege

Command History Version 8.3.17.0 Supported on the M I/O Aggregator.

**show lacp**

Displays the LACP matrix.

Syntax

```
show lacp port-channel-number [sys-id | counters]
```

Parameters

- **port-channel-number**
  - Enter a port-channel number:
  - The range is from 1 to 128.

- **sys-id**
  - (OPTIONAL) Enter the keywords `sys-id` and the value that identifies a system.

- **counters**
  - (OPTIONAL) Enter the keyword `counters` to display the LACP counters.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Example (Port-Channel-Number)

```
Dell#show lacp 128
Port-channel 1 admin up, oper up, mode lacp
Actor   System ID:Priority 32768, Address 0001.e800.a12b
Partner System ID:Priority 32768, Address 0001.e801.45a5
   Actor Admin Key 1, Oper Key 1, Partner Oper Key 1
LACP LAG 1 is an aggregatable link
```
A-Active LACP, B-Passive LACP, C-Short Timeout, D-Long Timeout
E-Aggregatable Link, F-Individual Link, G-IN_SYNC, H-OUT_OF_SYNC
I-Collection enabled, J-Collection disabled, K-Distribution enabled, L-Distribution disabled,
M-Partner Defaulted, N-Partner Non-defaulted, O-Receiver is in expired state,
P-Receiver is not in expired state

Port Te 0/1 is enabled, LACP is enabled and mode is lacp
Actor   Admin: State ACEHJLMP Key 1    Priority 128
         Oper: State ACEGIKNP Key 1    Priority 128
Partner Admin: State BDFHJLMP Key 0    Priority 0
         Oper: State BCEGIKNP Key 1    Priority 128

Example (Sys-id)
Dell#show lacp 1 sys-id
Actor    System ID: Priority 32768, Address 0001.e800.a12b
Partner  System ID: Priority 32768, Address 0001.e801.45a5

Example (Counter)
Dell#show lacp 1 counters
----------------------------------------------------
LACP PDU    Marker PDU   Unknown   Illegal
Port     Xmit   Recv   Xmit Recv      Pkts Rx   Pkts Rx
-----------------------------------------------------
TenGig 0/1  200  200     0    0        0          0

Related Commands
clear lacp counters—Clears the LACP counters.
show interfaces port-channel—Displays the information on configured Port Channel groups.

show link-bundle-distribution port-channel
Display the traffic-handling and utilization of the member interfaces of the port channel.

Syntax
show link-bundle-distribution port-channel

Command Modes
EXEC
EXEC Privilege

Command History
Version 9.3.0.0 Introduced on the M I/O Aggregator

Usage Information
The following table describes the output fields of this show command:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link-bundle trigger threshold</td>
<td>Threshold value that is the checkpoint, exceeding which the link bundle is</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LAG bundle number</td>
<td>Number of the LAG bundle</td>
</tr>
<tr>
<td>Utilization (In Percent)</td>
<td>Traffic usage in percentage of the packets processed by the port channel</td>
</tr>
<tr>
<td>Alarm State</td>
<td>Indicates whether an alarm is generated if overutilization of the port channel occurred. Possible values are Active and Inactive</td>
</tr>
<tr>
<td>Interface</td>
<td>Slot and port number, and the type of the member interface of the port channel</td>
</tr>
<tr>
<td>Line Protocol</td>
<td>Indicates whether the interface is administratively up or down</td>
</tr>
<tr>
<td>Utilization (In Percent)</td>
<td>Traffic usage in percentage of the packets processed by the particular member interface</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show link-bundle-distribution port-channel
Link-bundle trigger threshold - 60

LAG bundle - 1     Utilization[In Percent] - 0     Alarm State - Inactive

 Interface            Line Protocol Utilization[In Percent]
 Te 0/5                Up            0
 Te 0/13               Up            0
```
Layer 2

This chapter describes commands to configure Layer 2 features. This chapter contains the following sections:

- MAC Addressing Commands
- Virtual LAN (VLAN) Commands

MAC Addressing Commands

The following commands are related to configuring, managing, and viewing MAC addresses:

- clear mac-address-table dynamic
- show cam mac stack-unit

Virtual LAN (VLAN) Commands

The following commands configure and monitor virtual local area networks (VLANs). VLANs are a virtual interface and use many of the same commands as physical interfaces.

You can configure an IP address and Layer 3 protocols on a VLAN called Inter-VLAN routing. FTP, TFTP, ACLs and SNMP are not supported on a VLAN.

For more information, also refer to Virtual LAN (VLAN) Commands.

clear mac-address-table dynamic

Clear the MAC address table of all MAC address learned dynamically.

**Syntax**

```
clear mac-address-table dynamic {address mac-address | all | interface interface | vlan vlan-id}
```

**Parameters**

- **address mac-address**
  - Enter the keyword address followed by a MAC address in nn:nn:nn:nn:nn:nn format.
- **all**
  - Enter the keyword all to delete all MAC address entries in the MAC address table.
interface

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

- For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.

vlan vlan-id

Enter the keyword vlan followed by a VLAN ID number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

description

Add a description about the selected VLAN.

Syntax
description description

To remove the description from the VLAN, use the no description command.

Parameters
description

Enter a text string description to identify the VLAN (80 characters maximum).

Defaults
none

Command Modes INTERFACE VLAN

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Related Commands
show vlan – displays the VLAN configuration.

show cam mac stack-unit

Display the content addressable memory (CAM) size and the portions allocated for MAC addresses and for MAC ACLs.

Syntax

show cam mac stack-unit unit_number port-set port-pipe count [vlan vlan-id] [interface interface]
### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>stack-unit</td>
<td>(REQUIRED) Enter the keyword <code>stack-unit</code> followed by a stack member number to select the stack unit for which to gather information. The range is 0 to 5.</td>
</tr>
<tr>
<td>unit_number</td>
<td></td>
</tr>
<tr>
<td>port-set port-pipe</td>
<td>(REQUIRED) Enter the keywords <code>port-set</code> followed by a Port-Pipe number to select the Port-Pipe for which to gather information. The range is 0.</td>
</tr>
<tr>
<td>address mac-addr</td>
<td>(OPTIONAL) Enter the keyword <code>address</code> followed by a MAC address in the <code>nn:nn:nn:nn:nn:nn</code> format to display information on that MAC address.</td>
</tr>
<tr>
<td>dynamic</td>
<td>(OPTIONAL) Enter the keyword <code>dynamic</code> to display only those MAC addresses learned dynamically by the switch.</td>
</tr>
<tr>
<td>static</td>
<td>(OPTIONAL) Enter the keyword <code>static</code> to display only those MAC address specifically configured on the switch.</td>
</tr>
<tr>
<td>interface interface</td>
<td>(OPTIONAL) Enter the keyword <code>interface</code> followed by the interface type, slot and port information:</td>
</tr>
<tr>
<td></td>
<td>• For a 10-Gigabit Ethernet interface, enter the keyword <code>TenGigabitEthernet</code> followed by the slot/port information.</td>
</tr>
<tr>
<td>vlan vlan-id</td>
<td>(OPTIONAL) Enter the keyword <code>vlan</code> followed by the VLAN ID to display the MAC address assigned to the VLAN. The range is from 1 to 4094.</td>
</tr>
</tbody>
</table>

### Command Modes

- EXEC
- EXEC Privilege

### Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.
Link Layer Discovery Protocol (LLDP)

The link layer discovery protocol (LLDP) advertises connectivity and management from the local station to the adjacent stations on an IEEE 802 LAN. LLDP facilitates multi-vendor interoperability by using standard management tools to discover and make available a physical topology for network management. The Dell Networking OS implementation of LLDP is based on IEEE standard 801.1ab.

This chapter contains the following commands, in addition to the commands:

- clear lldp counters
- debug lldp interface
- protocol lldp (Configuration)
- protocol lldp (Interface)
- show lldp neighbors
- show lldp statistics

The starting point for using LLDP is invoking LLDP with the `protocol lldp` command in either CONFIGURATION or INTERFACE mode.

The information LLDP distributes is stored by its recipients in a standard management information base (MIB). You can access the information by a network management system through a management protocol such as simple network management protocol (SNMP).

For details about implementing LLDP/LLDP-MED, refer to the Link Layer Discovery Protocol chapter of the Dell PowerEdge M I/O Aggregator Configuration Guide.

clear lldp counters

Clear LLDP transmitting and receiving counters for all physical interfaces or a specific physical interface.

Syntax
clear lldp counters interface

Parameters
interface Enter the following keywords and slot/port or number information:
- For a 10-Gigabit Ethernet interface, enter the keyword tenGigabitEthernet followed by the slot/port information.

Defaults none

Command Modes EXEC Privilege
debug lldp interface

Enable LLDP debugging to display timer events, neighbor additions or deletions, and other information about incoming and outgoing packets.

**Syntax**

debug lldp interface {interface | all}{events | packet {brief | detail} {tx | rx | both}}

To disable debugging, use the no debug lldp interface {interface | all}{events} {packet {brief | detail} {tx | rx | both}} command.

**Parameters**

- **interface**
  
Enter the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` followed by the slot/port information.

- **all**
  
  (OPTIONAL) Enter the keyword `all` to display information on all interfaces.

- **events**
  
  (OPTIONAL) Enter the keyword `events` to display major events such as timer events.

- **packet**
  
  (OPTIONAL) Enter the keyword `packet` to display information regarding packets coming in or going out.

- **brief**
  
  (OPTIONAL) Enter the keyword `brief` to display brief packet information.

- **detail**
  
  (OPTIONAL) Enter the keyword `detail` to display detailed packet information.

- **tx**
  
  (OPTIONAL) Enter the keyword `tx` to display transmit-only packet information.

- **rx**
  
  (OPTIONAL) Enter the keyword `rx` to display receive-only packet information.

- **both**
  
  (OPTIONAL) Enter the keyword `both` to display both receive and transmit packet information.

**Defaults**

none

**Command Modes**

EXEC Privilege
protocol lldp (Configuration)

Enable LLDP globally on the switch.

Syntax

```
protocol lldp
```

To disable LLDP globally on the chassis, use the `no protocol lldp` command.

Defaults

Enabled.

Command Modes

CONFIGURATION (conf-lldp)

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

protocol lldp (Interface)

Enter the LLDP protocol in the INTERFACE mode.

Syntax

```
[no] protocol lldp
```

To return to the global LLDP configuration mode, use the `no protocol lldp` command from Interface mode.

Defaults

Enabled

Command Modes

INTERFACE (conf-if-interface-lldp)

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

By default, protocol lldp is enabled. To disable, use the `no protocol lldp` command.

When you enter the LLDP protocol in the Interface context, it overrides global configurations. When you execute the `no protocol lldp` from INTERFACE mode, interfaces begin to inherit the configuration from global LLDP CONFIGURATION mode.
**show lldp neighbors**

Display LLDP neighbor information for all interfaces or a specified interface.

**Syntax**

```
show lldp neighbors [interface] [detail]
```

**Parameters**

- `interface` (OPTIONAL) Enter the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information.

- `detail` (OPTIONAL) Enter the keyword `detail` to display all the TLV information, timers, and LLDP tx and rx counters.

**Defaults**

none

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

Omitting the keyword `detail` displays only the remote chassis ID, Port ID, and Dead Interval.

**Example**

```
Dell (conf-if-te-1/31)#do show lldp neighbors
Loc PortID    Rem Host Name  Rem Port Id             Rem Chassis Id
---------------------------------------------------------------
Te 1/37       FTOS         TenGigabitEthernet 0/37 00:01:e8:05:40:46
Te 1/38       FTOS         TenGigabitEthernet 0/38 00:01:e8:05:40:46
Te 1/39       FTOS         TenGigabitEthernet 0/39 00:01:e8:05:40:46
Te 1/40       FTOS         TenGigabitEthernet 0/40 00:01:e8:05:40:46
Dell (conf-if-te-1/31)#
```

**show lldp statistics**

Displays the LLDP statistical information.

**Syntax**

```
show lldp statistics
```

**Defaults**

none

**Command Modes**

EXEC Privilege
Command History

Example

Dell#show lldp statistics
--------- LLDP GLOBAL STATISTICS ON CHASSIS ---------
Total number of neighbors: 4
Last table change time: 00:01:17, In ticks: 3859
Total number of Table Inserts: 7
Total number of Table Deletes: 3
Total number of Table Drops: 0
Total number of Table Age Outs: 0
Dell#
Port Monitoring

The port monitoring feature allows you to monitor network traffic by forwarding a copy of each incoming or outgoing packet from one port to another port.

Important Points to Remember

- Port monitoring is supported on physical ports only. Port-channel interfaces and virtual local area networks (VLANs), are not supported.
- The monitoring (destination, “MG”) and monitored (source, “MD”) ports must be on the same switch.
- The monitored (source) interface must be a server-facing interface in the format slot/port, where valid slot numbers are 0-1 and server-facing port numbers are from 1 to 32. The monitoring interface must be an uplink port in the chassis.
- Dell Networking OS permits a limited set of commands for monitoring ports. To display these commands, use the ? command.
- Only one MG and one MD may be in a single port-pipe.
- A monitoring port may not be a member of a VLAN.
- There may only be one destination port in a monitoring session.
- A source port (MD) can only be monitored by one destination port (MG). If you try to assign a monitored port to more than one monitoring port, the following error is displayed as shown in example.

Example

```
Dell(conf)#mon ses 1
Dell(conf-mon-sess-1)#source tengig 0/0 destination tengig 0/60 direction both
Dell(conf-mon-sess-1)#do show mon ses
SessionID Source      Destination  Direction  Mode  Type
--------- ------      -----------  ---------  ----  ----
1    TenGig 0/0  TenGig 0/60  both            interface
Port-based
Dell(conf-mon-sess-1)#mon ses 2
Dell(conf-mon-sess-2)#source tengig 0/0 destination tengig 0/61 direction both
% Error: MD port is already being monitored.
```

NOTE: There is no limit to the number of monitoring sessions per system, provided that there are only four destination ports per port-pipe. If each monitoring session has a unique destination port, the maximum number of session is four per port-pipe.
**description**

Enter a description of this monitoring session.

**Syntax**

description {\textit{description}}

To remove the description, use the \texttt{no description \{description\}} command.

**Parameters**

- **description**
  Enter a description regarding this session (80 characters maximum).

**Defaults**

- none

**Command Modes**

MONITOR SESSION (conf-mon-sess-session-ID)

**Command History**

- **Supported on the M I/O Aggregator.**

**Related Commands**

- \texttt{monitor session} — enables a monitoring session.

---

**monitor session**

Create a session for monitoring traffic with port monitoring.

**Syntax**

\texttt{monitor session \textit{session-ID}}

To delete a session, use the \texttt{no monitor session \textit{session-ID}} command.

To delete all monitor sessions, use the \texttt{no monitor session all} command.

**Parameters**

- **session-ID**
  Enter a session identification number. The range is from 0 to 65535.

**Defaults**

- none

**Command Modes**

CONFIGURATION

**Command History**

- **Supported on M I/O Aggregator**

**Usage Information**

The \texttt{monitor} command is saved in the running configuration at Monitor Session mode level and can be restored after a chassis reload.

**Example**

```
Dell(conf)# monitor session 60
Dell(conf-mon-sess-60)
```
Related Command

- `show monitor session` — Displays the monitor session.
- `show running-config monitor session` — Displays the running configuration of a monitor session.

**show config**

Display the current monitor session configuration.

**Syntax**

```
show config
```

**Defaults**

none

**Command Modes**

MONITOR SESSION (conf-mon-sess-session-ID)

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

Dell(conf-mon-sess-5)#show config
!
monitor session 5
source TenGigabitEthernet 0/4 destination TenGigabitEthernet 0/43 direction rx
Dell(conf-mon-sess-5)#

**show monitor session**

Display the monitor information of a particular session or all sessions.

**Syntax**

```
show monitor session {session-ID}
```

To display monitoring information for all sessions, use the `show monitor session` command.

**Parameters**

- `session-ID` (OPTIONAL) Enter a session identification number. The range is from 0 to 65535.

**Defaults**

none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.
Example

```
Dell#show monitor session 5
SessionID Source   Destination Direction Mode      Type
--------- ------   ----------- --------- ----      ----
        Te 0/4  Te 0/43       rx     interface  Port-based
Dell#
```

Related Commands

- `monitor session` — creates a session for monitoring.

**show running-config monitor session**

Displays the running configuration of all monitor sessions or a specific session.

**Syntax**

```
show running-config monitor session {session-ID}
```

To display the running configuration for all monitor sessions, use the `show running-config monitor session` command.

**Parameters**

- `session-ID` (OPTIONAL) Enter a session identification number. The range is from 0 to 65535.

**Defaults**

- none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

**Usage Information**

The `monitoring` command is saved in the running configuration at the Monitor Session mode level and can be restored after a chassis reload.

**Example**

```
Dell#show run monitor session
!
monitor session 5
  source TenGigabitEthernet 0/4 destination TenGigabitEthernet 0/43 direction rx
!
monitor session 20
  source TenGigabitEthernet 0/3 destination TenGigabitEthernet 0/42 direction both
Dell#
Dell#show run monitor session 20
!
monitor session 20
  source TenGigabitEthernet 0/3 destination TenGigabitEthernet 0/42 direction both
Dell#
```

Related Commands

- `monitor session` — creates a session for monitoring.
**show monitor session**—displays a monitor session.

### source (port monitoring)

Configure a port monitor source.

**Syntax**

```
source interface destination interface direction {rx | tx | both}
```

To disable a monitor source, use the `no source interface destination interface direction {rx | tx | both}` command.

**Parameters**

- **interface**
  - Enter the one of the following keywords and slot/port information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- **destination**
  - Enter the keyword `destination` to indicate the interface destination.

- **direction (rx | tx | both)**
  - Enter the keyword `direction` followed by one of the packet directional indicators.
    - `rx`: to monitor receiving packets only.
    - `tx`: to monitor transmitting packets only.
    - `both`: to monitor both transmitting and receiving packets.

**Defaults**

none

**Command Modes**

MONITOR SESSION (conf-mon-sess-session-ID)

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

```
Dell(conf-mon-sess-11)#source tengig 10/0 destination tengig 10/47 direction rx
Dell(conf-mon-sess-11)#
```

**Usage Information**

The monitored (source) interface must be a server-facing interface in the format slot/port, where valid slot numbers are 0-1 and server-facing port numbers are from 1 to 32.
Quality of Service (QoS)

The Dell Networking OS commands for quality of service (QoS) include traffic conditioning and congestion control.

This chapter contains the following section:

- Policy-Based QoS Commands

Policy-Based QoS Commands

Policy-based traffic classification is handled with class maps. These maps classify unicast traffic into one of four classes. The system allows you to match multiple class maps and specify multiple match criteria. Policy-based QoS is not supported on logical interfaces, such as port-channels, VLANs, or Loopbacks.

The commands are:

- `show qos statistics`
- `show qos dot1p-queue-mapping`

show qos statistics

View QoS statistics.

```
Syntax
    show qos statistics [interface]

Parameters
    interface
        • For a Ten-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.

Defaults
    none

Command Modes
    • EXEC
    • EXEC Privilege

Command History
    Version 8.3.17.0 Supported on the M I/O Aggregator.

Example
    Dell#show qos statistics
    Interface Te 0/20
    Queue# Matched Pkts
    0 0
```
Usage Information

The following describes the `show qos statistics` command in the following example.

<table>
<thead>
<tr>
<th>Field (ED and EE)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queue #</td>
<td>Queue Number</td>
</tr>
<tr>
<td>Matched Pkts</td>
<td>The number of packets that matched the class-map criteria.</td>
</tr>
</tbody>
</table>

**NOTE:** When you configure `trust`, matched packet counters are not incremented in this field.

### show qos dot1p-queue-mapping

View dot1p to queue mapping.

**Syntax**
```
show qos dot1p-queue-mapping
```

**Defaults**
none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Example**
```
Dell#show qos dot1p-queue-mapping
Dot1p Priority : 0 1 2 3 4 5 6 7
    Queue : 0 0 0 1 2 3 3 3
Dell#
```
Security for M I/O Aggregator

Security features are supported on the M I/O Aggregator.
This chapter describes several ways to provide access security to the Dell Networking system.

For details about all the commands described in this chapter, refer to the Security chapter in the Dell Networking OS Command Reference Guide.

AAA Accounting Commands

AAA Accounting enables tracking of services that users are accessing and the amount of network resources being consumed by those services. When you enable AAA Accounting, the network server reports user activity to the TACACS+ security server in the form of accounting records. Each accounting record is comprised of accounting AV pairs and is stored on the access control server.

As with authentication and authorization, you must configure AAA Accounting by defining a named list of accounting methods, and then applying that list to various interfaces.

aaa accounting

Enable AAA Accounting and create a record for monitoring the accounting function.

Syntax

```
aaa accounting {system | exec | commands level} {name | default}{start-stop | wait-start | stop-only} {tacacs+}
```

To disable AAA Accounting, use the `no aaa accounting {system | exec | commands level} {name | default}{start-stop | wait-start | stop-only} {tacacs+} command`.

Parameters

- `system`: Enter the keyword `system` to send accounting information of any other AAA configuration.
- `exec`: Enter the keyword `exec` to send accounting information when a user has logged in to EXEC mode.
- `commands level`: Enter the keyword `command` then a privilege level for accounting of commands executed at that privilege level.
- `name | default`: Enter one of the following:
  - For `name`, enter a user-defined name of a list of accounting methods.
For default, the default accounting methods used.

- **start-stop**: Enter the keywords `start-stop` to send a "start accounting" notice at the beginning of the requested event and a "stop accounting" notice at the end of the event.

- **wait-start**: Enter the keywords `wait-start` to ensure that the TACACS+ security server acknowledges the start notice before granting the user’s process request.

- **stop-only**: Enter the keywords `stop-only` to instruct the TACACS+ security server to send a "stop record accounting" notice at the end of the requested user process.

- **tacacs+**: Enter the keyword `tacacs+` to use TACACS+ data for accounting. Dell Networking OS currently only supports TACACS+ accounting.

**Defaults**

- none

**Command Modes**

- CONFIGURATION

**Command History**

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

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

- **Version 9.4(0.0)**
  - Introduced on the I/O Aggregator.

- **Version 9.0.2.0**
  - Introduced on the S6000.

- **Version 8.3.19.0**
  - Introduced on the S4820T.

- **Version 8.3.11.1**
  - Introduced on the Z9000.

- **Version 8.3.7.0**
  - Introduced on the S4810.

- **Version 7.6.1.0**
  - Introduced on the S-Series.

- **Version 7.5.1.0**
  - Introduced on the C-Series.

- **Version 6.3.1.0**
  - Introduced on the E-Series.

**Usage Information**

In the example above, TACACS+ accounting is used to track all usage of EXEC command and commands on privilege level 15.

Privilege level 15 is the default. If you want to track usage at privilege level 1 for example, use the `aaa accounting command 1` command.

**Example**

```plaintext
Dell(conf)# aaa accounting exec default start-stop tacacs+
Dell(conf)# aaa accounting command 15 default start-stop tacacs+
```

Dell(config)#
**aaa accounting suppress**

Prevent the generation of accounting records of users with the user name value of NULL.

**Syntax**

```
aaa accounting suppress null-username
```

To permit accounting records to users with user name value of NULL, use the `no aaa accounting suppress null-username` command.

**Defaults**

Accounting records are recorded for all users.

**Command Modes**

CONFIGURATION

**Command History**

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

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

- **Version 9.4.0.0**
  - Introduced on the I/O Aggregator.
- **Version 9.0.2.0**
  - Introduced on the S6000.
- **Version 8.3.19.0**
  - Introduced on the S4280T.
- **Version 8.3.11.1**
  - Introduced on the Z9000.
- **Version 8.3.7.0**
  - Introduced on the S4810.
- **Version 7.6.1.0**
  - Introduced on the S-Series.
- **Version 7.5.1.0**
  - Introduced on the C-Series.
- **Version 6.3.1.0**
  - Introduced on the E-Series.

**Usage Information**

Dell Networking OS issues accounting records for all users on the system, including users whose username string, due to protocol translation, is NULL. For example, a user who comes on line with the `aaa authentication login method-list none` command is applied. To prevent the accounting records from being generated for sessions that do not have user names associated to them, use the `aaa accounting suppress` command.
**show accounting**

Display the active accounting sessions for each online user.

**Syntax**

```
show accounting
```

**Defaults**

```
none
```

**Command Modes**

```
EXEC
```

**Command History**

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

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

- **Version 9.4(0.0)**
  Introduced on the I/O Aggregator.
- **Version 9.0.2.0**
  Introduced on the S6000.
- **Version 8.3.19.0**
  Introduced on the S4820T.
- **Version 8.3.11.1**
  Introduced on the Z9000.
- **Version 8.3.7.0**
  Introduced on the S4810.
- **Version 7.6.1.0**
  Introduced on the S-Series.
- **Version 7.5.1.0**
  Introduced on the C-Series.
- **Version 6.3.1.0**
  Introduced on the E-Series.

**Usage Information**

This command steps through all active sessions and then displays the accounting records for the active account functions.

**Example**

```
Dell#show accounting
Active accounted actions on tty2, User admin Priv 1
   Task ID 1, EXEC Accounting record, 00:00:39 Elapsed,
   service=shell
Active accounted actions on tty3, User admin Priv 1
   Task ID 2, EXEC Accounting record, 00:00:26 Elapsed,
   service=shell
Dell#
```

**Related Commands**

- `aaa accounting` — enables AAA Accounting and creates a record for monitoring the accounting function.

---

**Authentication and Password Commands**

This section contains the following commands controlling management access to the system:

- `enable password`
aaa authentication enable

Configure AAA Authentication method lists for user access to EXEC privilege mode (the “Enable” access).

**Syntax**

```plaintext
aaa authentication enable {default | method-list-name} method [... method2]  
```

To return to the default setting, use the no aaa authentication enable  
(default | method-list-name) method [... method2] command.

**Parameters**

- **default**
  - Enter the keyword default then the authentication methods to use as the default sequence of methods for the Enable login. The default is default enable.

- **method-list-name**
  - Enter a text string (up to 16 characters long) to name the list of enabled authentication methods activated at login.

- **method**
  - Enter one of the following methods:
    - `enable`: use the password the enable password command defines in CONFIGURATION mode.
    - `line`: use the password the password command defines in LINE mode.
    - `none`: no authentication.
    - `radius`: use the RADIUS servers configured with the radius-server host command.
    - `tacacs+`: use the TACACS+ server(s) configured with the tacacs-server host command.

- **... method2**
  - (OPTIONAL) In the event of a "no response" from the first method, Dell Networking Operating System (OS) applies the next configured method.

**Defaults**

Use the enable password.

**Command Modes**

CONFIGURATION

**Command History**

Version 9.3(0.0) 
Introduced on the M I/O Aggregator.

**Usage Information**

By default, the Enable password is used. If you configure `aaa authentication enable default`, Dell Networking Operating System (OS) uses the methods defined for Enable access instead.
Methods configured with the `aaa authentication enable` command are evaluated in the order they are configured. If authentication fails using the primary method, Dell Networking Operating System (OS) employs the second method (or third method, if necessary) automatically. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell Networking OS proceeds to the next authentication method. The TACACS+ is incorrect, but the user is still authenticated by the secondary method.

**Related Commands**

- `enable password` — changes the password for the `enable` command.
- `login authentication` — enables AAA login authentication on the terminal lines.
- `radius-server host` — specifies a RADIUS server host.
- `tacacs-server host` — specifies a TACACS+ server host.

### aaa authentication login

Configure AAA Authentication method lists for user access to EXEC mode (Enable log-in).

**Syntax**

```
aaa authentication login {method-list-name | default} method [... method4]
```

To return to the default setting, use the `no aaa authentication login {method-list-name | default}` command.

**Parameters**

- `method-list-name` Enter a text string (up to 16 characters long) as the name of a user-configured method list that can be applied to different lines.
- `default` Enter the keyword `default` to specify that the method list specified is the default method for all terminal lines.
- `method` Enter one of the following methods:
  - `enable`: use the password the `enable password` command defines in CONFIGURATION mode.
  - `line`: use the password the `password` command defines in LINE mode.
  - `none`: no authentication.
  - `radius`: use the RADIUS servers configured with the `radius-server host` command.
  - `tacacs+`: use the TACACS+ servers configured with the `tacacs-server host` command.
- `... method4` (OPTIONAL) Enter up to four additional methods. In the event of a “no response” from the first method, Dell Networking Operating System (OS) applies the next configured method (up to four configured methods).
By default, the locally configured username password is used. If you configure `aaa authentication login default`, Dell Networking Operating System (OS) uses the methods this command defines for login instead.

Methods configured with the `aaa authentication login` command are evaluated in the order they are configured. If users encounter an error with the first method listed, Dell Networking Operating System (OS) applies the next method configured. If users fail the first method listed, no other methods are applied. The only exception is the local method. If the user’s name is not listed in the local database, the next method is applied. If the correct user name/password combination is not entered, the user is not allowed access to the switch.

**NOTE:** If authentication fails using the primary method, Dell Networking Operating System (OS) employs the second method (or third method, if necessary) automatically. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell Networking Operating System (OS) proceeds to the next authentication method. The TACACS+ is incorrect, but the user is still authenticated by the secondary method.

After configuring the `aaa authentication login` command, configure the `login authentication` command to enable the authentication scheme on terminal lines.

Connections to the SSH server work with the following login mechanisms: local, radius, and tacacs.

**Related Commands**

- `login authentication` — enables AAA login authentication on the terminal lines.
- `radius-server host` — specifies a RADIUS server host.
- `tacacs-server host` — specifies a TACACS+ server host.

**banner exec**

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

**Syntax**

```
banner exec c line c
```

To delete a banner, use the `no banner exec` command.
Enter the keywords `banner exec`, then enter a character delineator, represented here by the letter `c`. Press `ENTER`.

Enter a text string for your banner message ending the message with your delineator. In the following example, the delineator is a percent character (`%`); the banner message is “testing, testing”.

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

Dell(conf)#banner exec ?
LINE c banner-text c, where 'c' is a delimiting character
Dell(conf)#banner exec %
Enter TEXT message. End with the character '%'.
This is the banner%
Dell(conf)#end
Dell#exit
4d21h5m: %RPM0-P:CP %SEC-5-LOGOUT: Exec session is terminated for user on line console
This is the banner
Dell con0 now available
Press RETURN to get started.
4d21h6m: %RPM0-P:CP %SEC-5-LOGIN_SUCCESS: Login successful for user on line console
This is the banner
Dell>

**Related Commands**

- `banner login` — sets a banner for login connections to the system.
- `banner motd` — sets a Message of the Day banner.
- `exec-banner` — enables the display of a text string when you enter EXEC mode.
- `line` — enables and configures the console and virtual terminal lines to the system.
**banner login**

Set a banner to display when logging on to the system.

**Syntax**

```
banner login {keyboard-interactive | no keyboard-interactive} [c line c]
```

**Parameters**

- **keyboard-interactive**
  - Enter the keyword `keyboard-interactive` to require a carriage return (CR) to get the message banner prompt.

- **c**
  - Enter a delineator character to specify the limits of the text banner. The delineator is a percent character (%).

- **line**
  - Enter a text string for your text banner message ending the message with your delineator. The delineator is a percent character (%). Range: maximum of 50 lines, up to 255 characters per line.

**Defaults**

No banner is configured and the CR is required when creating a banner.

**Command Modes**

CONFIGURATION

**Command History**

Version 9.3(0.0)  Introduced on the M I/O Aggregator.

**Usage Information**

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

**Example**

```
Dell(conf)#banner login?
keyboard-interactive Press enter key to get prompt
LINE c banner-text c, where 'c' is a delimiting character
Dell(conf)#no banner login?
keyboard-interactive Prompt will be displayed by default <cr>
Dell(conf)#banner login keyboard-interactive

Enter TEXT message. End with the character '%'.
This is the banner%
Dell(conf)#end
Dell#exit

13d21h9m: %RPM0-P:CP %SEC-5-LOGOUT: Exec session is terminated for user on line console

This is the banner

Dell con0 now available

Press RETURN to get started.
13d21h10m: %RPM0-P:CP %SEC-5-LOGIN_SUCCESS: Login successful for user on line console
This is the banner
Dell>
```
Related Commands

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

### banner motd

Set a message of the day (MOTD) banner.

**Syntax**

```
banner motd c line c
```

**Parameters**

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

**Defaults**

No banner is configured.

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.3(0.0)**
  - Introduced on the M I/O Aggregator.

**Usage Information**

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

**Related Commands**

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

### debug radius

View RADIUS transactions to assist with troubleshooting.

**Syntax**

```
debug radius
```

To disable debugging of RADIUS, use the `no debug radius` command.

**Defaults**

Disabled.
debug tacacs+

To assist with troubleshooting, view TACACS+ transactions.

Syntax  

```
debug tacacs+
```

To disable debugging of TACACS+, use the `no debug tacacs+` command.

Defaults  

Disabled.

Command Modes  

EXEC Privilege

Command History  

Version 9.3.0.0  
Introduced on the M I/O Aggregator.

exec-banner

Enable the display of a text string when the user enters EXEC mode.

Syntax  

```
exec-banner
```

To disable the banner on terminal lines, use the `no exec-banner` command.

Defaults  

Enabled on all lines (if configured, the banner appears).

Command Modes  

LINE

Command History  

Version 9.3.  
Introduced on the M I/O Aggregator.

Usage Information  

Optionally, use the `banner exec` command to create a text string that is displayed when you access EXEC mode. This command toggles that display.

Related Commands  

`banner exec` — configures a banner to display when entering EXEC mode.

`line` — enables and configures console and virtual terminal lines to the system.
ip radius source-interface

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

Syntax

```
ip radius source-interface interface
```

To delete a source interface, use the `no ip radius source-interface` command.

Parameters

- `interface` Enter the following keywords and slot/port or number information:
  - For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
  - For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
  - For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838.
  - For the Null interface, enter the keywords `null 0`.
  - For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
  - For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
  - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
  - For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

- CONFIGURATION

Command History

- Version 9.3.(0.0) Introduced on the M I/O Aggregator.

ip tacacs source-interface

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

Syntax

```
ip tacacs source-interface interface
```

To delete a source interface, use the `no ip tacacs source-interface` command.

Parameters

- `interface` Enter the following keywords and slot/port or number information:
For a 100/1000 Ethernet interface, enter the keyword GigabitEthernet then the slot/port information.

For a Gigabit Ethernet interface, enter the keyword GigabitEthernet then the slot/port information.

For Loopback interfaces, enter the keyword loopback then a number from zero (0) to 16838.

For the Null interface, enter the keywords null 0.

For a Port Channel interface, enter the keywords port-channel then a number. The range is from 1 to 128.

For a ten-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.

For a forty-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.

For VLAN interface, enter the keyword vlan then a number from 1 to 4094.

Defaults
Not configured.

Command Modes
CONFIGURATION

Command History
Version 9.3.(0.0) Introduced on the M I/O Aggregator.

login authentication

To designate the terminal lines, apply an authentication method list.

Syntax
login authentication {method-list-name | default}

To use the local user/password database for login authentication, use the no login authentication command.

Parameters
- **method-list-name**
  - Enter the keywords method-list-name to specify that method list, created in the aaa authentication login command, to be applied to the designated terminal line.

- **default**
  - Enter the keyword default to specify that the default method list, created in the aaa authentication login command, is applied to the terminal line.

Defaults
No authentication is performed on the console lines. Local authentication is performed on the virtual terminal and auxiliary lines.

Command Modes
LINE

Security for M I/O Aggregator 241
RADIUS Commands

The following RADIUS commands are supported by Dell Networking Operating System (OS).

radius-server deadtime

Configure a time interval during which non-responsive RADIUS servers to authentication requests are skipped.

Syntax

radius-server deadtime seconds

To disable this function or return to the default value, use the no radius-server deadtime command.

Parameters

seconds

Enter a number of seconds during which non-responsive RADIUS servers are skipped. The range is from 0 to 2147483647 seconds. The default is 0 seconds.

Defaults

0 seconds

Command Modes

CONFIGURATION

Command History

Version 9.3(0.0) Introduced on the M I/O Aggregator.

radius-server host

Configure a RADIUS server host.

Syntax

radius-server host {hostname | ipv4-address | ipv6-address} [auth-port port-number] [retransmit retries] [timeout seconds] [key [encryption-type] key]
### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>hostname</strong></td>
<td>Enter the name of the RADIUS server host.</td>
</tr>
<tr>
<td>ipv4-address</td>
<td>Enter the IPv4 address (A.B.C.D) or IPv6 address (X::X::X::X) of the RADIUS server host.</td>
</tr>
<tr>
<td><strong>auth-port</strong></td>
<td><strong>port-number</strong> (OPTIONAL) Enter the keywords auth-port then a number as the port number. The range is from zero (0) to 65535. The default port-number is <strong>1812</strong>.</td>
</tr>
<tr>
<td><strong>retransmit</strong></td>
<td><strong>retries</strong> (OPTIONAL) Enter the keyword retransmit then a number as the number of attempts. This parameter overwrites the radius-server retransmit command. The range is from zero (0) to 100. The default is <strong>3 attempts</strong>.</td>
</tr>
<tr>
<td><strong>timeout</strong></td>
<td><strong>seconds</strong> (OPTIONAL) Enter the keyword timeout then the seconds the time interval the switch waits for a reply from the RADIUS server. This parameter overwrites the radius-server timeout command. The range is from 0 to 1000. The default is <strong>5 seconds</strong>.</td>
</tr>
</tbody>
</table>
| **key** | (OPTIONAL) Enter the keyword key then an optional encryption-type and a string up to 42 characters long as the authentication key. The RADIUS host server uses this authentication key and the RADIUS daemon operating on this switch. For the encryption-type, enter either zero (0) or 7 as the encryption type for the key entered. The options are:  
  - 0 is the default and means the password is not encrypted and stored as clear text.  
  - 7 means that the password is encrypted and hidden. Configure this parameter last because leading spaces are ignored. |

**Defaults**

Not configured.

**Command Modes**

CONFIGURATION

**Command History**

**Version 9.3(0.0)** Introduced on the M I/O Aggregator.

**Usage Information**

To configure any number of RADIUS server hosts for each server host that is configured, use this command. Dell Networking Operating System (OS) searches for the RADIUS hosts in the order they are configured in the software.

The global default values for the **timeout**, retransmit, and **key** optional parameters are applied, unless those values are specified in the radius-server host or other commands. To return to the global default values, if you configure...
the timeout, retransmit, or key values, include those keywords when using the no radius-server host command syntax.

Related Commands

- **login authentication** — sets the database to be checked when a user logs in.
- **radius-server retransmit** — sets the number of times the RADIUS server attempts to send information.
- **radius-server timeout** — sets the time interval before the RADIUS server times out.

### radius-server retransmit

Configure the number of times the switch attempts to connect with the configured RADIUS host server before declaring the RADIUS host server unreachable.

**Syntax**

```
radius-server retransmit retries
```

To configure zero retransmit attempts, use the `no radius-server retransmit` command.

To return to the default setting, use the `radius-server retransmit 3` command.

**Parameters**

- **retries**

**Defaults**

3 retries

**Command Modes**

CONFIGURATION

**Command History**

Version 9.3(0.0) Introduced on the M I/O Aggregator.

**Related Commands**

- **radius-server host** — configures a RADIUS host.

### radius-server timeout

To reply to a request, configure the amount of time the RADIUS client (the switch) waits for a RADIUS host server.

**Syntax**

```
radius-server timeout seconds
```

To return to the default value, use the `no radius-server timeout` command.
Parameters

| seconds | Enter the number of seconds between an unsuccessful attempt and the radius-server timeout times out. The range is from zero (0) to 1000 seconds. The default is 5 seconds. |

Defaults

| 5 seconds |

Command Modes

| CONFIGURATION |

Command History

| Version 9.3(0.0) | Introduced on the M I/O Aggregator. |

Related Commands

| radius-server host | — configures a RADIUS host. |

radius-server key

Configure a key for all RADIUS communications between the switch and the RADIUS host server.

Syntax

```
radius-server key [encryption-type] key
```

To delete a password, use the `no radius-server key` command.

Parameters

<table>
<thead>
<tr>
<th>encryption-type</th>
<th>(OPTIONAL) Enter either zero (0) or 7 as the encryption type for the key entered. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 0 is the default and means the key is not encrypted and stored as clear text.</td>
</tr>
<tr>
<td></td>
<td>• 7 means that the key is encrypted and hidden.</td>
</tr>
</tbody>
</table>

| key | Enter a string that is the key to be exchanged between the switch and RADIUS servers. It can be up to 42 characters long. |

Defaults

| Not configured. |

Command Modes

| CONFIGURATION |

Command History

| Version 9.3(0.0) | Introduced on the M I/O Aggregator. |

Usage Information

The key configured on the switch must match the key configured on the RADIUS server daemon.

If you configure the `key` parameter in the `radius-server host` command, the key configured with the `radius-server key` command is the default key for all RADIUS communications.
show privilege

View your access level.

**Syntax**

```plaintext
show privilege
```

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

- **Version 9.3(0.0)** Introduced on the M I/O Aggregator.

**Example**

```plaintext
Dell#show privilege
Current privilege level is 15
Dell#
```

### Suppressing AAA Accounting for Null Username Sessions

When you activate AAA accounting, the Dell Networking OS software issues accounting records for all users on the system, including users whose username string, because of protocol translation, is NULL. An example of this is a user who comes in on a line where the AAA authentication `login method-list none` command is applied. To prevent accounting records from being generated for sessions that do not have usernames associated with them, use the following command.

- Prevent accounting records from being generated for users whose username string is NULL.

  ```plaintext
  CONFIGURATION mode
  aaa accounting suppress null-username
  ```

### TACACS+ Commands

Dell Networking OS supports TACACS+ as an alternate method for login authentication.
**tacacs-server host**

Specify a TACACS+ host.

**Syntax**

```
tacacs-server host {hostname | ipv4-address | ipv6-address} [port number] [timeout seconds] [key key]
```

**Parameters**

- **hostname**
  - Enter the name of the TACACS+ server host.

- **ipv4-address | ipv6-address**
  - Enter the IPv4 address (A.B.C.D) or IPv6 address (X::X::X::X) of the TACACS+ server host.

- **port number**
  - (OPTIONAL) Enter the keyword port then a number as the port to be used by the TACACS+ server. The range is from zero (0) to 65535. The default is **49**.

- **timeout seconds**
  - (OPTIONAL) Enter the keyword timeout then the number of seconds the switch waits for a reply from the TACACS+ server. The range is from 0 to 1000. The default is **10 seconds**.

- **key key**
  - (OPTIONAL) Enter the keyword key then a string up to 42 characters long as the authentication key. This authentication key must match the key specified in the `tacacs-server key` for the TACACS+ daemon.

**Defaults**

Not configured.

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.3(0.0)**
  - Introduced on the M I/O Aggregator.

**Usage Information**

To list multiple TACACS+ servers to be used by the `aaa authentication login` command, configure this command multiple times.

If you are not configuring the switch as a TACACS+ server, you do not need to configure the `port`, `timeout` and `key` optional parameters. If you do not configure a key, the key assigned in the `tacacs-server key` command is used.

**Related Commands**

- `aaa authentication login` — specifies the login authentication method.
- `tacacs-server key` — configures a TACACS+ key for the TACACS server.
**tacacs-server key**

Configure a key for communication between a TACACS+ server and a client.

**Syntax**

```
tacacs-server key [encryption-type] key
```

To delete a key, use the `no tacacs-server key key` command.

**Parameters**

- `encryption-type` (OPTIONAL) Enter either zero (0) or 7 as the encryption type for the key entered. The options are:
  - 0 is the default and means the key is not encrypted and stored as clear text.
  - 7 means that the key is encrypted and hidden.

- `key` Enter a text string, up to 42 characters long, as the clear text password. Leading spaces are ignored.

**Defaults**
Not configured.

**Command Modes**
CONFIGURATION

**Command History**
Version 9.3.(0.0) Introduced on the M I/O Aggregator.

**Usage Information**
The key configured with this command must match the key configured on the TACACS+ daemon.

**timeout login response**

Specify how long the software waits for the login input (for example, the user name and password) before timing out.

**Syntax**

```
timeout login response seconds
```

To return to the default values, use the `no timeout login response` command.

**Parameters**

- `seconds` Enter a number of seconds the software waits before logging you out. The range is:
  - VTY: the range is from 1 to 30 seconds, the default is **30 seconds**.
  - Console: the range is from 1 to 300 seconds, the default is **0 seconds** (no timeout).
• AUX: the range is from 1 to 300 seconds, the default is 0 seconds (no timeout).

Defaults

See the defaults settings shown in Parameters.

Command Modes

LINE

Command History

Version 9.3.0.0 Introduced on the M I/O Aggregator.

Usage Information

The software measures the period of inactivity defined in this command as the period between consecutive keystrokes. For example, if your password is “password” you can enter “p” and wait 29 seconds to enter the next letter.

SSH Server and SCP Commands

The Dell Networking OS supports secure shell (SSH) protocol versions 1.5 and 2.0. SSH is a protocol for secure remote login over an insecure network. SSH sessions are encrypted and use authentication. The SSH and SCP commands are:

• show ip ssh
• show ip ssh client-pub-keys
• show ip ssh rsa-authentication
• ssh

enable password

Change the password for the enable command.

Syntax

enable password [level level] [encryption-type] password

To delete a password, use the no enable password [encryption-type] password [level level] command.

Parameters

level level

(Optional) Enter the keyword level followed by a number as the level of access. The range is from 1 to 15.

encryption-type

(Optional) Enter the number 7 or 0 as the encryption type.

Enter a 7 followed by a text string as the hidden password. The text string must be a password that was already encrypted by a Dell Networking router. Use this parameter only with a password that you copied from the show running-config file of another Dell Networking router.

Enter a 0 followed by 64 ASCII characters as the hidden password. The text string cannot contain any space characters. Use this parameter only with a password that you copied from the show running-config file of another Dell Networking router.
password

Enter a text string, up to 32 characters long, as the clear text password.

Defaults
No password is configured. level = 15.

Command Modes
CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

Use this command to define a password for a level.

Passwords must meet the following criteria:

- Start with a letter, not a number.
- Passwords can have a regular expression as the password. To create a password with a regular expression in it, use CNTL + v prior to entering regular expression. For example, to create the password `abcd\]e`, you type `abcd CNTL \]e`. When the password is created, you do not use the CNTL + v key combination and enter `abcd\]e`.

NOTE: The question mark (?) and the tilde (~) are not supported characters.

Related Commands

show running-config — views the current configuration.

enable restricted

Allows Dell Networking technical support to access restricted commands.

Syntax

```
enable restricted [encryption-type] password
```

To disallow access to restricted commands, use the no enable restricted command.

Parameters

- `encryption-type` (OPTIONAL) Enter the number 7 as the encryption type. Enter 7 followed a text string as the hidden password. The text string must be a password that was already encrypted by a Dell Networking router. Use this parameter only with a password that you copied from the show running-config file of another Dell Networking router.

- `password` Enter a text string, up to 32 characters long, as the clear text password.
enable ioa-debug

Enable IOA debug-level commands.

NOTE: This command has been deprecated in Dell Networking OS version 9.2(0.0).

Syntax

```
enable ioa-debug
```

To disable SMUX debug, use `no enable ioa-debug` command.

Command Modes

Not configured.

Command History

- **Version 8.3.17.0**: Supported on the M I/O Aggregator.
- **Version 9.2(0.0)**: Deprecated command

service password-encryption

Encrypt all passwords configured in Dell Networking OS.

Syntax

```
service password-encryption
```

To store new passwords as clear text, use the `no service password-encryption` command.

Defaults

Enabled.

Command Modes

CONFIGURATION

Command History

- **Version 8.3.17.0**: Supported on the M I/O Aggregator.

Usage Information

CAUTION: Encrypting passwords with this command does not provide a high level of security. When the passwords are encrypted, you cannot return them to plain text unless you re-configure them. To remove an encrypted password, use the `no password password` command.

To keep unauthorized people from viewing passwords in the switch configuration file, use the `service password-encryption` command. This command
encrypts the clear-text passwords created for user name passwords, authentication
key passwords, the privileged command password, and console and virtual
terminal line access passwords.

To view passwords, use the `show running-config` command.

**show ip ssh**

Display information about established SSH sessions.

**Syntax**

```
show ip ssh
```

**Command Modes**

- EXEC
- EXEC Privilege

**Example**

```
Dell#show ip ssh
2#show ip ssh
SSH server : disabled.
SSH server version : v1 and v2.
Password Authentication : enabled.
Hostbased Authentication : disabled.
RSA Authentication : disabled.
Dell#
```

**Related Commands**

- `show ip ssh client-pub-keys` — displays the client-public keys.

**show ip ssh client-pub-keys**

Displays the client public keys used in host-based authentication

**Syntax**

```
show ip ssh client-pub-keys
```

**Defaults**

none

**Command Modes**

EXEC

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

This command displays the contents of the flash://ADMIN_DIRssh/
knownhosts file.

**Example**

```
Dell#show ip ssh client-pub-keys
poclab4,123.12.1.123 ssh-rsa AAAAB3NzaC1yc2EAAAABIAwAAAIEAox/QQp8xh2zOxn07y4VGPACuUfgKoiTH09G4nNV+ui
+DWEc3cgYAcU5LailMU2ODrzhCwyDNP05tKBU3tReG1
o8AxLi6+S4hyEMqHzkzBFNVqHzpQc
```

Security for M I/O Aggregator
**show ip ssh rsa-authentication**

Displays the authorized-keys for the RSA authentication.

**Syntax**

```
show ip ssh rsa-authentication {my-authorized-keys}
```

**Parameters**

- `my-authorized-keys` Display the RSA authorized keys.

**Defaults**

none

**Command Modes**

EXEC

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**

This command displays the contents of the flash:/ADMIN_DIR/ssh/authorized-keys.username file.

**Example**

```
Dell#show ip ssh rsa-authentication my-authorized-keys
ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAyB17l4gFp4r2DRHIvMc1VZd0Sg5GQxRV1y1X1JOMeO6Nd0WuYyzrQMM4qJAcBwtne0XfLBCf3V2hcMIqaZN+CRCnw/zCMlncf0+qVTdloofsea5r09kS0xTIp0CNfHZ3NuGCq90v33m9+U9tMwhSvyy8AVx4d4km3e5t5vce=
freedom@poclab4
Dell#
```

**show users**

Allows you to view information on all users logged in to the switch.

**Syntax**

```
show users [all]
```

**Parameters**

- `all` (OPTIONAL) Enter the keyword all to view all terminal lines in the switch.

**Command Modes**

EXEC Privilege
Command History

Version 8.3.17.0
Supported on the M I/O Aggregator.

Usage Information

The following describes the show user command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(untitled)</td>
<td>Indicates with an asterisk (*) which terminal line you are using.</td>
</tr>
<tr>
<td>Line</td>
<td>Displays the terminal lines currently in use.</td>
</tr>
<tr>
<td>User</td>
<td>Displays the user name of all users logged in.</td>
</tr>
<tr>
<td>Host(s)</td>
<td>Displays the terminal line status.</td>
</tr>
<tr>
<td>Location</td>
<td>Displays the IP address of the user.</td>
</tr>
</tbody>
</table>

Example

Dell#show user
Line    User        Host(s)       Location
0 console 0  admin        idle
* 3 vty   1  admin        idle
172.31.1.4
Dell#

Related Commands

ssh — enables a user.

ssh

Open an SSH connection specifying the host name, username, port number and version of the SSH client.

Dell Networking OS supports both inbound and outbound SSH sessions using IPv4 addressing. Inbound SSH supports accessing the system through the management interface as well as through a physical Layer 3 interface.

Syntax

ssh {hostname | ipv4 address} [-l username | -p port-number][-v {1|2}]

Parameters

- hostname (OPTIONAL) Enter the IP address or the host name of the remote device.
- ipv4 address (OPTIONAL) Enter the IP address in dotted decimal format A.B.C.D.
- l username (OPTIONAL) Enter the keyword -l followed by the user name used in this SSH session. The default is the user name of the user associated with the terminal.
- p port-number (OPTIONAL) Enter the keyword -p followed by the port number. The range is from 1 to 65536. The default is 22.
-v {1 | 2} (OPTIONAL) Enter the keyword -v then the SSH version 1 or 2. The default is the version from the protocol negotiation.

Defaults
As shown in the Parameters section.

Command Modes
EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.

Example
Dell#ssh 123.12.1.123 -l ashwani -p 5005 -v 2

username
Establish an authentication system based on user names.

Syntax
username name access-list-name [nopassword | {password | secret} [encryption-type] password] [privilege level]

If you do not want a specific user to enter a password, use the nopassword option.

To delete authentication for a user, use the no username name command.

Parameters
name Enter a text string for the name of the user up to 63 characters.
access-list-name Enter the name of a configured access control list (either an IP access control list or MAC access control list).
nopassword Enter the keyword nopassword to specify that the user should not enter a password.
password Enter the keyword password followed by the encryption-type or the password.
secret Enter the keyword secret followed by the encryption-type or the password.

encryption-type Enter an encryption type for the password that you enter.

• 0 directs Dell Networking OS to store the password as clear text. It is the default encryption type when using the password option.
• 7 to indicate that a password encrypted using a DES hashing algorithm follows. This encryption type is available with the password option only.
• 5 to indicate that a password encrypted using an MD5 hashing algorithm follow. This encryption type is available with the secret option only, and is the default encryption type for this option.
**password** Enter a string up to 32 characters long.

**privilege level** Enter the keyword `privilege` then a number from zero (0) to 15.

**secret** Enter the keyword `secret` then the encryption type.

**Defaults**
The default encryption type for the `password` option is 0. The default encryption type for the `secret` option is 0.

**Command Modes**
CONFIGURATION

**Command History**
Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**
To view the defined user names, use the `show running-config user` command.

**Related Commands**
- `service password-encryption` — specifies a password for users on terminal lines.
- `show running-config` — views the current configuration.
Simple Network Management Protocol (SNMP) and Syslog

This chapter contains commands to configure and monitor the simple network management protocol (SNMP) v1/v2 and Syslog.

The chapter contains the following sections:

- **SNMP Commands**
- **Syslog Commands**

### SNMP Commands

The SNMP commands available in the Dell Networking OS are:

- `snmp-server enable traps`
- `snmp-server host`

The simple network management protocol (SNMP) is used to communicate management information between the network management stations and the agents in the network elements. Dell Networking OS supports SNMP versions 1, and 2c supporting only read-only mode.

### Important Points to Remember

- Typically, 5-second timeout and 3-second retry values on an SNMP server are sufficient for both local area network (LAN) and wide area network (WAN) applications. If you experience a timeout with these values, the recommended best practice on Dell Networking switches (to accommodate their high port density) is to increase the timeout and retry values on your SNMP server to the following:
  - SNMP Timeout — greater than 3 seconds.
  - SNMP Retry count — greater than 2 seconds.
- SNMP operations are not supported on a virtual local area network (VLAN).

### Syslog Commands

The following commands allow you to configure logging functions on all Dell Networking switches.

- `clear logging`
- `logging buffered`
- `logging console`
- `logging hostname`
clear logging

Clear the messages in the logging buffer.

Syntax:
```
clear logging
```

Defaults:
- none

Command Modes: EXEC Privilege

Command History:
- Version 8.3.17.0: Supported on the M I/O Aggregator.

Related Commands:
- `show logging` — displays logging settings and system messages in the internal buffer.

logging buffered

Enable logging and specify which messages are logged to an internal buffer. By default, all messages are logged to the internal buffer.

Syntax:
```
logging buffered [level] [size]
```

To return to the default values, use the `no logging buffered` command.

To disable logging stored to an internal buffer, use the `no logging buffered` command.

Parameters:
- **level** (OPTIONAL) Indicate a value from 0 to 7 or enter one of the following equivalent words: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 7 or debugging.

- **size** (OPTIONAL) Indicate the size, in bytes, of the logging buffer. The number of messages buffered depends on the size of each message. The range is from 40960 to 524288. The default is 40960 bytes.

Defaults:
- `level = 7; size = 40960 bytes`
logging console

Specify which messages are logged to the console.

Syntax

logging console [level]

To return to the default values, use the logging hostname command.

To disable logging to the console, use the no logging console command.

Parameters

level (OPTIONAL) Indicate a value from 0 to 7 or enter one of the following parameters: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 7 or debugging.

Defaults

level = 7; size = debugging

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Related Commands

clear logging — clears the logging buffer.

logging hostname — returns the logging buffered parameters to the default setting.

show logging — displays the logging setting and system messages in the internal buffer.
logging hostname

Configure an IP address or host name of a Syslog server where logging messages are sent. Multiple
logging servers of both IPv4 and/or IPv6 can be configured.

Syntax

logging {ipv4-address | hostname}

To disable logging, use the no logging command.

Parameters

ipv4-address

Enter the IPv4 address (A.B.C.D).

hostname

Enter the name of a host already configured and recognized by the switch.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Related Commands

logging trap — enables logging to the Syslog server based on severity.

logging monitor

Specify which messages are logged to Telnet applications.

Syntax

logging monitor [level]

To disable logging to terminal connections, use the no logging monitor command.

Parameters

level

Indicate a value from 0 to 7 or enter one of the following parameters: emergencies, alerts, critical, errors,
warnings, notifications, informational, or debugging. The default is 7 or debugging.

Defaults

7 or debugging

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator.

Related Commands

logging hostname — returns the logging monitor parameters to the default setting.
logging source-interface

Specify that the IP address of an interface is the source IP address of Syslog packets sent to the Syslog server.

Syntax

logging source-interface interface

To disable this command and return to the default setting, use the no logging source-interface command.

Parameters

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

- For a Ten-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
- For VLAN interface, enter the keyword vlan followed by a number from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

Version 8.3.17.0 Supported on the M I/O Aggregator

Usage Information

Syslog messages contain the IP address of the interface used to egress the router. By configuring the logging source-interface command, the Syslog packets contain the IP address of the interface configured.

Related Commands

logging hostname — enables logging to the Syslog server.

logging trap

Specify which messages are logged to the Syslog server based on the message severity.

Syntax

logging trap [level]

To return to the default values, use the default logging trap command.

To disable logging, use the no logging trap command.

Parameters

level Indicate a value from 0 to 7 or enter one of the following parameters: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 6 or informational.
show logging

Displays the logging settings and system messages logged to the internal buffer of the switch.

Syntax

```
show logging [number | history [reverse][number] | reverse [number] | summary | driverlog[stack-unit number] | kernellog [stack-unit number]]
```

Parameters

- **number** (OPTIONAL) Enter the number of messages displayed in the output. The range is from 1 to 65535.
- **history** (OPTIONAL) Enter the keyword history to view only information in the Syslog history table.
- **reverse** (OPTIONAL) Enter the keyword reverse to view the Syslog messages in FIFO (first in, first out) order.
- **summary** (OPTIONAL) Enter the keyword summary to view a table showing the number of messages per type and per slot.
- **driverlog** (OPTIONAL) Enter the keyword driverlog to view the driverlog information per stack-unit. Enter the keyword stack-unit followed by the stack member ID of the switch for which you want to display the driver log. The range is from 0 to 1.
- **kernellog** (OPTIONAL) Enter the keyword kernellog to view the kernellog information per stack-unit. Enter the keyword stack-unit followed by the stack member ID of the switch for which you want to display the driver log. The range is from 0 to 1.

Command Modes

- EXEC
- EXEC Privilege

Command History

- **Version 8.3.17.0** Supported on the M I/O Aggregator.

Related Commands

logging hostname — enables the logging to another device.
Example (Partial)

Dell#show logging
Syslog logging: enabled
  Console logging: level debugging
  Monitor logging: level debugging
  Buffer logging: level debugging, 168 Messages Logged, Size (40960 bytes)
  Trap logging: level informational
          Logging to 172.16.1.162
          Logging to 10.10.10.4
          Logging to 10.1.2.4
          Logging to 172.31.1.4
          Logging to 133.33.33.4
Aug 1 15:05:53: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 20:25:40: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 20:14:03: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 20:03:58: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 18:22:10: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 15:50:30: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 14:26:22: %STKUNIT1-M:CP %SYS-5-CONFIG_I: Configured from console
Jul 31 14:26:17: %STKUNIT1-M:CP %SEC-3-AUTHENTICATION_ENABLE_SUCCESS:
          Enable password authentication success on console
Jul 31 14:26:17: %STKUNIT1-M:CP %SEC-4-ENABLE_PASSW_NOT_CONFIGURED:
          Enable password is required for authentication but not configured
Jul 31 10:38:12: %STKUNIT1-M:CP %SYSADM-5-CPU_THRESHOLD_CLR:
          Overall cpu usage of management-unit drops below threshold. Cpu1minUsage {65%}
--More--

Example (History)

Dell#show logging history
Syslog History Table: 1 maximum table entries, saving level warnings or higher
SNMP notifications not Enabled
May 22 08:53:09: %STKUNIT0-M:CP %SEC-3-AUTHENTICATION_ENABLE_SUCCESS: Enable
password authentication success on vty0 ( 10.11.68.22 )
Dell#

Example (Driverlog)

Dell#show logging driverlog stack-unit 1
0:Task(tUsrRoot): [ 45232]SS DRV DEBUG: Wrapper init complete
1:Task(tUsrRoot): [ 206775]SS DRV DEBUG: Core init complete

Simple Network Management Protocol (SNMP) and Syslog

263
terminal monitor

Configure the Dell Networking OS to display messages on the monitor/terminal.

Syntax

```
terminal monitor
```

To return to default settings, use the `terminal no monitor` command.

defaults

Disabled.

Command Modes

- EXEC
- EXEC Privilege

Command History

- **Version 8.3.17.0** — Supported on the M I/O Aggregator.

Related Commands

- `logging monitor` — sets the logging parameters on the monitor/terminal.
Stacking Commands

Stacking is supported on an Aggregator only on the 40GbE ports on the base module. Stacking is limited to two Aggregators in the same chassis in a single stack. Up to three stacks are supported in an M1000e chassis.

Stacking provides a single point of management and NIC teaming for high availability and higher throughput. To configure an Aggregator stack, you must use the CLI.

The stacking commands are always available and operational, whether or not an Aggregator has a stacking module inserted. You can use the commands to pre-configure an Aggregator, so that the configuration settings are invoked when the Aggregator is attached to other Aggregator blades.

For more information about using the Aggregator stacking feature, refer to the Stacking Aggregators chapter in the Dell Networking OS Configuration Guide for the M I/O Aggregator.

You can use the following commands to manage a stack of Aggregator I/O modules:

- power-cycle stack-unit
- reset stack-unit
- show system stack-ports
- show system stack-unit fanout
- show system stack-unit iom-mode
- show system stack-unit stack-group
- stack-unit iom-mode

**power-cycle stack-unit**

To hard reset any stack unit including master unit.

**Syntax**

```
power-cycle stack-unit [0–5 | all]
```

**Defaults**

None

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**

This command is used to reset the stack-unit. The master unit can also be power cycled using this command.
reset stack-unit

Reset any designated stack member except the management unit (master unit).

Syntax

reset stack-unit 0–5 hard

Parameters

0–5

Enter the stack member unit identifier of the stack member to reset.

hard

Reset the stack unit if the unit is in a problem state.

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

Resetting the management unit is not allowed and an error message displays if you try to do so. Resetting is a soft reboot, including flushing the forwarding tables.

You can run this command directly on the stack standby unit (Standby Master) to reset the standby. You cannot reset any other unit from the standby unit.

Example

Dell#show system brief
Stack MAC : 00:1e:c9:f1:00:9b
-- Stack Info --
Unit    UnitType      Status      ReqTyp        CurTyp
Version      Ports
---------------------------------------------------------------
------------------
---
0       Management     online    I/O-Aggregator I/O-
        Aggregator 8-3-17-46   56
1       Standby        online    I/O-Aggregator I/O-
        Aggregator 8-3-17-46   56
2       Member      not present
3       Member      not present
4       Member      not present
5       Member      not present
Dell#
Dell#reset stack-unit 0 >>>Resetting master not allowed
% Error: Reset of master unit is not allowed.
Dell#
Dell#reset stack-unit 1
Dell#01:02:00: %STKUNIT0-M:CP %CHMGR-5-STACKUNIT_RESET: Stack unit 1 being reset
01:02:00: %STKUNIT0-M:CP %IFMGR-1-DEL_PORT: Removed port: Te 1/1-32,41-56
01:02:00: %STKUNIT0-M:CP %CHMGR-2-STACKUNIT_DOWN: Stack unit 1 down - reset
01:02:00: %STKUNIT1-S:CP %IFMGR-1-DEL_PORT: Removed port: Te 1/1-32,41-56
01:02:05: %I/O-Aggregator:0 %IFAGT-5-STACK_PORT_LINK_DOWN: Changed stack port state to down: 0/37
01:02:11: %STKUNIT0-M:CP %POLLMGR-2-ALT_STACK_UNIT_STATE: Alternate Stack-unit is
show system stack-ports

Display information about the stacking ports on all switches in the M I/O Aggregator switch stack.

Syntax

show system stack-ports [status | topology]

Parameters

status (OPTIONAL) Enter the keyword status to display the command output without the Connection field.

topology (OPTIONAL) Enter the keyword topology to limit the table to just the Interface and Connection fields.

Defaults none

Command Modes

• EXEC
• EXEC Privilege

Command History

Version 8.3.17.0   Supported on the M I/O Aggregator.

Usage Information

The following describes the show interfaces command shown in the following example.

Field  Description

Topology  Lists the topology of stack ports connected: Ring, Daisy chain, or Standalone.

Interface  The unit/port ID of the connected stack port on this unit.

Link Speed  Link Speed of the stack port (10 or 40) in Gb/s.

Admin Status  The only currently listed status is Up.

Connection  The stack port ID to which this unit's stack port is connected.

Example

Dell# show system stack-ports
Topology: Ring

<table>
<thead>
<tr>
<th>Interface</th>
<th>Connection</th>
<th>Link Speed (Gb/s)</th>
<th>Admin Status</th>
<th>Link Status</th>
<th>Trunk Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/33</td>
<td></td>
<td>40</td>
<td>up</td>
<td>down</td>
<td></td>
</tr>
</tbody>
</table>

Stacking Commands
Example
(Status)
Dell# show system stack-ports status
Topology: Daisy chain
Interface Link Speed Admin Link Trunk
    (Gb/s)       Status  Status  Group
0/33        40           up   down
0/37        40           up    up
1/33        40           up   down
1/37        40           up    up
Dell#

Example
(Topology)
Dell# show system stack-ports topology
Topology: Daisy chain
Interface Connection Trunk
                      Group
0/33
0/37  1/37
1/33
1/37  0/37
Dell#

Related
Commands
power-cycle stack-unit—resets the designated stack member.
show diag—displays the data plane or management plane input and output
statistics of the designated component of the designated stack member.

show system—displays the current status of all stack members or a specific
member.

show system stack-unit fanout
Displays the current 40GbE ports configured in fanout mode.

Syntax
show system stack-unit <unit-number> fanout[configured]

Parameters
unit-number Enter the number of the member stack unit. The range is
<0–5> from 0 to 5.

Defaults
none

Command Modes
• EXEC Privilege

Command History
Version 8.3.17.0 Supported on the M I/O Aggregator.
show system stack-unit iom-mode

Displays the current iom-mode (stack/standalone) and the mode configured after next reboot.

Syntax

show system stack-unit unit-number iom-mode

Parameters

- **unit number**
  - Enter the number of the member stack unit. The range is from 0 to 5.

Command Modes

EXEC Privilege

Command History

- **Version 8.3.17.0**
  - Supported on the M I/O Aggregator.

Example

Dell#show system stack-unit all iom-mode
<table>
<thead>
<tr>
<th>Unit</th>
<th>Boot-Mode</th>
<th>Next-Boot</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>stack</td>
<td>stack</td>
</tr>
<tr>
<td>1</td>
<td>stack</td>
<td>stack</td>
</tr>
<tr>
<td>2</td>
<td>stack</td>
<td>stack</td>
</tr>
<tr>
<td>3</td>
<td>stack</td>
<td>stack</td>
</tr>
<tr>
<td>4</td>
<td>Not Present</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Not Present</td>
<td></td>
</tr>
</tbody>
</table>

show system stack-unit iom-uplink-speed

Display the uplink speed of the LAG bundles configured on the Flex IO modules installed on the Aggregator.

Syntax

show system stack-unit unit-number iom-uplink-speed
show system stack-unit stack-group

Displays the stack-groups present/configured for a M I/O Aggregator stack unit.

**Syntax**

```
show system stack-unit unit-number stack-group [configured]
```

**Parameters**

- `unit number`<br>
Enter the number of the member stack unit. The range is from 0 to 5.

**Defaults**

none

**Command Modes**

EXEC Privilege

**Command History**

- **Version 8.3.17.0**  
  Supported on the M I/O Aggregator.

**Example**

```
Dell# show system stack-unit 0 stack-group ?
configured  Configured stack groups
| Pipe through a command
<cr>
Dell# show system stack-unit 0 stack-group configured
Configured stack groups in stack-unit 0
Dell# show system stack-unit 0 stack-group
Stack group Ports
------------------------------------
0         0/33
1         0/37
2         0/41
3         0/45
Dell#
```
Related Commands

- **reload** — reboots the system.
- **show system** — displays the current status of all stack members or a specific member.

---

**stack-unit iom-mode**

Toggle the M I/O Aggregator operating mode between programmable multiplex, stand-alone, stack, and VLT modes.

**Syntax**

```
stack-unit <unit-number> iom-mode [programmable-mux | stack | standalone | vlt]
```

**Parameters**

- **unit number**
  - <0-5>
  - Enter the number of the member stack unit. The range is from 0 to 5.
- **programmable-mux**
  - Enable programmable multiplex mode.
- **stack**
  - Enable stack mode.
- **standalone**
  - Enable stand-alone mode.
- **vlt**
  - Enable virtual link trunking mode.

**Defaults**

- standalone

**Command Modes**

- **CONFIGURATION**

**Command History**

- **Version 8.3.17.0**
  - Supported on the M I/O Aggregator.

**Example**

```
Dell(conf)#stack-unit 0 iom-mode stack
% You are about to stack your IOA module, please reload the IOA and then plug in the stacking cable for the changes to take effect.
Dell(conf)#
Dell#
```

**Related Commands**

- **reload** — Reboots the operating system.
- **show system** — displays the current status of all stack members or a specific member.
stack-unit iom-mode uplink-speed

Specify the uplink speed of the member interfaces in a LAG bundle for the Aggregator that operates in standalone, stacking, or VLT mode to be 40 GbE. By default, the uplink speed of the LAG bundle is set as 10 GbE.

Syntax

```plaintext
stack-unit unit-number iom-mode {stack | standalone | vlt}
uplink-speed 40G
```

To restore the default uplink speed of the LAG bundle, which is 10 GbE, use the `stack-unit unit-number iom-mode {stack | standalone | vlt}` command.

Parameters

- **unit number**  
  - `<0-5>`  
  - Enter the number of the member stack unit. The range is from 0 to 5.
- **iom-mode**  
  - Denotes the operating mode of the I/O Aggregator.
- **stack**  
  - Specify that the uplink speed of the member interfaces in a LAG bundle applies for the Aggregator in stacking mode.
- **standalone**  
  - Specify that the uplink speed of the member interfaces in a LAG bundle applies for the Aggregator in standalone mode.
- **vlt**  
  - Specify that the uplink speed of the member interfaces in a LAG bundle applies for the Aggregator in VLT mode.
- **uplink-speed**  
  - `40G`  
  - Set the uplink speed of the member or child interfaces of the LAG bundle to function at 40 Gigabit Ethernet per second.

Command Modes

- **CONFIGURATION**

Command History

- **Version 9.3.0.0**  
  - Introduced on the M I/O Aggregator

Usage Information

This functionality to set the uplink speed is available from the CMC interface when the I/O Aggregator functions as a simple MUX or a VLT node with all of the uplink interfaces configured to be member links in the same LAG bundle. You cannot configure the uplink speed to be set as 40 GbE by default if the Aggregator functions in programmable MUX mode with multiple uplink LAG interfaces or in stacking mode because CMC is not involved with configuration of parameters when the Aggregator operates in either of these modes with uplink interfaces being part of different LAG bundles.

When you configure the native mode to be 40 GbE, the CMC sends a notification to the IOA to set the default internal working of all of the ports to be 40 GbE after the reload of the switch is performed. After you configure the native mode that denotes the uplink speed of the module ports to be 40 GbE, you must enter the `reboot` command (not pressing the Reset button, which causes the factory default settings to be applied when the device comes up online) from the CMC to cause the configuration of the uplink speed to be effective.
stack-unit priority

Configure the ability of a switch to become the management unit of a stack.

Syntax

```
stack-unit stack-number priority 1-14
```

Parameters

- **stack-number**
  - Enter the stack member unit identifier.
- **1–14**
  - This preference parameter allows you to specify the management priority of one backup switch over another, with 0 the lowest priority and 14 the highest. The switch with the highest priority value is chosen to become the management unit if the active management unit fails or on the next reload.

Defaults

0

Command Modes

CONFIGURATION

Command History

Version 9.3(0.0)
Introduced on the M I/O Aggregator.

Related Commands

- **reload** – reboots Dell Networking Operating System (OS).
- **show system** – displays the status of all stack members or a specific member.

stack-unit renumber

Change the stack member ID of any stack member or a stand-alone unit.

Syntax

```
stack-unit 0-5 renumber 0-5
```

Parameters

- **0-5**
  - The first instance of this value is the stack member unit identifier, from 0 to 5, of the switch that you want add to the stack. The range is from 0 to 5. The second instance of this value is the desired new unit identifier number.

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 9.3(0.0)
Introduced on the M I/O Aggregator

Usage Information

You can renumber any switch, including the management unit or a stand-alone unit.

You cannot renumber a unit to a number of an active member in the stack.
When executing this command on the master, the stack reloads. When the members are renumbered, only that specific unit is reset and comes up with the new unit number.

**Example**

Dell#stack-unit 5 renumber 4

Renumbering will reset the unit.
Warning: Interface configuration for current unit will be lost! Proceed to renumber [confirm yes/no]:

**Related Commands**

- `reload` – reboots Dell Networking Operating System (OS).
- `reset stack-unit` – resets the designated S-Series stack member.
- `show system` – displays the current status of all stack members or a specific member.
Storm Control

The Dell Networking OS storm control feature allows you to limit or suppress traffic during a traffic storm.

**NOTE:** When iSCSI storage devices are detected on the server-ports, storm-control is disabled on the those ports. When the iSCSI devices are off the ports, storm-control is enabled again.

The storm control commands are:

- `io-aggregator broadcast storm-control`
- `show io-aggregator broadcast storm-control status`

### io-aggregator broadcast storm-control

Rate-limit the broadcast traffic to 1 Gbps.

**Syntax**

`io-aggregator broadcast storm-control`

To disable storm control, use the `no io-aggregator broadcast storm-control` command.

**Defaults**

Enabled

**Command Modes**

- CONFIGURATION

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

### show io-aggregator broadcast storm-control status

Shows if storm control is enabled or disabled. If enabled, displays information on the rate limit value.

**Syntax**

`show io-aggregator broadcast storm-control status`

**Command Modes**

- EXEC Privilege

**Command History**

Version 8.3.17.0 Supported on the M I/O Aggregator.

**Example**

Dell#show io-aggregator broadcast storm-control status
Storm-Control Enabled
Broadcast Traffic limited to 1000 Mbps
Dell#
System Time

The commands in this chapter configure time values on the system, either using the Dell Networking OS, the hardware, or using the network time protocol (NTP). With NTP, the switch can act only as a client to an NTP clock host.

For more information, refer to the Network Time Protocol section of the Management chapter in the Dell PowerEdge M I/O Aggregator Configuration Guide.

The NTP commands are:

- calendar set
- ntp server
- show calendar
- show clock
- clock read-calendar
- clock set
- clock summer-time date
- clock summer-time recurring
- clock timezone
- clock update-calendar
- clock set

**calendar set**

Set the time and date for the switch hardware clock.

**Syntax**

calendar set time month day year

**Parameters**

- **time**: Enter the time in hours:minutes:seconds. For the hour variable, use the 24-hour format; for example, 17:15:00 is 5:15 pm.
- **month**: Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
- **day**: Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.
- **year**: Enter a four-digit number as the year. The range is from 1993 to 2035.
**Command Modes**
EXEC Privilege

**Command History**
Version 8.3.17.0 Supported on the M I/O Aggregator.

**Usage Information**
You can change the order of the month and day parameters to enter the time and date as time day month year.

In the switch, the hardware clock is separate from the software and is called the calendar. This hardware clock runs continuously. After the hardware clock (the calendar) is set, the operating system automatically updates the software clock after system bootup. You cannot delete the hardware clock (calendar).

To manually update the software with the hardware clock, use the `clock read-calendar` command.

**Example**
```
Dell#calendar set 08:55:00 june 18 2006
Dell#
```

**Related Commands**
- `clock read-calendar` — sets the software clock based on the hardware clock.
- `clock set` — sets the software clock.
- `clock update-calendar` — sets the hardware clock based on the software clock.
- `show clock` — displays the clock settings.

---

**ntp server**

Configure an NTP time-serving host.

**Syntax**
```
ntp server {hostname | ipv4-address} [key keyid] [prefer] [version number]
```

**Parameters**
- `ipv4-address` Enter an IPv4 address (A.B.C.D).
- `hostname` Enter the hostname of the server.
- `key keyid` (OPTIONAL) Enter the keyword `key` and a number as the NTP peer key. The range is from 1 to 4294967295.
- `prefer` (OPTIONAL) Enter the keyword `prefer` to indicate that this peer has priority over other servers.
- `version number` (OPTIONAL) Enter the keyword `version` and a number to correspond to the NTP version used on the server. The range is from 1 to 3.
show calendar

Display the current date and time based on the switch hardware clock.

Syntax

```
show calendar
```

Command Modes

- EXEC
- EXEC Privilege

Command History

```
Version 8.3.17.0 Supported on the M I/O Aggregator.
```

Example

```
Dell#show calendar
12:29:34 pacific Tue May 22 2012
Dell#
```

Related Commands

```
show clock — displays the time and date from the switch software clock.
```

show clock

Displays the current clock settings.

Syntax

```
show clock [detail]
```

Parameters

detail (OPTIONAL) Enter the keyword detail to view the source information of the clock.

Command Modes

- EXEC
- EXEC Privilege

System Time

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clock read-calendar

Set the software clock on the switch from the information set in hardware clock (calendar).

Syntax

```
clock read-calendar
```

Defaults

Not configured.

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

In the switch, the hardware clock is separate from the software and is called the calendar. This hardware clock runs continuously. After the hardware clock (the calendar) is set, the operating system automatically updates the software clock after system bootup.

You cannot delete this command (there is not a no version of this command).

clock set

Set the software clock in the switch.

Syntax

```
clock set time month day year
```
Parameters

- **time**: Enter the time in hours:minutes:seconds. For the hour variable, use the 24-hour format; example, 17:15:00 is 5:15 pm.

- **month**: Enter the name of one of the 12 months, in English. You can enter the number of a day and change the order of the display to `time day month year`.

- **day**: Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to `time month day year`.

- **year**: Enter a four-digit number as the year. The range is from 1993 to 2035.

Defaults
Not configured.

Command Modes
EXEC Privilege

Command History
Version 8.3.17.0Supported on the M I/O Aggregator.

Usage Information
You can change the order of the month and day parameters to enter the time and date as `time day month year`. You cannot delete the software clock.

The software clock runs only when the software is up. The clock restarts, based on the hardware clock, when the switch reboots.

Dell Networking recommends using an outside time source, such as NTP, to ensure accurate time on the switch.

Example
```
Dell#clock set 12:11:00 21 may 2012
Dell#
```

**clock summer-time date**

Set a date (and time zone) on which to convert the switch to daylight saving time on a one-time basis.

Syntax
```
clock summer-time time-zone date start-month start-day start-year start-time end-month end-day end-year end-time [offset]
```

To delete a daylight saving time zone configuration, use the `no clock summer-time` command.

Parameters

- **time-zone**: Enter the three-letter name for the time zone. This name is displayed in the show clock output.
start-month  Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.

start-day  Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.

start-year  Enter a four-digit number as the year. The range is from 1993 to 2035.

start-time  Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.

day  Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.

day  Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.

day  Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.

end-year  Enter a four-digit number as the year. The range is from 1993 to 2035.

offset  (OPTIONAL) Enter the number of minutes to add during the summer-time period. The range is from 1 to 1440. The default is 60 minutes.

Defaults  Not configured.

Command Modes  CONFIGURATION

Command History  Version 8.3.17.0 Supported on the M I/O Aggregator.

Related Commands  calendar set — sets the hardware clock.

clock summer-time recurring — sets a date (and time zone) on which to convert the switch to daylight saving time each year.

show clock — displays the current clock settings.
clock summer-time recurring

Set the software clock to convert to daylight saving time on a specific day each year.

Syntax

clock summer-time time-zone recurring [start-week start-day start-month start-time end-week end-day end-month end-time [offset]]

To delete a daylight saving time zone configuration, use the no clock summer-time command.

Parameters

time-zone Enter the three-letter name for the time zone. This name is displayed in the show clock output. You can enter up to eight characters.

start-week (OPTIONAL) Enter one of the following as the week that daylight saving begins and then enter values for start-day through end-time:

• week-number: Enter a number from 1 to 4 as the number of the week in the month to start daylight saving time.
• first: Enter this keyword to start daylight saving time in the first week of the month.
• last: Enter this keyword to start daylight saving time in the last week of the month.

start-day Enter the name of the day that you want daylight saving time to begin. Use English three letter abbreviations; for example, Sun, Sat, Mon, and so on. The range is from Sun to Sat.

start-month Enter the name of one of the 12 months in English.

start-time Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.

end-week Enter the one of the following as the week that daylight saving ends:

• week-number: enter a number from 1 to 4 as the number of the week to end daylight saving time.
• first: enter the keyword first to end daylight saving time in the first week of the month.
• last: enter the keyword last to end daylight saving time in the last week of the month.

end-day Enter the weekday name that you want daylight saving time to end. Enter the weekdays using the three letter abbreviations; for example Sun, Sat, Mon, and so on. The range is from Sun to Sat.

end-month Enter the name of one of the 12 months in English.
end-time  Enter the time in hours:minutes:seconds. For the hour
variable, use the 24-hour format; example, 17:15:00 is 5:15
pm.

offset (OPTIONAL) Enter the number of minutes to add during the
summer-time period. The range is from 1 to 1440. The
default is 60 minutes.

Defaults  Not configured.
Command Modes  CONFIGURATION
Command History  Version 8.3.17.0  Supported on the M I/O Aggregator.
Related Commands  calendar set— sets the hardware clock.
  clock summer-time date— sets a date (and time zone) on which to convert the
  switch to daylight saving time on a one-time basis.
  show clock— displays the current clock settings.

clock timezone
Configure a timezone for the switch.

Syntax  clock timezone timezone-name offset
To delete a timezone configuration, use the no clock timezone command.

Parameters  timezone-name  Enter the name of the timezone. You cannot use spaces.
offset  Enter one of the following:
  • a number from 1 to 23 as the number of hours in addition
    to universal time coordinated (UTC) for the timezone.
  • a minus sign (-) then a number from 1 to 23 as the
    number of hours.

Defaults  Not configured.
Command Modes  CONFIGURATION
Command History  Version 8.3.17.0  Supported on the M I/O Aggregator.
Usage Information

Coordinated universal time (UTC) is the time standard based on the International Atomic Time standard, commonly known as Greenwich Mean time. When determining system time, include the differentiator between UTC and your local timezone. For example, San Jose, CA is the Pacific Timezone with a UTC offset of -8.

**clock update-calendar**

Set the switch hardware clock based on the software clock.

**Syntax**

```
clock update-calendar
```

**Defaults**

Not configured.

**Command Modes**

EXEC Privilege

**Command History**

Version 8.3.17.0  Supported on the M I/O Aggregator.

**Usage Information**

Use this command only if you are sure that the hardware clock is inaccurate and the software clock is correct. You cannot delete this command (there is not a no form of this command).

**Related Commands**

- `calendar set` — sets the hardware clock.
Uplink Failure Detection (UFD)

Uplink failure detection (UFD) provides detection of the loss of upstream connectivity and, if you use this with network interface controller (NIC) teaming, automatic recovery from a failed link.

**NOTE:** In Standalone, VLT, and Stacking modes, the UFD group number is 1 by default and cannot be changed.

### defer-timer

Configure a timer that prevents unwanted flapping of downstream ports when the uplink port channel goes down and comes up.

**Syntax**

```
defer-timer seconds
```

**Defaults**

10 (Standalone mode)

**Parameters**

- `seconds`
  Specify the time (in seconds) to wait for the upstream port channel (LAG 128) to come back up before server ports are brought down. The range is from 1 to 120.

**Command Modes**

UPLINK-STATE-GROUP

**Command History**

Version 9.2(0.0) Introduced on the M I/O Aggregator.

**Usage Information**

This command is not supported in programmable-mux mode.

### enable

Re-enable upstream-link tracking for an uplink-state group after it has been disabled.

**Syntax**

```
enable
```

To disable upstream-link tracking without deleting the uplink-state group, use the `no enable` command.

**group-id**

Enables debugging on the specified uplink-state group. Valid `group-id` values are 1 to 16.
<table>
<thead>
<tr>
<th>Defaults</th>
<th>Upstream-link tracking is automatically enabled in an uplink-state group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Modes</td>
<td>UPLINK-STATE-GROUP</td>
</tr>
<tr>
<td>Command History</td>
<td><strong>Version 9.2(0.0)</strong></td>
</tr>
<tr>
<td></td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
Virtual Link Trunking (VLT)

Virtual link trunking (VLT) allows physical links between two chassis to appear as a single virtual link to the network core. VLT domain configuration is automatic and you must connect the base module ports for VLT interconnect (VLTi) communication. In VLT mode, all LAGs are peer-LAG VLT enabled, so you do not need to configure any VLT LAGs. If you change to VLT mode, reboot the I/O aggregator. VLT mode VLT provides Layer 2 multipathing, creating redundancy through increased bandwidth, enabling multiple parallel paths between nodes and load-balancing traffic where alternative paths exist.

The VLT commands described in this chapter are:

- `show vlt backup-link`
- `show vlt brief`
- `show vlt detail`
- `show vlt role`
- `show vlt statistics`
- `stack-unit iom-mode`

show vlt backup-link

Displays information on the backup link operation.

**Syntax**

```
show vlt backup-link
```

**Default**

Not configured.

**Command Modes**

EXEC

**Command History**

Version 9.2.0 Introduced on the DELL Poweredge I/O Aggregator Switch IO Module.

**Example**

```
Dell# show vlt backup-link
VLT Backup Link
----------------
Destination: 169.254.31.23
Peer HeartBeat status: Up
HeartBeat Timer Interval: 1
HeartBeat Timeout: 3
UDP Port: 34998
HeartBeat Messages Sent: 24
HeartBeat Messages Received: 25
```
show vlt brief

Display brief status information about VLT domains currently configured on the switch.

Syntax  
show vlt brief

Default  
Not configured.

Command Modes  
EXEC

Command History  
Version 9.2. Introduced on the DELL Poweredge I/O Aggregator Switch
(0.0)  
IO Module.

Example (Brief)  
Dell# show vlt brief
VLT Domain Brief
------------------
Domain ID:                        1
Role:                            Primary
Role Priority:                  32768
ICL Link Status:                Up
HeartBeat Status:               Up
VLT Peer Status:                Up
Local Unit Id:                  0
Version:                        6(1)
Local System MAC address:       00:01:e8:00:ab:03
Remote System MAC address:      00:01:e8:e1:e1:c3
Configured System MAC address:  00:01:05:08:02:05
Remote system version:          6(1)
Delay-Restore timer:            90 seconds
Peer-Routing :                  Disabled
Peer-Routing-timeout timer:      0 seconds
Multicast peer-routing timeout: 150 seconds
Dell#

show vlt detail

Displays detailed status information about VLT domains currently configured on the switch.

Syntax  
show vlt detail

Default  
Not configured.

Command Modes  
EXEC

Command History  
Version 9.2. Introduced on the DELL Poweredge I/O Aggregator Switch
(0.0)  
IO Module.

Example  
Dell# show vlt detail
Local LAG Id Peer LAG Id Local Status  Peer Status  Active VLANs
------------ ----------- ------------  -----------  [multiline]

---------

-----------

---------

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Virtual Link Trunking (VLT)
show vlt role

Display the VLT peer status, role of the local VLT switch, VLT system MAC address and system priority, and the MAC address and priority of the locally-attached VLT device.

Syntax

show vlt role

Default
Not configured.

Command Modes
EXEC

Command History

Version 9.2(0.0) Introduced on the DELL Poweredge I/O Aggregator Switch IO Module.

Example

Dell#show vlt role
VLT Role
---------
VLT Role: Primary
System MAC address: 00:01:05:08:02:05
Primary Role Priority: 32768
Local System MAC address: 00:01:e8:00:ab:03
Local System Role Priority: 32768
Local Unit Id: 0
Dell#

show vlt statistics

Displays statistics on VLT operations.

Syntax

show vlt statistics

Default
Not configured.

Command Modes
EXEC

Command History

Version 9.2(0.0) Introduced on the DELL Poweredge I/O Aggregator.

Example

Dell#show vlt statistics
VLT Domain Statistics
-----------------------
HeartBeat Messages Sent: 449
HeartBeat Messages Received: 448
ICL Hello’s Sent: 154
ICL Hello’s Received: 154
Domain Mismatch Errors: 0
Version Mismatch Errors: 0
Config Mismatch Errors: 0

VLT MAC Statistics
---------------------
L2 Info Pkts sent: 16, L2 Mac-sync Pkts Sent: 25
L2 Info Pkts Rcvd: 15, L2 Mac-sync Pkts Rcvd: 24
L2 Reg Request sent: 2
L2 Reg Request rcvd: 1
L2 Reg Response sent: 1
L2 Reg Response rcvd: 1

VLT Igmp-Snooping Statistics
-----------------------------
IGMP Info Pkts sent: 9
IGMP Info Pkts Rcvd: 10
IGMP Reg Request sent: 2
IGMP Reg Request rcvd: 2
IGMP Reg Response sent: 2
IGMP Reg Response rcvd: 1
IGMP PDU Tunnel Pkt sent: 0
IGMP PDU Tunnel Pkt rcvd: 0
IGMP Tunnel PDUs sent: 0
IGMP Tunnel PDUs rcvd: 0

VLT ARP Statistics
-------------------
ARP Tunnel Pkts sent: 0
ARP Tunnel Pkts Rcvd: 0
ARP Tunnel Pkts sent Non Vlt: 0
ARP Tunnel Pkts Rcvd Non Vlt: 0
ARP-sync Pkts Sent: 0
ARP-sync Pkts Rcvd: 0
ARP Reg Request sent: 2
ARP Reg Request rcvd: 1

VLT IOA Statistics
-------------------
IOA Info Pkts sent: 5
IOA Info Pkts Rcvd: 7
IOA Reg Request sent: 2
IOA Reg Request rcvd: 2
IOA Reg Response sent: 2
IOA Reg Response rcvd: 1

VLT NDP Statistics
-------------------
NDP NA VLT Tunnel Pkts sent: 0
NDP NA VLT Tunnel Pkts Rcvd: 0
NDP NA Non-VLT Tunnel Pkts sent: 0
NDP NA Non-VLT Tunnel Pkts Rcvd: 0
Ndp-sync Pkts Sent: 0
Ndp-sync Pkts Rcvd: 0
Ndp Reg Request sent: 2
Ndp Reg Request rcvd: 1

VLT multicast not enabled
**stack-unit iom-mode**

Set the M I/O Aggregator operating mode to VLT mode.

**Syntax**

```
stack-unit <unit-number> iom-mode vlt
```

**Parameters**

- **unit number**
  - `<0-5>`: Enter the number of the member stack unit. The range is from 0 to 5. The default is 0.
- **vlt**: Enable virtual link trunking mode.

**Command Modes**

- CONFIGURATION

**Command History**

Version 9.2(0.0): Introduced on the DELL Poweredge I/O Aggregator Switch IO Module.

**Usage Information**

This command resets the operating mode to VLT. You must reboot the I/O Aggregator after using this command.
Debugging and Diagnostics

This chapter contains the following sections:

- Offline Diagnostic Commands
- Hardware Commands

Offline Diagnostic Commands

The offline diagnostics test suite is useful for isolating faults and debugging hardware. While tests are running, the Dell Networking OS results are saved as a text file (TestReport-SU-X.txt) in the flash directory. The `show file` command is available only on Master and Standby.

Important Points to Remember

- Offline diagnostics can only be run when the unit is offline.
- Offline diagnostics cannot be run in Stacking mode.
- You can only run offline diagnostics on a unit to which you are connected via the console. In other words, you cannot run diagnostics on a unit to which you are connected via a stacking link.
- Diagnostic results are stored in a file (TestReport-SU-X.txt) in the flash directory. To review the results, use the `show file` command, which prints the results to the screen.
- Diagnostics only test connectivity, not the entire data path.

The offline diagnostics commands are:

- `diag stack-unit`
- `offline stack-unit`
- `show diag`

Hardware Commands

These commands display information from a hardware sub-component or ASIC.

The hardware commands are:

- `clear hardware stack-unit`
- `show diag`
- `show hardware stack-unit`
- `show hardware system-flow`
clear hardware stack-unit
Clear statistics from selected hardware components.

Syntax
```
clear hardware stack-unit 0–5 {counters | unit 0–1 counters |
cpu data-plane statistics | cpu party-bus statistics | stack-
port 0–52}
```

Parameters
- `stack-unit 0–5`: Enter the keywords `stack-unit` then 0 to 5 to select a particular stack member and then enter one of the following command options to clear a specific collection of data.
- `counters`: Enter the keyword `counters` to clear the counters on the selected stack member.
- `unit 0–0 counters`: Enter the keyword `unit` along with a port-pipe number, from 0 to 1, then the keyword `counters` to clear the counters on the selected port-pipe.
- `cpu data-plane statistics`: Enter the keywords `cpu data-plane statistics` to clear the data plane statistics.
- `cpu party-bus statistics`: Enter the keywords `cpu party-bus statistics` to clear the management statistics.
- `stack-port 33–56`: Enter the keywords `stack-port` then the port number of the stacking port to clear the statistics of the particular stacking port. The range is from 33 to 56.

NOTE: You can identify stack port numbers by physical inspection of the rear modules. The numbering is the same as for the 10G ports. You can also inspect the output of the `show system stack-ports` command.

Defaults
none

Command Modes
EXEC Privilege

Command History
Version 8.3.17.0 Support on the M I/O Aggregator.

Related Commands
- `show diag`— displays the data plane or management plane input and output statistics of the designated component of the designated stack member.

diag stack-unit
Run offline diagnostics on a stack unit.

Syntax
```
diag stack-unit number {alllevels | level0 | level1 | level2 [verbose no-reboot] | terminate | interactive test <id>}
```
Parameters

**number**
Enter the stack-unit number. The range is from 0 to 5.

**alllevels**
Enter the keyword `alllevels` to run the complete set of offline diagnostic tests.

**level0**
Enter the keyword `level0` to run Level 0 diagnostics. Level 0 diagnostics check for the presence of various components and perform essential path verifications. In addition, they verify the identification registers of the components on the board.

**level1**
Enter the keyword `level1` to run Level 1 diagnostics. Level 1 diagnostics is a smaller set of diagnostic tests with support for automatic partitioning. They perform status/self test for all the components on the board and test their registers for appropriate values. In addition, they perform extensive tests on memory devices (for example, SDRAM, flash, NVRAM, EEPROM, and CPLD) wherever possible. There are no tests on 10G links. At this level, stack ports are shut down automatically.

**level2**
Enter the keyword `level2` to run Level 2 diagnostics. Level 2 diagnostics are a full set of diagnostic tests with no support for automatic partitioning. Level 2 diagnostics are used primarily for on-board loopback tests and more extensive component diagnostics. Various components on the board are put into Loopback mode and test packets are transmitted through those components. These diagnostics also perform snake tests using VLAN configurations. To test 10G links, physically remove the unit from the stack.

**verbose**
Enter the keyword `verbose` to run the diagnostic in Verbose mode. Verbose mode gives more information in the output than Standard mode.

**no-reboot**
Enter the keyword `no-reboot` to avoid automatic rebooting of the chassis after completion of diagnostic execution. Generally, this option is never used because if you run the diagnostic once again without rebooting the chassis, it may cause an issue with the diagnostic results.

**terminate**
Enter the keyword `terminate` to stop the execution of the level diag that is already started using the diag stack-unit command. Once this CLI is issued, syslogs indicating the termination of the diag test is displayed. The diag results for the executed tests are stored in the flash directory (TestReport-SU-X.txt).

**interactive**
Enter the keyword `interactive` to run some individual diag tests such as POWERLEDTEST, STATUSLEDTEST and so on. The help option under the interactive command displays the list of tests that can be run.
hardware watchdog

Set the watchdog timer to trigger a reboot and restart the system.

Syntax

    hardware watchdog

Defaults

    Enabled

Command Modes

    •  CONFIGURATION

Command History

    Version 8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

This command enables a hardware watchdog mechanism that automatically
reboots an Dell Networking OS switch/router with a single unresponsive unit. This
is a last resort mechanism intended to prevent a manual power cycle.

offline stack-unit

Place a stack unit in the offline state.

Syntax

    offline stack-unit number

Parameters

    number  Enter the stack-unit number. The range is from 0 to 5.

Defaults

    none

Command Modes

    EXEC Privilege

Command History

    Version 9.4(0.0)  Supported on the FN I/O aggregator.

Usage Information

While executing the offline stack unit CLI, the following warning message is
displayed:

Dell#offline stack-unit 0
Warning - offline of unit will bring down all the protocols and
the unit will be operationally down, except for running
Diagnostics.
Please make sure that stacking/fanout not configured for
Diagnostics execution.
Also reboot/online command is necessary for normal operation
after the offline command is issued.
Proceed with Offline [confirm yes/no]: no
Dell#

Make sure that stacking is not configured for Diagnostics execution. Also, reboot/online command is necessary for normal operation after the offline command is issued.

**show diag**

View diagnostics information.

**Syntax**

```
show diag {information | stack-unit number [detail | periodic | summary] | testcase}
```

**Parameters**

- **information**
  
Enter the keyword `information` to view current diagnostics information in the system.

- **stack-unit unit-id**
  
Enter the keyword `stack-unit` followed by the `unit-id` to display information on a specific stack member. The range is from 0 to 5.

- **detail**
  
(Optional) Enter the keyword `detail` to view detailed diagnostics information.

- **summary**
  
(Optional) Enter the keyword `summary` to view a summary of the diagnostics information. By default, the summary is displayed.

- **testcase**
  
Enter the keyword `testcase` to view the list of all the diag tests available.

**Defaults**

- **Summary**
  
**Command Modes**

- **EXEC Privilege**

**Command History**

- **Version 8.3.17.0**
  
Supported on the M I/O Aggregator.

**Example 1**

```
Dell#show diag information
Diag information:
Diag software image version:
8-3-17-36
-------------------------------------------

Stack-unit Member 0: Unit diags are terminated (Stackunit Offline).
Stack-unit Member 1: Not present.
```
Stack-unit Member 2: Not present.
Stack-unit Member 3: Not present.
Stack-unit Member 4: Not present.
Stack-unit Member 5: Not present.

----

Example 2
(show diag stack-unit Command)

Dell#show diag stackunit 0
Diag status of Stackunit member 0:
---------------------------------------------------------------
-----------
Stackunit is currently offline.
Stackunit level0 diag issued at Tue May 15, 2012 11:11:47 AM.
Current diag status:     Unit diags are terminated.
Total number of diags:         17
Number of diags performed:      1
Number of diags passed:         1
Number of diags failed:         0
Number of diags pending:        16
Last Test executed:             POWERRAILSTATUSTEST
Last notification received at:  Tue May 15, 2012 11:12:24 AM
---------------------------------------------------------------
-----------

Example 3
(show diag testcase stack-unit Command)

Dell#show diag testcase stack-unit 0
*************************** Navasota Diagnostics Test
***************************
Test ID Test Description               Test Level
------- ----------------               ----------
1 POWERRAILSTATUSTEST                    Level0
2 OPTMOSLOTPOWERSTATUSTEST              Level0
3 TSENSORACCESSTEST                      Level0
4 RTCPRESENCETEST                        Level0
5 CPUSDRAIPRESENCETEST                   Level0
6 CPUSDRAMSIZETEST                       Level0
7 USBAACCESSTEST                         Level0
8 USBBHOSTCONTROLLERACCESSTEST          Level0
9 SDFLASHACCESSTEST                      Level0
10 QSFPPLUSPOWERMODETEST                 Level0
11 CPLDPRESENCETEST                      Level0
12 FLASHACCESSTEST                       Level0
13 BOARDREVTTEST                         Level0
14 MGMTPHYPRESENCETEST                   Level0
15 OPTMODTYPETEST                        Level0
16 QSFPPLUSPRESENCETEST                  Level0
17 CPU>TypeDETECTTEST                    Level0
101 RTCFUNCTIONTEST                      Level1
102 RTCRLOVERTEST                        Level1
103 GPIOACCESSTEST                       Level1
104 FSOCACCESSTEST                       Level1
105 FCIEBCM538846ACCESSTEST              Level1
106 CPUSDRAIMACCESSTEST                  Level1
107 CPUSDRAIMDATALINETEST                Level1
108 CPUSDRACHARREDACCESSTEST             Level1
109 USBFILECOPYTEST                      Level1
110 FLASHRWTEST                          Level1
111 I2CSTRESSTEST                        Level1
112 AVSPWRCNTRLACCESSTEST                Level1
113 SERVERPORTPHYACCESSTEST              Level1
114 SERVERPORTPHYRWTEST                  Level1
115 QSFPPLUSPHYACCESSTEST                Level1
116 QSFPPLUSPHYRWTEST                     Level1

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Debugging and Diagnostics
Example 4
(show diag testcase stack-unit interactive Command)

Dell#show diag testcase stack-unit 0 interactive

Navasota Diagnostics Test

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Description</th>
<th>Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>POWERLEDTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>402</td>
<td>DEBUGLEDTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>403</td>
<td>STATUSLEDTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>404</td>
<td>OPTMODLEDCONTROLTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>405</td>
<td>FIXEDLEDCONTROLTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>406</td>
<td>RTCBATTERYTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>407</td>
<td>CPLDRESETTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>408</td>
<td>I2CDEVICESCANTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>409</td>
<td>SERVERPORTPHYEXTLINKTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>410</td>
<td>CPUSNAKEOPTMODEXTLPBKTEST</td>
<td>Interactive</td>
</tr>
<tr>
<td>411</td>
<td>CPUSNAKEOPTMODEXTLPBKTEST</td>
<td>Interactive</td>
</tr>
</tbody>
</table>

Total Diagnostic Testcases in Interactive: 11

END

show hardware stack-unit

Display the data plane or management plane input and output statistics of the designated component of the designated stack member.

Syntax

show hardware stack-unit 0-5 {buffer [buffer unit | port [(1-56) | all] total buffer | buffer unit (1) port (1-56) queue [(0-14) | all] buffer-info} [phy-firmware-version] [cpu data-plane statistics [stack-port 0-52] | cpu party-bus statistics | cpu private-mgmt statistics | drops [unit 0-1 [port 1-56]] | stack-port 33-56 | unit 0-0 [counters | details | port-stats [detail] | register]}

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<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>stack-unit 0–5</td>
<td>Enter the keywords <code>stack-unit</code> then 0 to 5 to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered.</td>
</tr>
<tr>
<td>(command-option)</td>
<td></td>
</tr>
<tr>
<td>buffer</td>
<td>Enter the keyword <code>buffer</code>. To display the total buffer statistics for the stack unit, enter the keyword <code>total-buffer</code>. Enter the keywords <code>buffer unit</code> then <code>total-buffer</code> to display the buffer details per unit and mode of allocation. To display the forwarding plane statistics containing the packet buffer usage per port per stack unit, enter the keywords <code>buffer unit</code> then <code>port</code> and the port number (1-56 or all), then <code>buffer-info</code>. To display the forwarding plane statistics containing the packet buffer statistics per COS per port, enter the keywords <code>buffer unit</code> and <code>port</code> (1-56), and <code>queue</code> (0-14 or all), and <code>buffer-info</code>. The buffer unit default is 1.</td>
</tr>
<tr>
<td>fpga</td>
<td>Enter the keyword <code>fpga</code>, to display fpga details.</td>
</tr>
<tr>
<td>fru</td>
<td>Enter the keyword <code>fru</code>, to display fru details.</td>
</tr>
<tr>
<td>phy-firmware-version</td>
<td>Each member of the stack is updated automatically with the latest firmware while booting as well as during OIR. To dump the physical firmware version for stack units, enter the keywords <code>phy-firmware-version</code>.</td>
</tr>
<tr>
<td>cpu data-plane statistics</td>
<td>Enter the keywords <code>cpu data-plane statistics</code>, optionally followed by the keywords <code>stack</code> port and its number from 0 to 52 to display the data plane statistics, which shows the High Gig (Higig) port raw input/output counter statistics to which the stacking module is connected.</td>
</tr>
<tr>
<td>cpu party-bus statistics</td>
<td>Enter the keywords <code>cpu party-bus statistics</code>, to display the Management plane input/output counter statistics of the Private Management interface.</td>
</tr>
<tr>
<td>cpu private-mgmt statistics</td>
<td>Enter the keywords <code>cpu private-mgmt statistics</code>, to display the Management plane input/output counter statistics of the Private Management interface.</td>
</tr>
<tr>
<td>drops [unit 0–0 [port 1–56]]</td>
<td>Enter the keyword <code>drops</code> to display internal drops on the selected stack member. Optionally, use the keyword <code>unit</code> with 0 to select port-pipe 0, and then use <code>port</code> 1-56 to select a port on that port-pipe.</td>
</tr>
<tr>
<td>stack-port 33–56</td>
<td>Enter the keywords <code>stack-port</code> and a stacking port number to select a stacking port for which to display statistics. Identify the stack port number as you would to identify a 10G port that was in the same place in one of the rear modules.</td>
</tr>
</tbody>
</table>
NOTE: You can identify stack port numbers by physical inspection of the rear modules. The numbering is the same as for the 10G ports. You can also inspect the output of the `show system stack-ports` command.

```
unit 0–0
  (counters |
   details | port-
   stats [detail] |
   register)
```

Enter the keyword `unit` then 0 for port-pipe 0, and then enter one of the following keywords to troubleshoot errors on the selected port-pipe and to give status on why a port is not coming up to register level: `counters`, `details`, `port-stats [detail]`, or `register`.

**Defaults**

none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

Version 8.3.17.0   Supported on the M I/O Aggregator.

**Example (show hardware stack-unit phy-firmware-version Command)**

```
Dell#show hardware stack-unit 1 phy-firmware-version
PortNumber  Status        Programmed Version            SW
Version
========================================================================================
41           Present        01.05
01.05
42           Present        01.05
01.05
43           Present        01.05
01.05
44           Present        01.05
01.05
45           Not Present    N/A
N/A
46           Not Present    N/A
N/A
47           Not Present    N/A
N/A
48           Not Present    N/A
N/A
49           Present        01.06
01.06
50           Present        01.06
01.06
51           Present        01.06
01.06
52           Present        01.06
01.06
53           Present        01.06
01.06
54           Present        01.06
01.06
55           Present        01.06
01.06
56           Present        01.06
01.06
Dell#
```
In the above example, the **Status** field represents presence of OPTM ports, **Programmed version** field represents loaded firmware version, and **SW version** represents the SDK version.

### Example (data-plane)

```plaintext
Dell#show hardware stack-unit 1 cpu data-plane statistics

bc pci driver statistics for device:
rxHandle        :7392
noMhdr          :0
noMbuf          :0
noClus          :0
recvd           :7392
dropped         :0
recvToNet       :7392
rxError         :0
rxDatapathErr   :0
rxPkt(COS0)     :0
rxPkt(COS1)     :0
rxPkt(COS2)     :10
rxPkt(COS3)     :0
rxPkt(COS4)     :0
rxPkt(COS5)     :338
rxPkt(COS6)     :0
rxPkt(COS7)     :7044
rxPkt(UNIT0)    :7392
transmitted     :29899
txRequested     :29899
noTxDesc        : 0
txError         :0
txReqTooLarge   :0
txInternalError :0
txDatapathErr   :0
txPkt(COS0)     :0
txPkt(COS1)     :0
txPkt(COS2)     :0
txPkt(COS3)     :0
txPkt(COS4)     :0
txPkt(COS5)     :0
txPkt(COS6)     :0
txPkt(COS7)     :0
txPkt(UNIT0)    :0
Dell#
```

### Example

```plaintext
Dell#show hardware stack-unit 1 cpu party-bus statistics

Input Statistics:
8189 packets, 8076608 bytes
0 dropped, 0 errors
Output Statistics:
366 packets, 133100 bytes
0 errors
Dell#
```

### Example (drops)

```plaintext
Dell#show hard stack-unit 1 drops
UNIT No: 0

Total Ingress Drops : 7448
Total IngMac Drops : 0
Total Mmu Drops : 0
Total EgMac Drops : 0
```
Total Egress Drops : 16
Dell#

Example (drop summary)
Dell#show hardware stack-unit 1 drops unit 0
UserPort PortNumber Ingress Drops IngMac Drops Total Mmu Drops EgMac Drops Egress Drops
1 1 0 0 0
0 0 0
2 2 0 0
0 0 0
3 3 0 0
0 0 0
4 4 0 0
0 0 0
5 5 728 0 0
0 0 0
6 6 0 0
0 0 0
7 7 0 0
0 0 0
8 8 0 0
0 0 0
9 9 0 0
0 0 0
10 10 0 0
0 0 0
--More--
Dell#

Example (drop counters)
Dell#show hardware stack-unit 0 drops unit 0 port 27
--- Ingress Drops ---
Ingress Drops : 0
IBP CBP Full Drops : 0
PortSTPnotFwd Drops : 0
IPv4 L3 Discards : 0
Policy Discards : 0
Packets dropped by FP : 0
(L2+L3) Drops : 0
Port bitmap zero Drops : 0
Rx VLAN Drops : 0
--- Ingress MAC counters---
Ingress FCSDrops : 0
Ingress MTUExceeds : 0
--- MMU Drops ---
HOL DROPS : 0
TxPurge CellErr : 0
Aged Drops : 0
--- Egress MAC counters---
Egress FCS Drops : 0
--- Egress FORWARD PROCESSOR Drops ---
IPv4 L3UC Aged & Drops : 0

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Example (port-statistics)

Dell#show hardware stack-unit 1 unit 0 port-stats
ena/ speed/ link auto STP  lrn inter
max
loop
port link duplex scan neg?  state pause discrd ops face
frame back
xe0  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe1  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1554
xe2  up   1G FD      SW Yes Forward  None  FA  GMII 11996
xe3  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe4  down 10G FD     SW Yes Block     None  FA  KR  8996
xe5  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe6  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe7  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe8  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe9  !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe10 down 10G FD     SW Yes Forward  Tag  F  KR  1550
xe11 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe12 !ena  1G FD      SW Yes Block     None  FA  GMII 11996
xe13 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe14 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe15 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe16 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe17 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe18 down 1G FD      SW Yes Forward  Tag  F  GMII 1550
xe19 !ena  1G FD      SW Yes Forward  Tag  F  GMII 1550
xe20 down 1G FD      SW Yes Forward  Tag  F  GMII 1550
--More--

Example (register)

Dell#show hardware stack-unit 0 unit 0 register
0x0f180d34 ALTERNATE_EMIRROR_BITMAP_PARITY_CONTROL.ipipe0 =
0x00000001
0x0f180d35 ALTERNATE_EMIRROR_BITMAP_PARITY_STATUS_INTR.ipipe0 =
0x00000000
0x0f180d36 ALTERNATE_EMIRROR_BITMAP_PARITY_STATUS_NACK.ipipe0 =
0x00000000
0x0018070c ARB_EOP_DEBUG.ipipe0 = 0x00000000
0x00180312 ARB_RAM_DBGCTRL.ipipe0 = 0x00000000
0x03300000 ASF_PORT_SPEED.cpu0 = 0x00000000
0x03322000 ASF_PORT_SPEED.xe0 = 0x00000000
0x03326000 ASF_PORT_SPEED.xe1 = 0x00000000
0x0332a000 ASF_PORT_SPEED.xe2 = 0x00000000
0x0332e000 ASF_PORT_SPEED.xe3 = 0x00000000
0x03330000 ASF_PORT_SPEED.xe4 = 0x00000000
0x03332000 ASF_PORT_SPEED.xe5 = 0x00000000
0x03336000 ASF_PORT_SPEED.xe6 = 0x00000000
0x0333a000 ASF_PORT_SPEED.xe7 = 0x00000000
0x03340000 ASF_PORT_SPEED.xe8 = 0x00000000
0x03344000 ASF_PORT_SPEED.xe9 = 0x00000000
0x03348000 ASF_PORT_SPEED.xe10 = 0x00000000
0x0334c000 ASF_PORT_SPEED.xe11 = 0x00000000
0x03350000 ASF_PORT_SPEED.xe12 = 0x00000000
Example (unit details)

Dell#show hardware stack-unit 0 unit 0 details
********************************************************************************
The total no of FP & CSF Devices in the Card is 1
The total no of FP Devices in the Card is 1
The total no of CSF Devices in the Card is 0
The number of ports in device 0 is - 49
The number of Hg ports in devices 0 is - 1
The CPU Port of the device is 0
The staring unit no the SWF in the device is 0
********************************************************************************
bcmLinkMonStatusShow: The Current Link Status Is
Front End Link Status 0x200000000000000000000000
Front End Port Present Status 0x000000000000000000000000
Back Plane Link Status 0x00000000
********************************************************************************
Link Status of all the ports in the Device - 0
The linkStatus of Front End Port 1 is FALSE
The linkStatus of Front End Port 2 is FALSE
The linkStatus of Front End Port 3 is TRUE
The linkStatus of Front End Port 4 is FALSE
The linkStatus of Front End Port 5 is FALSE
The linkStatus of Front End Port 6 is FALSE
The linkStatus of Front End Port 7 is FALSE
The linkStatus of Front End Port 8 is FALSE
The linkStatus of Front End Port 9 is FALSE
The linkStatus of Front End Port 10 is FALSE
The linkStatus of Front End Port 11 is FALSE
The linkStatus of Front End Port 12 is FALSE
The linkStatus of Front End Port 13 is FALSE
The linkStatus of Front End Port 14 is FALSE
The linkStatus of Front End Port 15 is FALSE
The linkStatus of Front End Port 16 is FALSE
The linkStatus of Front End Port 17 is FALSE
The linkStatus of Front End Port 18 is FALSE
The linkStatus of Front End Port 19 is FALSE
The linkStatus of Front End Port 20 is FALSE
The linkStatus of Front End Port 21 is FALSE
The linkStatus of Front End Port 22 is FALSE
The linkStatus of Front End Port 23 is FALSE
The linkStatus of Front End Port 24 is FALSE
The linkStatus of Front End Port 25 is FALSE
The linkStatus of Front End Port 26 is FALSE
The linkStatus of Front End Port 27 is FALSE
The linkStatus of Front End Port 28 is FALSE
!------------------ output truncated ----------------!
The linkStatus of Front End Port 29 is FALSE
The linkStatus of Front End Port 30 is FALSE
The linkStatus of Front End Port 31 is FALSE
The linkStatus of Front End Port 32 is FALSE
The linkStatus of Front End Port 37 is FALSE

Example
(buffer)

Dell#show hardware stack-unit 0 buffer total-buffer
Dell#sh hardware stack-unit 0 buffer total-buffer
Total Buffers allocated per Stack-Unit 46080

Example
(specific port)

Dell(conf)#show hardware stack-unit 0 buffer unit 0 port 1
buffer-info
----- Buffer Stats for Unit 0 Port 1 -----
Maximum Shared Limit for the Port: 30720
Default Packet Buffer allocate for the Port: 120
Used Packet Buffer for the Port: 0

Example
(queue buffer)

Dell(conf)#show hardware stack-unit 0 buffer unit 0 port 1
queue 2 buffer-info
----- Buffer Stats for Unit 0 Port 1 Queue 2 -----
Maximum Shared Limit: 30720
Default Packet Buffer allocate for the Queue: 8
Used Packet Buffer: 0

Related
Commands

show interfaces stack-unit — displays information on all interfaces on a specific stack member.

show processes cpu — displays CPU usage information based on running processes.

show system stack-ports — displays information about the stacking ports on all switches in the stack.

show system — displays the current status of all stack members or a specific member.

show hardware system-flow

Display Layer 2 ACL or QoS data for the selected stack member and stack member port-pipe.

Syntax

show hardware system-flow layer2 stack-unit 0–5 port-set 0–0 [counters]

Parameters

acl | qos

For the selected stack member and stack member port-pipe, display which system flow entry the packet hits and what queue the packet takes as it dumps the raw system flow tables.

stack-unit 0–5

Enter the keywords stack-unit then 0 to 5 to select a stack member ID.
port-set 0–0  Enter the keywords `port-set` with a port-pipe number—0.

[counters]  (OPTIONAL) Enter the keyword `counters` to display hit counters for the selected ACL or QoS option.

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 8.3.17.0  Supported on the M I/O Aggregator.

Example

```
Dell#show hardware system-flow layer2 stack-unit 0 port-set 0 counters

<table>
<thead>
<tr>
<th>EntryId</th>
<th>Description</th>
<th>#HITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2048</td>
<td>STP BPDU Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2047</td>
<td>LLDP BPDU Redirects</td>
<td>164904</td>
</tr>
<tr>
<td>2045</td>
<td>LACP traffic Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2044</td>
<td>GVRP traffic Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2043</td>
<td>ARP Reply Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2042</td>
<td>802.1x frames Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2041</td>
<td>VRRP frames Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2040</td>
<td>IPv6VRRP frames Redirects</td>
<td>0</td>
</tr>
<tr>
<td>2039</td>
<td>GRAT ARP</td>
<td>0</td>
</tr>
<tr>
<td>2036</td>
<td>IPv6 Mcast Control Traffic</td>
<td>128840</td>
</tr>
<tr>
<td>2000</td>
<td>VLT ARP SYNC Frames</td>
<td>0</td>
</tr>
<tr>
<td>1999</td>
<td>ICL Hellos</td>
<td>0</td>
</tr>
<tr>
<td>1998</td>
<td>ICL MAC SYNC Frames</td>
<td>0</td>
</tr>
<tr>
<td>1997</td>
<td>VLT Tunneled STP Frames</td>
<td>0</td>
</tr>
<tr>
<td>1995</td>
<td>DROP Cases</td>
<td>43207</td>
</tr>
<tr>
<td>1917</td>
<td>L3 Term Traffic ClassID 1 to Q6</td>
<td>0</td>
</tr>
<tr>
<td>1916</td>
<td>L3 CPU Bound Traffic ClassId 2 to Q5</td>
<td>0</td>
</tr>
<tr>
<td>1915</td>
<td>Unknown MCAST Packets</td>
<td>0</td>
</tr>
<tr>
<td>1792</td>
<td>BGP with TTL1, L4 SRC port Redirects</td>
<td>0</td>
</tr>
<tr>
<td>1791</td>
<td>BGP with TTL1, L4 DST Port Redirects</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Example (non-counters)

```
Dell#show hardware system-flow layer2 stack-unit 0 port-set 0

FP Entry for redirecting STP BPDU to CPU Port

EID 2048: gid=1, slice=15, slice_idx=0x00, prio=0x800, flags=0x82, Installed tcam: color_indep=0, higig=0, higig_mask=0, KEY=0x00000000 00000000 00000000 0180c200 00000000 00000000 ffff0000 00000000 0x00
, FPF4=0x00
, MASK=0000000000 00000000 00000000 ffff0000 00000000 0x00
, 0x00
, action={act=Drop, param0=0(0x00), param1=0(0x00)},
, action={act=CosQcpuNew, param0=7(0x07), param1=0(0x00)},
, action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
, action={act=UpdateCounter, param0=1(0x01),
```

Debugging and Diagnostics  309
param1=0(0x00),
    meter=NULL,
    counter={idx=0, mode=0x01, entries=1}

################ FP Entry for redirecting LLDP BPDU to RSM
################
EID 2047: gid=1,
slice=15, slice_idx=0x01, prio=0x7ff, flags=0x82,
Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
    KEY=0x00000000 00000000 00000000 0180c200 000e0000 00000000 00000000
action={act=Drop, param0=0(0x00), param1=0(0x00)},
pparam1=0(0x00)
    action={act=CosQCpuNew, param0=7(0x07),
    param1=0(0x00)},
action={act=CopyToCpu, param0=0(0x00),
    param1=0(0x00)},
action={act=UpdateCounter, param0=1(0x01),
    param1=0(0x00)},
    meter=NULL,
    counter={idx=1, mode=0x01, entries=1}

############## FP Entry for redirecting LACP traffic to CPU Port ############
EID 2045: gid=1,
slice=15, slice_idx=0x02, prio=0x7fd, flags=0x82,
Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
    KEY=0x00000000 00000000 00000000 0180c200 00020000 00000000 00000000
action={act=Drop, param0=0(0x00), param1=0(0x00)},
pparam1=0(0x00)
    action={act=CosQCpuNew, param0=7(0x07),
    param1=0(0x00)},
action={act=CopyToCpu, param0=0(0x00),
    param1=0(0x00)},
action={act=UpdateCounter, param0=1(0x01),
    param1=0(0x00)},
    meter=NULL,
    counter={idx=1, mode=0x01, entries=1}

################# FP Entry for redirecting GVRP traffic to RSM
###########
EID 2044: gid=1,
slice=15, slice_idx=0x03, prio=0x7fc, flags=0x82,
Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
    KEY=0x00000000 00000000 00000000 0180c200 00210000 00000000 00000000
action={act=Drop, param0=0(0x00), param1=0(0x00)},
pparam1=0(0x00)
    action={act=CosQCpuNew, param0=7(0x07),
    param1=0(0x00)},
action={act=CopyToCpu, param0=0(0x00),
    param1=0(0x00)},
action={act=UpdateCounter, param0=1(0x01),
    param1=0(0x00)},
    meter=NULL,
    counter={idx=2, mode=0x01, entries=1}
param1=0(0x00)},
        action={act=UpdateCounter, param0=1(0x01),
        param1=0(0x00)},
    meter=NULL,
    counter={idx=3, mode=0x01, entries=1}

################# FP Entry for redirecting ARP Replies to RSM
#################
EID 2043: gid=1,
        slice=15, slice_idx=0x04, prio=0x7fb, flags=0x82,
Installed
        tcam: color_indep=0, higig=0, higig_mask=0,
        KEY=0x00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
        , FPF4=0x00
        MASK=0x00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
        , 0x00
        action={act=Drop, param0=0(0x00), param1=0(0x00)},
        action={act=CosQCpuNew, param0=6(0x06),
        param1=0(0x00)},
        action={act=CopyToCpu, param0=0(0x00),
        param1=0(0x00)},
        action={act=UpdateCounter, param0=1(0x01),
        param1=0(0x00)},
!--------- output truncated -----------------!


FC Flex IO Modules

Data Center Bridging (DCB) for FC Flex IO Modules

Interworking of DCB Map With DCB Buffer Threshold Settings
the dcb-buffer-threshold configuration is present on a stack port or any interface, the dcb-input or dcb-output policies cannot be applied on those interfaces.

Example: When the dcb-buffer-threshold policy is applied on interfaces or stack ports with the dcb-input or dcb-output policies, the following error message is displayed:

%Error: dcb-buffer-threshold not supported on interfaces with deprecated commands

Example: When the dcb-input or dcb-output policy is configured on interfaces or stack ports with the dcb-buffer threshold policy, the following error message is displayed:

%Error: Deprecated command is not supported on interfaces with dcb-buffer-threshold configured

You must not modify the service-class dot1p mappings when any buffer-threshold-policy is configured on the system.

Dell(conf)#service-class dot1p-mapping dot1p0 3

% Error: PFC buffer-threshold policies conflict with dot1p mappings. Please remove all dcb-buffer-threshold policies to change mappings.

The show dcb command has been enhanced to display the following additional buffer-related information:

Dell (conf)#do show dcb
  dcbb Status :  Enabled
  PFC Queue Count :  2 --Indicate the PFC queue configured.
  Total buffer (lossy + lossless) (in KB): 7787 --Total buffer space for lossy and lossless queues
  PFC total buffer (in KB): 6526 --Indicates the total buffer (configured or default)
  PFC shared buffer (in KB): 832 --Indicates the shared buffer (Configured or default)
  PFC available buffer (in KB): 5694 --Indicates remaining available buffers for PFC that are free to be allocated

dcb-map

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

Syntax

dcb-map map-name

Parameters

map-name Enter a DCB map name. The maximum number of alphanumeric characters is 32.

Defaults

None. There are no pre-configured PFC and ETS settings on S5000 Ethernet interfaces.

Command Modes

CONFIGURATION

INTERFACE

Command History

Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator.
A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).

To display the PFC and ETS settings in DCB maps, enter the `show qos dcb-map` command.

Use the `dcb-map` command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The `dcb-map` command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the `no dcb-map map-name` command in Interface configuration mode.

### Related Commands

- `show qos dcb-map`—Displays the dcb-map profiles configured on the system.
- `dcb-map stack-unit all stack-ports all`—Applies a DCB map on all ports of a switch stack.

### priority-pgid

Assign 802.1p priority traffic to a priority group in a DCB map.

**FC Flex IO Modules with M I/O Aggregator**

#### Syntax

```
priority-pgid dot1p0_group-num dot1p1_group-num dot1p2_group-num dot1p3_group-num dot1p4_group-num dot1p5_group-num dot1p6_group-num dot1p7_group-num
```

#### Parameters

- `dot1p0_group-num`
- `dot1p1_group-num`
- `dot1p2_group-num`
- `dot1p3_group-num`
- `dot1p4_group-num`
- `dot1p5_group-num`
- `dot1p6_group-num`

Enter the priority group number for each 802.1p class of traffic in a DCB map.
**dot1p7_group-num**

**Defaults**
None

**Command Modes**
DCB MAP

**Command History**
Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator

**Usage Information**
PFC and ETS settings are not pre-configured on Ethernet ports. You must use the `dcb-map` command to configure different groups of 802.1p priorities with PFC and ETS settings.

Using the `priority-pgid` command, you assign each 802.1p priority to one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group. For example, the `priority-pgid 0 0 0 1 2 4 4 4` command creates the following groups of 802.1p priority traffic:

- Priority group 0 contains traffic with dot1p priorities 0, 1, and 2.
- Priority group 1 contains traffic with dot1p priority 3.
- Priority group 2 contains traffic with dot1p priority 4.
- Priority group 4 contains traffic with dot1p priority 5, 6, and 7.

To remove a priority-pgid configuration from a DCB map, enter the `no priority-pgid` command.

**Related Commands**
`dcb-map` — Creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

`priority-group bandwidth pfc` — Configures the ETS bandwidth allocation and the PFC setting used to manage the port traffic in an 802.1p priority group.

**priority-group bandwidth pfc**

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

**FC Flex IO Modules with M I/O Aggregator**

**Syntax**
```
priority-group group-num {bandwidth percentage| strict-priority} pfc {on | off}
```

**Parameters**
- `priority-group group-num`: Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.
Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.

Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.

Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

**Defaults**

None

**Command Modes**

DCB MAP

**Command History**

Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator.

Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.

Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.
Related Commands

dcb-map – Creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

priority-pgid – Configures the 802.1p priority traffic in a priority group for a DCB map.

dcb-map stack-unit all stack-ports all
Apply the specified DCB map on all ports of the switch stack.

**FC Flex IO Modules with I/O Aggregator**

Syntax

dcb-map stack-unit all stack-ports all dcb-map-name

To remove the PFC and ETS settings in a DCB map from all stack units, use the no dcb-map stack-unit all stack-ports all command.

Parameters

dcb-map-name Enter the name of the DCB map.

Defaults

None

Command Modes

CONFIGURATION

Command History

Version 9.3(0.0) Introduced on the FC Flex IO Modules with I/O Aggregator.

Usage Information

The dcb-map stack-unit all stack-ports all command overwrites any previous DCB maps applied to stack ports.

Related Commands

dcb-map – creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

show qos dcb-map
Display the DCB parameters configured in a specified DCB map.

**FC Flex IO Modules with M I/O Aggregator**

Syntax

show qos dcb-map map-name

Parameters

map-name Displays the PFC and ETS parameters configured in the specified map.

Command Modes

• EXEC
• EXEC Privilege

Command History

Version 9.3(0.0) Introduced on the FC Flex IO module installed in the M I/O Aggregator.
Use the `show qos dcb-map` command to display the enhanced transmission selection (ETS) and priority-based flow control (PFC) parameters used to configure server-facing Ethernet ports. S5000 Ethernet ports are DCBx-enabled by default.

The following table describes the `show qos dcb-map` output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Complete: All mandatory DCB parameters are correctly configured. In progress: The DCB map configuration is not complete. Some mandatory parameters are not configured.</td>
</tr>
<tr>
<td>PFC Mode</td>
<td>PFC configuration in DCB map: On (enabled) or Off.</td>
</tr>
<tr>
<td>PG</td>
<td>Priority group configured in the DCB map.</td>
</tr>
<tr>
<td>TSA</td>
<td>Transmission scheduling algorithm used by the priority group: Enhanced Transmission Selection (ETS).</td>
</tr>
<tr>
<td>BW</td>
<td>Percentage of bandwidth allocated to the priority group.</td>
</tr>
<tr>
<td>PFC</td>
<td>PFC setting for the priority group: On (enabled) or Off.</td>
</tr>
<tr>
<td>Priorities</td>
<td>802.1p priorities configured in the priority group.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell# show qos dcb-map dcbmap2

State :Complete
PfcMode:ON

-------------------
PG:0 TSA:ETS BW:50 PFC:OFF
Priorities:0 1 2 4 5 6 7

PG:1 TSA:ETS BW:50 PFC:ON
Priorities:3
```

**Related Commands**

- `dcb-map` — creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

**DCB Command**

The following DCB command is supported on the FC Flex IO module installed in the M I/O Aggregator.

**dcb-enable**

Enable data center bridging.

**Syntax**

```
dcb enable
```

To disable DCB, use the `no dcb enable` command.

**Defaults**

- none
**Command Modes**

CONFIGURATION

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator.

**Usage Information**

DCB is not supported if you enable link-level flow control on one or more interfaces.

### DCBX Commands

The following DCBX commands are supported on the FC Flex IO module installed in the M I/O Aggregator.

#### advertise dcbx-appln-tlv

On a DCBX port with a manual role, configure the application priority TLVs advertised on the interface to DCBX peers.

**Syntax**

```
advertise dcbx-appln-tlv {fcoe | iscsi}
```

To remove the application priority TLVs, use the `no advertise dcbx-appln-tlv {fcoe | iscsi}` command.

**Parameters**

- `{fcoe | iscsi}`  
  - Enter the application priority TLVs, where:
    - `fcoe`: enables the advertisement of FCoE in application priority TLVs.
    - `iscsi`: enables the advertisement of iSCSI in application priority TLVs.

**Defaults**

Application priority TLVs are enabled to advertise FCoE and iSCSI.

**Command Modes**

PROTOCOL LLDP

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Usage Information**

To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-appln-tlv iscsi`.

#### advertise dcbx-tlv

On a DCBX port with a manual role, configure the PFC and ETS TLVs advertised to DCBX peers.

**Syntax**

```
advertise dcbx-tlv {ets-conf | ets-reco | pfc} [ets-conf | ets-reco | pfc]
```

To remove the advertised ETS TLVs, use the `no advertise dcbx-tlv` command.

**Parameters**

- `{ets-conf | ets-reco | pfc}`  
  - Enter the application priority TLVs.

**Defaults**

Application priority TLVs are enabled to advertise FCoE and iSCSI.

**Command Modes**

PROTOCOL LLDP

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Usage Information**

To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-appln-tlv iscsi`.
Enter the PFC and ETS TLVs advertised, where:

- `ets-conf`: enables the advertisement of ETS configuration TLVs.
- `ets-reco`: enables the advertisement of ETS recommend TLVs.
- `pfc`: enables the advertisement of PFC TLVs.

**Defaults**

All PFC and ETS TLVs are advertised.

**Command Modes**

PROTOCOL LLDP

**Command History**

Version 9.3.0.0
Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Usage Information**

You can configure the transmission of more than one TLV type at a time; for example: `advertise dcbx-tlv ets-conf ets-reco`.

You can enable ETS recommend TLVs (`ets-reco`) only if you enable ETS configuration TLVs (`ets-conf`). To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-tlv pfc ets-reco`.

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

dcbx port-role

Configure the DCBX port role the interface uses to exchange DCB information.

**Syntax**

dcbx port-role {config-source | auto-downstream | auto-upstream | manual}

To remove DCBX port role, use the `no dcbx port-role {config-source | auto-downstream | auto-upstream | manual}` command.

**Parameters**

- `config-source | auto-downstream | auto-upstream | manual`

Enter the DCBX port role, where:

- `config-source`: configures the port to serve as the configuration source on the switch.
- `auto-upstream`: configures the port to receive a peer configuration. The configuration source is elected from auto-upstream ports.
- `auto-downstream`: configures the port to accept the internally propagated DCB configuration from a configuration source.
manual: configures the port to operate only on administer-configured DCB parameters. The port does not accept a DCB configuration received form a peer or a local configuration source.

<table>
<thead>
<tr>
<th>Defaults</th>
<th>Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Modes</td>
<td>INTERFACE PROTOCOL LLDP</td>
</tr>
<tr>
<td>Command History</td>
<td>Version 9.3.0.0</td>
</tr>
<tr>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch</td>
<td></td>
</tr>
</tbody>
</table>

Usage Information
DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.
Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

dcbx version
Configure the DCBX version used on the interface.

Syntax
```
dcbx version {auto | cee | cin | ieee-v2.5}
```

To remove the DCBX version, use the `dcbx version {auto | cee | cin | ieee-v2.5}` command.

Parameters
```
| auto | cee | cin | ieee-v2.5 |
```
Enter the DCBX version type used on the interface, where:
- **auto**: configures the port to operate using the DCBX version received from a peer.
- **cee**: configures the port to use CDD (Intel 1.01).
- **cin**: configures the port to use Cisco-Intel-Nuova (DCBX 1.0).
- **ieee-v2**: configures the port to use IEEE 802.1az (Draft 2.5).

Defaults
Auto

Command Modes
INTERFACE PROTOCOL LLDP

Command History
Version 9.3.0.0 |
Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

Usage Information
DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.
Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

**debug dcbx**

Enable DCBX debugging.

**Syntax**

```plaintext
debug dcbx {all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}
```

To disable DCBX debugging, use the `no debug dcbx` command.

**Parameters**

- `{all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}`

Enter the type of debugging, where:

- `all`: enables all DCBX debugging operations.
- `auto-detect-timer`: enables traces for DCBX auto-detect timers.
- `config-exchng`: enables traces for DCBX configuration exchanges.
- `fail`: enables traces for DCBX failures.
- `mgmt`: enables traces for DCBX management frames.
- `resource`: enables traces for DCBX system resource frames.
- `sem`: enables traces for the DCBX state machine.
- `tlv`: enables traces for DCBX TLVs.

**Defaults**

none

**Command Modes**

EXEC Privilege

**Command History**

Version 9.3.0.0

Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**fcoe priority-bits**

Configure the FCoE priority advertised for the FCoE protocol in application priority TLVs.

**Syntax**

```plaintext
fcoe priority-bits priority-bitmap
```

To remove the configured FCoE priority, use the `no fcoe priority-bits` command.

**Parameters**

- `priority-bitmap`

Enter the priority-bitmap range. The range is from 1 to FF.

**Defaults**

0x8

---

FC Flex IO Modules 323
### iscsi priority-bits

Configure the iSCSI priority advertised for the iSCSI protocol in application priority TLVs.

**Syntax**

```
iscsi priority-bits priority-bitmap
```

To remove the configured iSCSI priority, use the `no iscsi priority-bits` command.

**Parameters**

- **priority-bitmap**
  - Enter the priority-bitmap range. The range is from 1 to FF.

**Defaults**

0x10

**Command Modes**

PROTOCOL LLDP

**Command History**

- **Version 9.3.0.0**
  - Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Usage Information**

This command is available at the global level only.

### show interface dcbx detail

Displays the DCBX configuration on an interface.

**Syntax**

```
show interface port-type slot/port dcbx detail
```

**Parameters**

- **port-type**
  - Enter the port type.

- **slot/port**
  - Enter the slot/port number.

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.3.0.0**
  -Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**

To clear DCBX frame counters, use the `clear dcbx counters interface stack-unit/port` command.
The following describes the `show interface dcbx detail` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with chassis slot and port number.</td>
</tr>
<tr>
<td>Port-Role</td>
<td>Configured the DCBX port role: auto-upstream, auto-downstream, config-source, or manual.</td>
</tr>
<tr>
<td>DCBX Operational</td>
<td>Operational status (enabled or disabled) used to elect a configuration source and internally propagate a DCB configuration. The DCBX operational status is the combination of PFC and ETS operational status.</td>
</tr>
<tr>
<td>Configuration</td>
<td>Specifies whether the port serves as the DCBX configuration source on the switch: true (yes) or false (no).</td>
</tr>
<tr>
<td>Source</td>
<td></td>
</tr>
<tr>
<td>Local DCBX</td>
<td>DCBX version accepted in a DCB configuration as compatible. In auto-upstream mode, a port can only receive a DCBX version supported on the remote peer.</td>
</tr>
<tr>
<td>Compatibility mode</td>
<td></td>
</tr>
<tr>
<td>Local DCBX</td>
<td>DCBX version configured on the port: CEE, CIN, IEEE v2.5, or Auto (port auto-configures to use the DCBX version received from a peer).</td>
</tr>
<tr>
<td>Configured mode</td>
<td>DBCX version that the peer uses to exchange DCB parameters.</td>
</tr>
<tr>
<td>Peer Operating</td>
<td>Transmission status (enabled or disabled) of advertised DCB TLVs (see TLV code at the top of the show command output).</td>
</tr>
<tr>
<td>version</td>
<td></td>
</tr>
<tr>
<td>Local DCBX TLVs</td>
<td>DBCX version advertised in Control TLVs.</td>
</tr>
<tr>
<td>Transmitted</td>
<td>DBCX version advertised in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX</td>
<td>Highest DCBX version supported in Control TLVs.</td>
</tr>
<tr>
<td>Status: DCBX</td>
<td>Sequence number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Operational</td>
<td>Acknowledgement number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Version</td>
<td>Current operational state of the DCBX protocol: ACK or IN-SYNC.</td>
</tr>
<tr>
<td>Local DCBX</td>
<td></td>
</tr>
<tr>
<td>Status: DCBX Max</td>
<td></td>
</tr>
<tr>
<td>Version Supported</td>
<td></td>
</tr>
<tr>
<td>Local DCBX</td>
<td></td>
</tr>
<tr>
<td>Status: Sequence</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Local DCBX</td>
<td></td>
</tr>
<tr>
<td>Status: Acknowledgment</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Local DCBX</td>
<td></td>
</tr>
<tr>
<td>Status: Protocol</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX Operational Version</td>
<td>DCBX version advertised in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX Max Version Supported</td>
<td>Highest DCBX version supported in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Peer DCBX Status: Sequence Number</td>
<td>Sequence number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Peer DCBX Status: Acknowledgment Number</td>
<td>Acknowledgement number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Total DCBX Frames transmitted</td>
<td>Number of DCBX frames sent from the local port.</td>
</tr>
<tr>
<td>Total DCBX Frames received</td>
<td>Number of DCBX frames received from the remote peer port.</td>
</tr>
<tr>
<td>Total DCBX Frame errors</td>
<td>Number of DCBX frames with errors received.</td>
</tr>
<tr>
<td>Total DCBX Frames unrecognized</td>
<td>Number of unrecognizable DCBX frames received.</td>
</tr>
</tbody>
</table>

Example

Dell(conf)# show interface tengigabitethernet 0/49 dcbx detail
Dell#show interface te 0/49 dcbx detail

E-ETS Configuration TLV enabled
e-ETS Configuration TLV disabled
R-ETS Recommendation TLV enabled
  r-ETS Recommendation TLV disabled
P-PFC Configuration TLV enabled
  p-PFC Configuration TLV disabled
F-Application priority for FCOE enabled
  f-Application Priority for FCOE disabled
I-Application priority for iSCSI enabled
  i-Application Priority for iSCSI disabled

Interface TenGigabitEthernet 0/49
  Remote Mac Address 00:00:00:00:00:11
  Port Role is Auto-Upstream
  DCBX Operational Status is Enabled
  Is Configuration Source? TRUE

Local DCBX Compatibility mode is CEE
Local DCBX Configured mode is CEE
Peer Operating version is CEE
Local DCBX TLVs Transmitted: ErPfi

Local DCBX Status
DCBX Operational Version is 0
DCBX Max Version Supported is 0
Sequence Number: 2
Acknowledgment Number: 2
Protocol State: In-Sync

Peer DCBX Status:
------------------
DCBX Operational Version is 0
DCBX Max Version Supported is 255
Sequence Number: 2
Acknowledgment Number: 2
Total DCBX Frames transmitted 27
Total DCBX Frames received 6
Total DCBX Frame errors 0
Total DCBX Frames unrecognized 0

ETS Commands

The following ETS commands are supported on the FC Flex IO module installed in the M I/O Aggregator.

**bandwidth-percentage**

Configure the bandwidth percentage allocated to priority traffic in port queues.

**Syntax**

```
bandwidth-percentage percentage
```

To remove the configured bandwidth percentage, use the `no bandwidth-percentage` command.

**Parameters**

- **percentage** (Optional) Enter the bandwidth percentage. The percentage range is from 1 to 100% in units of 1%.

**Defaults**

none

**Command Modes**

QOS-POLICY-OUT-ETS

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**

By default, equal bandwidth is assigned to each port queue and each dot1p priority in a priority group. To configure bandwidth amounts in associated dot1p queues, use the `bandwidth-percentage` command. When specified bandwidth is assigned to some port queues and not to others, the remaining bandwidth (100% minus assigned bandwidth amount) is equally distributed to unassigned nonstrict priority queues in the priority group. The sum of the allocated bandwidth to all queues in a priority group must be 100% of the bandwidth on the link.

ETS-assigned bandwidth allocation applies only to data queues, not to control queues.

The configuration of bandwidth allocation and strict-queue scheduling is not supported at the same time for a priority group. If you configure both, the...
configured bandwidth allocation is ignored for priority-group traffic when you apply the output policy on an interface.

By default, equal bandwidth is assigned to each priority group in the ETS output policy applied to an egress port if you did not configure bandwidth allocation. The sum of configured bandwidth allocation to dot1p priority traffic in all ETS priority groups must be 100%. Allocate at least 1% of the total bandwidth to each priority group and queue. If bandwidth is assigned to some priority groups but not to others, the remaining bandwidth (100% minus assigned bandwidth amount) is equally distributed to nonstrict-priority groups which have no configured scheduler.

**Related Commands**

- `qos-policy-output ets` — creates a QoS output policy.
- `scheduler` — schedules priority traffic in port queues.

### clear ets counters

Clear all ETS TLV counters on an interface.

**Syntax**

```plaintext
clear ets counters port-type slot/port
```

**Parameters**

- `port-type` Enter the keywords `port-type` then the slot/port information.

**Defaults**

- none

**Command Modes**

- EXEC Privilege

**Command History**

- Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

### dcb-map

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

**M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module**

**Syntax**

```plaintext
dcb-map map-name
```

**Parameters**

- `map-name` Enter a DCB map name. The maximum number of alphanumeric characters is 32.

**Defaults**

- None. There are no pre-configured PFC and ETS settings on M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module Ethernet interfaces. With autodetection of DCB enabled, a DCB map named 'dcb-map' is applied on all the Ethernet interfaces on which the DCBx frames are observed.
**Command Modes**

CONFIGURATION

INTERFACE

**Command History**

Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).

To display the PFC and ETS settings in DCB maps, enter the `show qos dcb-map` command.

Use the `dcb-map` command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The `dcb-map` command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the `no dcb-map map-name` command in Interface configuration mode.

**Related Commands**

- `show qos dcb-map` — displays the dcb-map profiles configured on the system.

**dcb-output**

To associate an ETS configuration with priority traffic, create a DCB output policy.

**Syntax**

```
dcb-output policy-name
```

To remove the ETS output policy globally, use the `no dcb output policy-name` command.

**Parameters**

- `policy-name` Enter the DCB output policy name. The maximum is 32 alphanumeric characters.

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**

To associate a priority group with an ETS output policy with scheduling and bandwidth configuration, create a DCB output policy. You can apply a DCB output policy on multiple egress ports. When you apply an ETS output policy on an
interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

The ETS configuration associated with 802.1 priority traffic in a DCB output policy is used in DCBX negotiation with ETS peers.

Related Commands

dcb-policy output — applies the output policy.

dcb-policy output
Apply the output policy with the ETS configuration to an egress interface.

Syntax
dcb-policy output policy-name

To delete the output policy, use the no dcb-policy output command.

Parameters

policy-name Enter the output policy name.

Defaults

none

Command Modes

INTERFACE

Command History

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

Usage Information

When you apply an ETS output policy to an interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

To remove an ETS output policy from an interface, use the no dcb-policy output policy-name command. ETS is enabled by default with the default ETS configuration applied (all dot1p priorities in the same group with equal bandwidth allocation).

Related Commands

dcb-output — creates a DCB output policy.

dcb-policy output stack-unit stack-ports all
Apply the specified DCB output policy on all ports of the switch stack or a single stacked switch.

Syntax
dcb-policy output stack-unit {all | stack-unit-id} stack-ports all dcb-output-policy-name

To remove all DCB output policies applied to the stacked ports, use the no dcb-policy output stack-unit all command.

To remove only the DCB output policies applied to the specified switch, use the no dcb-policy output stack-unit command.
Parameters

- **stack-unit-id**: Enter the stack unit identification.
- **dcb-output-policy-name**: Enter the policy name for the DCB output policy.

**Defaults**

- none

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Usage Information**

The `dcb-policy output stack-unit all` command overwrites any previous `dcb-policy output stack-unit stack-unit-id` configurations. Similarly, a `dcb-policy output stack-unit stack-unit-id` command overwrites any previous `dcb-policy output stack-unit all` configuration.

You can apply a DCB output policy with ETS configuration to all stacked ports in a switch stack or an individual stacked switch. You can apply different DCB output policies to different stack units.

**Related Commands**

- `dcb-policy output stack-unit stack-ports all` — applies the specified DCB input policy.

**description**

Enter a text description of the DCB policy (PFC input or ETS output).

**Syntax**

```
description text
```

To remove the text description, use the `no description` command.

**Parameters**

- **text**: Enter the description of the output policy. The maximum is 32 characters.

**Defaults**

- none

**Command Modes**

- DCB INPUT POLICY
- DCB OUTPUT POLICY

**Command History**

- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

**Related Commands**

- `dcb-input` — creates a DCB PFC input policy.
- `dcb-policy input` — applies the output policy.
- `dcb-output` — creates a DCBETS output policy.
• **dcb-policy output** — applies the output policy.

### ets mode on
Enable the ETS configuration so that scheduling and bandwidth allocation configured in an ETS output policy or received in a DCBX TLV from a peer can take effect on an interface.

**Syntax**

```plaintext
ets mode on
```

To remove the ETS configuration, use the `no ets mode on` command.

**Defaults**
ETS mode is on.

**Command Modes**
DCB OUTPUT POLICY

**Command History**
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**
If you disable ETS in an output policy applied to an interface using the `no ets mode on` command, any previously configured QoS settings at the interface or global level takes effect. If you configure QoS settings at the interface or global level and in an output policy map (the `service-policy output` command), the QoS configuration in the output policy takes precedence.

**Related Commands**

- `dcb-output` — creates a DCB output policy.
- `dcb-policy output` — applies the output policy.

### priority-group
To use with an ETS output policy, create an ETS priority group.

**Syntax**

```plaintext
priority-group group-name
```

To remove the priority group, use the `no priority-group` command.

**Parameters**

- `group-name` Enter the name of the ETS priority group. The maximum is 32 characters.

**Defaults**
none

**Command Modes**
CONFIGURATION

**Command History**
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**
A priority group consists of 802.1p priority values that are grouped for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.
You must configure 802.1p priorities in priority groups associated with an ETS output policy. You can assign each dot1p priority to only one priority group.

The maximum number of priority groups supported in ETS output policies on an interface is equal to the number of data queues (4) on the port. The 802.1p priorities in a priority group can map to multiple queues.

If you configure more than one priority queue as strict priority or more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

**Related Commands**
- `priority-list` — configures the 802.1p priorities for an ETS output policy.
- `set-pgid` — configures the priority-group.

### priority-group bandwidth pfc

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

**M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module**

**Syntax**

```
priority-group group-num {bandwidth percentage| strict-priority} pfc {on | off}
```

**Parameters**

- `priority-group group-num`  
  Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.

- `bandwidth percentage`  
  Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.

- `strict-priority`  
  Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.

- `pfc (on | off)`  
  Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

**Defaults**  
None

**Command Modes**  
DCB MAP

**Command History**  
Version 9.3(0.0)  
Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**  
Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.
Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.

**Related Commands**

- `dcb-map` – creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.
- `priority-pgid` – configures the 802.1p priority traffic in a priority group for a DCB map.

**Priority-group qos-policy**

Associate the 802.1p priority traffic in a priority group with the ETS configuration in a QoS output policy.

**Syntax**

```
priority-group group-name qos-policy ets-policy-name
```

To remove the 802.1p priority group, use the `no priority-group qos-policy` command.

**Parameters**

- `group-name` Enter the group name of the 802.1p priority group. The maximum is 32 characters.
- `ets-policy-name` Enter the ETS policy name.

**Defaults**

- none

**Command Modes**

DCB OUTPUT POLICY
Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information
The ETS configuration associated with 802.1p priority traffic in a DCB output policy is used in DCBX negotiation with ETS peers.

If you disable ETS in an output policy applied to an interface using the no ets mode on command, any previously configured QoS settings at the interface or global level take effect. If you configure QoS settings at the interface or global level and in an output policy map (the service-policy output command), the QoS configuration in the output policy takes precedence.

Related Commands
• dcb-output — creates a DCB output policy.
• dcb-policy output — applies the output policy.

priority-list
Configure the 802.1p priorities for the traffic on which you want to apply an ETS output policy.

Syntax
priority-list value
To remove the priority list, use the no priority-list command.

Parameters
value Enter the priority list value. Separate priority values with a comma; specify a priority range with a dash; for example, priority-list 3,5-7. The range is from 0 to 7.

Defaults
none

Command Modes
PRIORITY-GROUP

Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information
By default:
• All 802.1p priorities are grouped in priority group 0.
• 100% of the port bandwidth is assigned to priority group 0. The complete bandwidth is equally assigned to each priority class so that each class has 12 to 13%.

Related Commands
• priority-group qos-policy — associates an ETS priority group with an ETS output policy.
• set-pgid — configures the priority-group.
qos-policy-output ets

To configure the ETS bandwidth allocation and scheduling for priority traffic, create a QoS output policy.

Syntax

```
qos-policy-output policy-name ets
```

To remove the QoS output policy, use the `no qos-policy-output ets` command.

Parameters

- **policy-name**
  
Enter the policy name. The maximum is 32 characters.

Command Modes

CONFIGURATION

Command History

Version 9.3.0.0

Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information

If an error occurs in an ETS output-policy configuration, the configuration is ignored and the scheduler and bandwidth allocation settings are reset to the ETS default values (all priorities are in the same ETS priority group and bandwidth is allocated equally to each priority).

If an error occurs when a port receives a peer's ETS configuration, the port's configuration is reset to the previously configured ETS output policy. If no ETS output policy was previously applied, the port is reset to the default ETS parameters.

Related Commands

- `scheduler` — schedules the priority traffic in port queues.
- `bandwidth-percentage` — bandwidth percentage allocated to the priority traffic in port queues.

scheduler

Configure the method used to schedule priority traffic in port queues.

Syntax

```
scheduler value
```

To remove the configured priority schedule, use the `no scheduler` command.

Parameters

- **value**
  
Enter schedule priority value. The valid values are:
  - `strict`: strict-priority traffic is serviced before any other queued traffic.
  - `werr`: weighted elastic round robin (werr) provides low-latency scheduling for priority traffic on port queues.

Defaults

Weighted elastic round robin (WERR) scheduling is used to queue priority traffic.
set-pgid

Configure the priority-group identifier.

Syntax

```
set-pgid value
```

To remove the priority group, use the `no set-pgid` command.

Parameters

- `value`: Enter the priority group identification. The range is from 0 to 7.

Defaults

none

Command Modes

PRIORITY-GROUP

Command History

- **Version 9.3(0.0)**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Related Commands

- `priority-group qos-policy` — creates an ETS priority group.
- `priority-list` — configures the 802.1p priorities.
show interface ets
Displays the ETS configuration applied to egress traffic on an interface, including priority groups with priorities and bandwidth allocation.

Syntax
show interface port-type slot/port ets {summary | detail}

Parameters
- **port-type slot/port ets**: Enter the port-type slot and port ETS information.
- **{summary | detail}**: Enter the keyword summary for a summary list of results or enter the keyword detail for a full list of results.

Command Modes
- CONFIGURATION

Command History
- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information
To clear ETS TLV counters, use the `clear ets counters interface port-type slot/port` command.

The following describes the `show interface summary` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Max Supported TC Group</td>
<td>Maximum number of priority groups supported.</td>
</tr>
<tr>
<td>Number of Traffic Classes</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Admin mode</td>
<td>ETS mode: on or off. When on, the scheduling and bandwidth allocation configured in an ETS output policy or received in a DCBX TLV from a peer can take effect on an interface.</td>
</tr>
<tr>
<td>Admin Parameters</td>
<td>ETS configuration on local port, including priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Remote Parameters</td>
<td>ETS configuration on remote peer port, including admin mode (enabled if a valid TLV was received or disabled), priority groups, assigned dot1p priorities, and bandwidth allocation. If ETS admin mode is enabled on the remote port for DCBX exchange, the Willing bit received in ETS TLVs from the remote peer is included.</td>
</tr>
<tr>
<td>Local Parameters</td>
<td>ETS configuration on local port, including admin mode (enabled when a valid TLV is received from a peer), priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Operational status** (local port) | Port state for current operational ETS configuration:  
  • **Init**: Local ETS configuration parameters were exchanged with the peer.  
  • **Recommend**: Remote ETS configuration parameters were received from the peer.  
  • **Internally propagated**: ETS configuration parameters were received from the configuration source. |
| **ETS DCBX Oper status**       | Operational status of the ETS configuration on the local port: match or mismatch.                                                              |
| **State Machine Type**         | Type of state machine used for DCBX exchanges of ETS parameters: Feature — for legacy DCBX versions; Asymmetric — for an IEEE version.            |
| **Conf TLV Tx Status**         | Status of ETS Configuration TLV advertisements: enabled or disabled.                                                                           |
| **Reco TLV Tx Status**         | Status of ETS Recommendation TLV advertisements: enabled or disabled.                                                                          |
| **Input Conf TLV pkts**        | Number of ETS Configuration TLVs received.                                                                                                      |
| **Output Conf TLV pkts**       | Number of ETS Configuration TLVs transmitted.                                                                                                   |
| **Error Conf TLV pkts**        | Number of ETS Error Configuration TLVs received.                                                                                                 |
| **Input Reco TLV pkts**        | Number of ETS Recommendation TLVs received.                                                                                                      |
| **Output Reco TLV pkts**       | Number of ETS Recommendation TLVs transmitted.                                                                                                   |
| **Error Reco TLV pkts**        | Number of ETS Error Recommendation TLVs received.                                                                                                 |

**Example (Summary)**

Dell(config)# show interfaces te 0/0 ets summary  
Interface TenGigabitEthernet 0/0  
Max Supported TC Groups is 4  
Number of Traffic Classes is 8  
Admin mode is on  
Admin Parameters:  
--------------------------  
Admin is enabled  
TC-grp Priority# Bandwidth TSA  
0 0,1,2,3,4,5,6,7 100% ETS  
1 0% ETS  
2 0% ETS  
3 0% ETS  
4 0% ETS
Remote Parameters:
-------------------
Remote is disabled
Local Parameters:
------------------
Local is enabled

TC-grp Priority#        Bandwidth TSA
0      0,1,2,3,4,5,6,7  100%      ETS
1                       0%        ETS
2                       0%        ETS
3                       0%        ETS
4                       0%        ETS
5                       0%        ETS
6                       0%        ETS
7                       0%        ETS

Priority#               Bandwidth TSA
0                       13%       ETS
1                       13%       ETS
2                       13%       ETS
3                       13%       ETS
4                       12%       ETS
5                       12%       ETS
6                       12%       ETS
7                       12%       ETS

Oper status is init
Conf TLV Tx Status is disabled
Traffic Class TLV Tx Status is disabled

Example (Detail)

Dell(conf)# show interfaces tengigabitethernet 0/0 ets detail
Interface TenGigabitEthernet 0/0
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters :
------------------
Admin is enabled

TC-grp Priority#        Bandwidth TSA
0      0,1,2,3,4,5,6,7  100%      ETS
1                       0%        ETS
2                       0%        ETS
3                       0%        ETS
4                       0%        ETS
5                       0%        ETS
6                       0%        ETS
7                       0%        ETS

Priority#               Bandwidth TSA
0                       13%       ETS
1                       13%       ETS
2                       13%       ETS
3                       13%       ETS

FC Flex IO Modules
Remote Parameters:
-------------------
Remote is disabled

Local Parameters:
------------------
Local is enabled

<table>
<thead>
<tr>
<th>TC-grp Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100%</td>
<td>ETS</td>
</tr>
<tr>
<td>1</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>2</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>3</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>4</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>5</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>6</td>
<td>0%</td>
<td>ETS</td>
</tr>
<tr>
<td>7</td>
<td>0%</td>
<td>ETS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>13%</td>
<td>ETS</td>
</tr>
<tr>
<td>1</td>
<td>13%</td>
<td>ETS</td>
</tr>
<tr>
<td>2</td>
<td>13%</td>
<td>ETS</td>
</tr>
<tr>
<td>3</td>
<td>13%</td>
<td>ETS</td>
</tr>
<tr>
<td>4</td>
<td>12%</td>
<td>ETS</td>
</tr>
<tr>
<td>5</td>
<td>12%</td>
<td>ETS</td>
</tr>
<tr>
<td>6</td>
<td>12%</td>
<td>ETS</td>
</tr>
<tr>
<td>7</td>
<td>12%</td>
<td>ETS</td>
</tr>
</tbody>
</table>

Oper status is init
Conf TLV Tx Status is disabled
Traffic Class TLV Tx Status is disabled
0 Input Conf TLV Pkts, 0 Output Conf TLV Pkts, 0 Error Conf TLV Pkts
0 Input Traffic Class TLV Pkts, 0 Output Traffic Class TLV Pkts, 0 Error Traffic Class TLV Pkts

---

**show qos dcb-output**

Displays the ETS configuration in a DCB output policy.

**Syntax**

```
show qos dcb-output [ets-profile]
```

**Parameters**

- **[ets-profile]**: Enter the ETS profile.

**Command Modes**

EXEC Privilege

**Command History**

- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Example**

```
Dell# show qos dcb-output
dcb-output ets
priority-group san qos-policy san
```
show qos priority-groups
Displays the ETS priority groups configured on the switch, including the 802.1p priority classes and ID of each group.

Syntax
```
show qos priority-groups
```

Command Modes
EXEC Privilege

Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Example
Dell#show qos priority-groups
priority-group ipc qos-policy ipc
priority-list 4
set-pgid 2

show stack-unit stack-ports ets details
Displays the ETS configuration applied to egress traffic on stacked ports, including ETS Operational mode on each unit and the configured priority groups with dot1p priorities, bandwidth allocation, and scheduler type.

Syntax
```
show stack-unit {all | stack-unit} stack-ports {all | port-number} ets details
```

Parameters
- `stack-unit`: Enter the stack unit identification.
- `port-number`: Enter the port number.

Command Modes
CONFIGURATION

Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Example
Dell(conf)# show stack-unit all stack-ports all ets details
Stack unit 0 stack port all
Max Supported TC Groups is 4
Number of Traffic Classes is 1
Admin mode is on

Admin Parameters:
--------------------
Admin is enabled

<table>
<thead>
<tr>
<th>TC-grp Priority#</th>
<th>Bandwidth TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0,1,2,3,4,5,6,7 100% ETS</td>
</tr>
<tr>
<td>1</td>
<td>- -</td>
</tr>
<tr>
<td>2</td>
<td>- -</td>
</tr>
<tr>
<td>3</td>
<td>- -</td>
</tr>
</tbody>
</table>
Stack unit 1 stack port all
Max Supported TC Groups is 4
Number of Traffic Classes is 1
Admin mode is on
Admin Parameters:
Admin is enabled

TC-grp Priority# Bandwidth TSA
---------------------------------
0 0,1,2,3,4,5,6,7 100% ETS
1 - -
2 - -
3 - -
4 - -
5 - -
6 - -
7 - -
8 - -

PFC Commands

The following PFC commands are supported on the FC Flex IO module installed in the M I/O Aggregator.

clear pfc counters

Clear the PFC TLV counters and PFC statistics on an interface or stack unit.

Syntax

```
clear pfc counters [port-type slot/port | stack-unit {unit number | all } all stack-ports all] | interface {statistics}
```

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>port-type</td>
<td>Enter the keywords port-type then the slot/port information.</td>
</tr>
<tr>
<td>stack-unit</td>
<td>Enter the keywords stack-unit then the stack-unit number to be cleared.</td>
</tr>
<tr>
<td>unit number</td>
<td>Enter the keywords stack-unit then the stack-unit number to be cleared.</td>
</tr>
<tr>
<td>all stack-ports all</td>
<td>Enter the keywords all stack-ports all to clear the counters on all interfaces.</td>
</tr>
<tr>
<td>statistics</td>
<td>Enter the keyword statistics to clear only the hardware PFC counters.</td>
</tr>
</tbody>
</table>

Defaults

none

Command Modes

EXEC Privilege

Command History

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.
Usage Information
If you do not use the statistics parameter, both hardware and DCBx counters clear.

dcb stack-unit pfc-buffering pfc-port-count pfc-queues

Configure the PFC buffer for all port pipes in a specified stack unit by specifying the port-pipe number, number of PFC-enabled ports, and number of configured lossless queues.

Syntax
dcb stack-unit stack-unit-id [port-set port-set-id] pfc-buffering pfc-ports {1-56} pfc-queues {1-2}

To remove the configuration for the PFC buffer on all port pipes in a specified stack unit, use the no dcb stack-unit stack-unit-id [port-set port-set-id] pfc-buffering pfc-ports pfc-queues command.

Parameters
- **stack-unit-id**: Enter the stack unit identification. The range is from 0 to 5.
- **port-set**: Enter the port-set identification. The only valid port-set ID (port-pipe number) on an MXL Switch is 0.
- **pfc-ports (1-56)**: Enter the pfc-ports. The range is from 1 to 56.
- **pfc-queues (1-2)**: Enter the pfc-queue number. The range is from 1 to 2.

Command Modes
CONFIGURATION

Command History
Version 9.3.0.0
Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

Usage Information
If you configure PFC on a 40GbE port, count the 40GbE port as four PFC-enabled ports in the pfc-port number you enter in the command syntax.

To achieve lossless PFC operation, the PFC port count and queue number used for the reserved buffer size that is created must be greater than or equal to the buffer size required for PFC-enabled ports and lossless queues on the switch.

You must reload the stack or a specified stack unit (use the reload command in EXEC Privilege mode) for the PFC buffer configuration to take effect.

Related Commands
- **dcb stack-unit pfc-buffering pfc-port pfc-queues** — configures the PFC buffer for all switches in the stack.

**dcb-input**

To apply pause or flow control for specified priorities using a configure delay time, create a DCB input policy.

Syntax
dcb-input policy-name

To delete the DCB input policy, use the no dcb-input command.
Parameters

- **policy-name**: Maximum: 32 alphanumeric characters.

Defaults

- none

Command Modes

- CONFIGURATION

Command History

- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information

As soon as you apply a DCB policy with PFC enabled on an interface, DCBx starts exchanging information with PFC-enabled peers. The IEEE802.1Qbb, CEE, and CIN versions of PFC TLV are supported. DCBx also validates PFC configurations received in TLVs from peer devices.

By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to **pfc no-drop queues**).

To remove a DCB input policy, including the PFC configuration it contains, enter the `no dcb-input policy-name` command in Interface Configuration mode.

Related Commands

- `dcb-policy input` — applies the input policy with the PFC configuration.

**dcb-policy input**

Apply the input policy with the PFC configuration to an ingress interface.

Syntax

```
dcb-policy input policy-name
```

To delete the policy, use the `no dcb-policy input` command.

Parameters

- **policy-name**: Enter the input policy name with the PFC configuration to an ingress interface.

Defaults

- none

Command Modes

- INTERFACE

Command History

- **Version 9.3.0.0**: Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

Usage Information

If you apply an input policy with PFC disabled (`no pfc mode on`):

- You can enable link-level flow control on the interface. To delete the input policy, first disable link-level flow control. PFC is then automatically enabled on the interface because an interface is by default PFC-enabled.
• PFC still allows you to configure lossless queues on a port to ensure no-drop handling of lossless traffic.

When you apply an input policy to an interface, an error message is displayed if:
• The PFC dot1p priorities result in more than two lossless port queues globally on the switch.
• You already enabled link-level flow control. PFC and link-level flow control cannot be enabled at the same time on an interface.

In a switch stack, configure all stacked ports with the same PFC configuration.

A DCB input policy for PFC applied to an interface may become invalid if you reconfigure the dot1p-queue mapping. This situation occurs when the new dot1p-queue assignment exceeds the maximum number (2) of lossless queues supported globally on the switch. In this case, all PFC configurations received from PFC-enabled peers are removed and resynchronized with the peer devices.

Traffic may be interrupted when you reconfigure PFC no-drop priorities in an input policy or reapply the policy to an interface.

Related Commands
dcb-input — creates a DCB input policy.

dcb-policy input stack-unit stack-ports all
Apply the specified DCB input policy on all ports of the switch stack or a single stacked switch.

Syntax
dcb-policy input stack-unit {all | stack-unit-id} stack-ports all dcb-input-policy-name

To remove all DCB input policies applied to the stacked ports and rest the PFC to its default settings, use the no dcb-policy input stack-unit all command.

To remove only the DCB input policies applied to the specified switch, use the no dcb-policy input stack-unit command.

Parameters
stack-unit-id
Enter the stack unit identification.
dcb-input-policy-name
Enter the policy name for the DCB input policy.

Defaults
none

Command Modes
CONFIGURATION

Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information
The dcb-policy input stack-unit all command overwrites any previous dcb-policy input stack-unit stack-unit-id configurations. Similarly, a dcb-policy input stack-unit stack-unit-id command overwrites any previous dcb-policy input stack-unit all configuration.
Related Commands

dcb-policy output stack-unit stack-ports all — applies the specified DCB output policy.

description

Enter a text description of the DCB policy (PFC input or ETS output).

Syntax
description text

To remove the text description, use the no description command.

Parameters
text

Enter the description of the output policy. The maximum is 32 characters.

Defaults

none

Command Modes

- DCB INPUT POLICY
- DCB OUTPUT POLICY

Command History

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch

Related Commands

- dcb-input — creates a DCB PFC input policy.
- dcb-policy input — applies the output policy.
- dcb-output — creates a DCBETS output policy.
- dcb-policy output — applies the output policy.

pfc link-delay

Configure the link delay used to pause specified priority traffic.

Syntax

pfc link-delay value

To remove the link delay, use the no pfc link-delay command.

Parameters

value

The range is (in quanta) from 712 to 65535. One quantum is equal to a 512-bit transmission.

Defaults

45556 quantum

Command Modes

DCB INPUT POLICY

Command History

Version 9.3.0.0 Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.
**Usage Information**

The minimum link delay must be greater than the round-trip transmission time a peer must honor a PFC pause frame multiplied by the number of PFC-enabled ingress ports.

**Related Commands**

- `dcb-input` — creates a DCB input policy.

**pfc mode on**

Enable the PFC configuration on the port so that the priorities are included in DCBX negotiation with peer PFC devices.

**Syntax**

```
pfc mode on
```

To disable the PFC configuration, use the `no pfc mode on` command.

**Defaults**

PFC mode is on.

**Command Modes**

DCB MAP

**Command History**

Version 9.3(0.0) Introduced on the MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to `pfc no-drop queues`).

To disable PFC operation on an interface, enter the `no pfc mode on` command in DCB Input Policy Configuration mode. PFC is enabled and disabled as global DCB operation is enabled (`dcb-enable`) or disabled (`no dcb-enable`).

You cannot enable PFC and link-level flow control at the same time on an interface.

**NOTE:** Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

**pfc no-drop queues**

Configure the port queues that still function as no-drop queues for lossless traffic.

**Syntax**

```
pfc no-drop queues queue-range
```

To remove the no-drop port queues, use the `no pfc no-drop queues` command.

**Parameters**

- `queue-range` Enter the queue range. Separate the queue values with a comma; specify a priority range with a dash; for example,
pfc no-drop queues 1, 3 or pfc no-drop queues 2–3. The range is from 0 to 3.

Defaults
No lossless queues are configured.

Command Modes
INTERFACE

Command History
Version 9.3.0.0 Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

Usage Information
The maximum number of lossless queues globally supported on the switch is two.

- The following lists the dot1p priority-queue assignments.

<table>
<thead>
<tr>
<th>dot1p Value in the Incoming Frame</th>
<th>Description heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

pfc priority
Configure the CoS traffic to be stopped for the specified delay.

Syntax
```
pfc priority priority-range
```

To delete the pfc priority configuration, use the no pfc priority command.

Parameters
- **priority-range** Enter the 802.1p values of the frames to be paused. Separate the priority values with a comma; specify a priority range with a dash; for example, pfc priority 1,3,5-7. The range is from 0 to 7.

Defaults
None

Command Modes
DCB INPUT POLICY

Command History
Version 9.3.0.0 Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.
Usage Information

You can enable any number of 802.1p priorities for PFC. Queues to which PFC priority traffic is mapped are lossless by default. Traffic may be interrupted due to an interface flap (going down and coming up) when you reconfigure the lossless queues for no-drop priorities in a PFC input policy and reapply the policy to an interface.

The maximum number of lossless queues supported on the switch is two.

A PFC peer must support the configured priority traffic (as DCBX detects) to apply PFC.

Related Commands

dcb-input — creates a DCB input policy.

show dcb

Displays the data center bridging status, the number of PFC-enabled ports, and the number of PFC-enabled queues.

Syntax

show dcb [stack-unit unit-number]

Parameters

unit number Enter the DCB unit number. The range is from 0 to 5.

Command Modes

EXEC Privilege

Command History

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Usage Information

Specify a stack-unit number on the Master switch in a stack.

Example

Dell# show dcb
stack-unit 0 port-set 0
   DCB Status : Enabled
   PFC Port Count : 56 (current), 56 (configured)
   PFC Queue Count : 2 (current), 2 (configured)

show interface pfc

Displays the PFC configuration applied to ingress traffic on an interface, including priorities and link delay.

Syntax

show interface port-type slot/port pfc {summary | detail}

Parameters

port-type slot/ Enter the port-type slot and port PFC information.
port pfc

(summary | Enter the keyword summary for a summary list of results or
detail) enter the keyword detail for a full list of results.
**Command Modes**

**INTERFACE**

**Command History**

Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Usage Information**

To clear the PFC TLV counters, use the `clear pfc counters interface port-type slot/port` command.

The following describes the `show interface pfc summary` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Admin mode is on Admin is enabled</td>
<td>PFC admin mode is on or off with a list of the configured PFC priorities. When the PFC admin mode is on, PFC advertisements are enabled to be sent and received from peers; received PFC configuration take effect. The admin operational status for a DCBX exchange of PFC configuration is enabled or disabled.</td>
</tr>
<tr>
<td>Remote is enabled Priority list Remote Willing Status is enabled</td>
<td>Operational status (enabled or disabled) of peer device for DCBX exchange of PFC configuration with a list of the configured PFC priorities. Willing status of peer device for DCBX exchange (Willing bit received in PFC TLV): enabled or disable.</td>
</tr>
<tr>
<td>Local is enabled</td>
<td>DCBX operational status (enabled or disabled) with a list of the configured PFC priorities.</td>
</tr>
<tr>
<td>Operational status (local port)</td>
<td>Port state for current operational PFC configuration:</td>
</tr>
<tr>
<td></td>
<td>- <strong>Init</strong>: Local PFC configuration parameters were exchanged with the peer.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Recommend</strong>: Remote PFC configuration parameters were received from the peer.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Internally propagated</strong>: PFC configuration parameters were received from the configuration source.</td>
</tr>
<tr>
<td>PFC DCBX Oper status</td>
<td>Operational status for the exchange of the PFC configuration on the local port: match (up) or mismatch (down).</td>
</tr>
<tr>
<td>State Machine Type</td>
<td>Type of state machine used for DCBX exchanges of the PFC parameters: Feature — for legacy DCBX versions; Symmetric — for an IEEE version.</td>
</tr>
<tr>
<td>TLV Tx Status</td>
<td>Status of the PFC TLV advertisements: enabled or disabled.</td>
</tr>
<tr>
<td>PFC Link Delay</td>
<td>Link delay (in quanta) used to pause specified priority traffic.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Application Priority TLV: FCOE TLV Tx Status</td>
<td>Status of FCoE advertisements in application priority TLVs from the local DCBX port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: SCSI TLV Tx Status</td>
<td>Status of iSCSI advertisements in application priority TLVs from the local DCBX port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: Local FCOE Priority Map</td>
<td>Priority bitmap the local DCBX port uses in FCoE advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Local iSCSI Priority Map</td>
<td>Priority bitmap the local DCBX port uses in iSCSI advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote FCOE Priority Map</td>
<td>Status of FCoE advertisements in application priority TLVs from the remote peer port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote iSCSI Priority Map</td>
<td>Status of iSCSI advertisements in application priority TLVs from the remote peer port: enabled or disabled.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Input TLV pkts</td>
<td>Number of PFC TLVs received.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Output TLV pkts</td>
<td>Number of PFC TLVs transmitted.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Error pkts</td>
<td>Number of PFC error packets received.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Pause Tx pkts</td>
<td>Number of PFC pause frames transmitted.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Pause Rx pkts</td>
<td>Number of PFC pause frames received.</td>
</tr>
</tbody>
</table>

**Example (Summary)**

```
Dell# show interfaces tengigabitethernet 0/49 pfc summary
Interface TenGigabitEthernet 0/49
  Admin mode is on
  Admin is enabled
  Remote is enabled, Priority list is 4
  Remote Willing Status is enabled
  Local is enabled
  Oper status is Recommended
  PFC DCBX Oper status is Up
  State Machine Type is Feature
  TLV Tx Status is enabled
  PFC Link Delay 45556 pause quantams
  Application Priority TLV Parameters :
  FCOE TLV Tx Status is disabled
```
ISCSI TLV Tx Status is disabled
Local FCOE PriorityMap is 0x8
Local ISCSI PriorityMap is 0x10
Remote FCOE PriorityMap is 0x8
Remote ISCSI PriorityMap is 0x8

Dell# show interfaces tengigabitethernet 0/49 pfc detail
Interface TenGigabitEthernet 0/49
Admin mode is on
Admin is enabled
Remote is enabled
Remote Willing Status is enabled
Local is enabled
Oper status is recommended
PFC DCBX Oper status is Up
State Machine Type is Feature
TLV Tx Status is enabled
PFC Link Delay 45556 pause quanta
Application Priority TLV Parameters :
--------------------------------------
FCOE TLV Tx Status is disabled
ISCSI TLV Tx Status is disabled
Local FCOE PriorityMap is 0x8
Local ISCSI PriorityMap is 0x10
Remote FCOE PriorityMap is 0x8
Remote ISCSI PriorityMap is 0x8
0 Input TLV pkts, 1 Output TLV pkts, 0 Error pkts,
0 Pause Tx pkts, 0 Pause Rx pkts

show interface pfc statistics
Displays counters for the PFC frames received and transmitted (by dot1p priority class) on an interface.

Syntax
show interface port-type slot/port pfc statistics

Parameters
port-type
Enter the port type.
slot/port
Enter the slot/port number.

Command Modes
INTERFACE

Command History
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

Example
Dell#show interfaces te 0/3 pfc statistics
Interface TenGigabitEthernet 0/3

Priority Rx XOFF Frames Rx Total Frames Tx Total Frames
--------------------------------------
0 0 0 0
1 0 0 0
2 0 0 0
3 0 0 0
4 0 0 0
5 0 0 0
6 0 0 0
7 0 0 0
**show qos dcb-input**
Displays the PFC configuration in a DCB input policy.

**Syntax**
```
show qos dcb-input [pfc-profile]
```

**Parameters**
- `pfc-profile` Enter the PFC profile.

**Command Modes**
CONFIGURATION

**Command History**
Version 9.3.0.0 Introduced on the FC Flex IO module installed in the M I/O Aggregator and MXL 10/40GbE Switch.

**Example**
```
Dell(conf)# show qos dcb-input
dcb-input pfc-profile
  pfc link-delay 32
  pfc priority 0-1
  dcb-input pfc-profile1
    no pfc mode on
    pfc priority 6-7
```
Fibre Channel over Ethernet for FC Flex IO Modules

FCoE provides a converged Ethernet network that allows the combination of storage-area network (SAN) and LAN traffic on a Layer 2 link by encapsulating Fibre Channel data into Ethernet frames.

The Fibre Channel (FC) Flex IO module is supported on Dell Networking Operating System (OS) MXL 10/40GbE Switch and M I/O Aggregator (IOA). The MXL and IOA switch installed with the FC Flex IO module functions as a top-of-rack edge switch that supports converged enhanced Ethernet (CEE) traffic — Fibre channel over Ethernet (FCoE) for storage, Interprocess Communication (IPC) for servers, and Ethernet local area network (LAN) (IP cloud) for data — as well as FC links to one or more storage area network (SAN) fabrics.

FCoE works with the Ethernet enhancements provided in Data Center Bridging (DCB) to support lossless (no-drop) SAN and LAN traffic. In addition, DCB provides flexible bandwidth sharing for different traffic types, such as LAN and SAN, according to 802.1p priority classes of service. DCBx should be enabled on the system before the FIP snooping feature is enabled.

All of the commands that are supported for FCoE on the MXL and I/O Aggregator apply to the FC Flex IO modules. Similarly, all of the configuration procedures and the settings that are applicable for FCoE on the MXL and I/O Aggregator are valid for the FC Flex IO modules.

Legacy FIP snooping-related commands are supported on 10G optional modules when the Fiber channel capability is disabled (by using the `no feature fc` command). If the FC capability is enabled, only the `fip-snooping max-sessions-per-enodemac` command is supported and the remaining FIP snooping commands are not supported.

NPIV Proxy Gateway for FC Flex IO Modules

The N-port identifier virtualization (NPIV) Proxy Gateway (NPG) feature provides FCoE-FC bridging capability on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module switch, allowing server CNAs to communicate with SAN fabrics over the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

To configure the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module to operate as an NPIV proxy gateway, use the following commands:

```plaintext
  dcb-map
```

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

```
M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module
```

```plaintext
Syntax  dcb-map map-name
```
Parameters

map-name

Enter a DCB map name. The maximum number of alphanumeric characters is 32.

Defaults

None. There are no pre-configured PFC and ETS settings on M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module Ethernet interfaces. With auto-detection of DCB enabled, a DCB map named 'dcb-map' is applied on all the Ethernet interfaces on which the DCBx frames are observed.

Command Modes

CONFIGURATION

INTERFACE

Command History

Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

Usage Information

A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).

To display the PFC and ETS settings in DCB maps, enter the show qos dcb-map command.

Use the dcb-map command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The dcb-map command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the no dcb-map map-name command in Interface configuration mode.

Related Commands

show qos dcb-map — displays the dcb-map profiles configured on the system.

description (for FCoE maps)

In an FCoE map, add a text description of the FCoE and FC parameters used to transmit storage traffic over an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway in a converged fabric.

M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

Syntax

description text

Parameters

text

Enter a maximum of 32 characters.

Defaults

None
Command Modes

FCOE MAP

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.</td>
</tr>
</tbody>
</table>

Usage Information

The text description is displayed in `show fcoe-map` command output.

Related Commands

- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

Fabric

Apply an FCoE map on a fabric-facing Fibre Channel (FC) port.

M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

Syntax

`fabric map-name`

Parameters

- `map-name` Maximum: 32 alphanumeric characters.

Defaults

None

Command Modes

INTERFACE FIBRE_CHANNEL

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.</td>
</tr>
</tbody>
</table>

Usage Information

An FCoE map is a template used to map FCoE and FC parameters in a converged fabric. An FCoE map is used to virtualize upstream FC ports on an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway so that they appear to downstream server CNA ports as FCoE forwarder (FCF) ports on an FCoE network. When applied to FC and Ethernet ports on an NPIV proxy gateway, an FCoE map allows the switch to operate as an FCoE-FC bridge between an FC SAN and an FCoE network by providing FCoE-enabled servers and switches with the necessary parameters to log in to a SAN fabric. Use the `fcoe-map` command to create an FCoE map.

On an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway, you cannot apply an FCoE map on fabric-facing FC ports and server-facing Ethernet ports.

After you apply an FCoE map on an FC interface, when the port is enabled (no shutdown), the NPIV proxy gateway starts sending FIP multicast advertisements on
behalf of the FC port to downstream servers in order to advertise the availability of a new FCF port on the FCoE VLAN.

To remove an FCoE map from an FC interface, enter the `no fabric map-name` command in Interface configuration mode.

**Related Commands**

- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

**fabric-id vlan**

In an FCoE map, configure the association between the dedicated VLAN used to carry FCoE traffic between servers and a SAN, and the fabric where the desired storage arrays are installed.

**M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module**

**Syntax**

```
fabric-id fabric-num vlan vlan-id
```

**Parameters**

- `fabric-id`  
  Enter a fabric ID number that is the same as the ID number of the dedicated VLAN used to carry FCoE storage traffic to the fabric specified in the FCoE map. You can enter a fabric ID in the range 1–4094.

- `fabric-num`  
  Enter the ID number of the dedicated VLAN used to carry FCoE storage traffic between servers and a SAN fabric and specified with the `vlan` command in the FCoE map.

- `vlan`  
  `vlan-id`  
  Enter the ID number of the dedicated VLAN used to carry FCoE storage traffic between servers and a SAN fabric and specified with the `vlan` command in the FCoE map.

**Defaults**

None

**Command Modes**

FCOE MAP

**Command History**

Version 9.3(0.0)  
Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

In the `fabric-id vlan` command, the fabric and VLAN ID numbers must be the same.

In each FCoE map, the fabric ID, FC-MAP value, and FCoE VLAN parameters must be unique.

To remove a fabric-VLAN association from an FCoE map, enter the `no fabric-id vlan` command.

You must first create a VLAN and then specify the configured VLAN ID in the `fabric-id vlan` command. Otherwise, the following error message is displayed.

```
FTOS(conf-fcoe-f)#fabric-id 10 vlan 10 % Error: Vlan 10 does not exist
```
Related Commands

- **fcoe-map** — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- **show fcoe-map** — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

**fcf-priority**

In an FCoE map, configure the priority used by a server CNA to select an upstream FCoE forwarder (FCF).

**M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module**

**Syntax**

```
fcf-priority priority
```

**Parameters**

- **priority**
  - Enter the priority assigned to the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway, which appears to a downstream server CNA as an FCF. The range of FCF priority values is from 1 to 255.

**Defaults**

128

**Command Modes**

FCOE MAP

**Command History**

Version 9.3(0.0)

Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

The FCF priority you assign to an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module is used by server CNAs to select an upstream FCF to use for a fabric login (FLOGI).

To remove a configured FCF priority from an FCoE map, enter the `no fcf-priority` command.

**Related Commands**

- **fcoe-map** — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- **show fcoe-map** — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

**fc-map**

In an FCoE map, configure the FCoE mapped address prefix (FC-MAP) value which is used to identify FCoE traffic transmitted on the FCoE VLAN for the specified fabric.

**M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module**

**Syntax**

```
fc-map fc-map-value
```

**Usage Information**

The FCF priority you assign to an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module is used by server CNAs to select an upstream FCF to use for a fabric login (FLOGI).
**Parameters**

- **fc-map-value**
  - Enter the unique MAC address prefix used by a SAN fabric.
  - The range of FC-MAP values is from 0EFC00 to 0EFCFF.

**Defaults**

- None

**Command Modes**

- FCOE MAP

**Command History**

- **Version 9.3(0.0)**
  - Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

- The FC–MAP value you enter must match the FC–MAP value used by an FC switch or FCoE forwarder (FCF) in the fabric. An FCF switch accepts only FCoE traffic that uses the correct FC–MAP value.

- The FC–MAP value is used to generate the fabric-provided MAC address (FP–MAC). The FPMA is used by servers to transmit FCoE traffic to the fabric. An FC–MAP can be associated with only one FCoE VLAN and vice versa.

- In an FCoE map, the FC–MAP value, fabric ID, and FCoE VLAN parameters must be unique.

- To remove a configured FC–MAP value from an FCoE map, enter the `no fc-map` command.

**Related Commands**

- **fcoe-map** — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.

- **show fcoe-map** — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

---

**fcoe priority-bits**

Configure the FCoE priority advertised for the FCoE protocol in application priority TLVs.

**Syntax**

`fcoe priority-bits priority-bitmap`

To remove the configured FCoE priority, use the `no fcoe priority-bits` command.

**Parameters**

- **priority-bitmap**
  - Enter the priority-bitmap range. The range is from 1 to FF.

**Defaults**

- 0x8

**Command Modes**

- PROTOCOL LLDP
fcoe-map

Create an FCoE map which contains the parameters used to configure the links between server CNAs and a SAN fabric. Apply the FCoE map on a server-facing Ethernet port.

M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

Syntax

```
fcoe-map map-name
```

Parameters

- **map-name**: Maximum: 32 alphanumeric characters.

Defaults

None on the MXL 10/40GbE Switch with FC Flex IO modules

On the I/O Aggregator with FC Flex IO modules, the following parameters are applied on all the FC Flex IO module interfaces:

- Description: SAN_FABRIC
- Fabric-id: 1002
- Fcoe-vlan: 1002
- Fc-map: 0x0efc00
- Fcf-priority: 128
- Fka-adv-period: 8000mSec
- Keepalive: enable
- Vlan priority: 3

Command Modes

- CONFIGURATION
- INTERFACE

Command History

Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

Usage Information

An FCoE map is a template used to map FCoE and FC parameters in a converged fabric. An FCoE map is used to virtualize upstream FC ports on an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway so that they appear to downstream server CNA ports as FCoE forwarder (FCF) ports on an FCoE network. When applied to FC and Ethernet ports on an NPIV proxy gateway, an FCoE map allows the switch to operate as an FCoE-FC bridge between an FC SAN and an FCoE network by providing FCoE-enabled servers and switches with the necessary parameters to log in to a SAN fabric.
On an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway, you cannot apply an FCoE map is applied on fabric-facing FC ports and server-facing 10–Gigabit Ethernet ports.

An FCoE map consists of the following parameters: the dedicated FCoE VLAN used for storage traffic, the destination SAN fabric (FC-MAP value), FCF priority used by a server, and the FIP keepalive (FKA) advertisement timeout.

In each FCoE map, the fabric ID, FC-MAP value, and FCoE VLAN parameters must be unique. Use one FCoE map to access one SAN fabric. You cannot use the same FCoE map to access different fabrics.

To remove an FCoE map from an Ethernet interface, enter the `no fcoe-map map-name` command in Interface configuration mode.

### Related Commands
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

### fka-adv-period
In an FCoE map, configure the time interval used to transmit FIP keepalive (FKA) advertisements.

**Syntax**
```
fka-adv-period seconds
```

**Parameters**
- `seconds` Enter the time period (in seconds) used to send FIP keepalive messages to peer devices. The range is from 8 to 90 seconds.

**Defaults**
- 8 seconds

**Command Modes**
- FCOE MAP

**Command History**
- **Version 9.3(0.0)** Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**
To delete the FIP keepalive time period from an FCoE map, enter the `no fka-adv-erpid period` command.

**Related Commands**
- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.
interface vlan (NPIV proxy gateway)

Create a dedicated VLAN to be used to send and receive Fibre Channel traffic over FCoE links between servers and a fabric over an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway.

M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

<table>
<thead>
<tr>
<th>Syntax</th>
<th>interface vlan vlan-id</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameters</td>
<td>vlan-id</td>
</tr>
<tr>
<td></td>
<td>Enter a number as the VLAN Identifier. The range is 1 to 4094.</td>
</tr>
<tr>
<td>Defaults</td>
<td>Not configured.</td>
</tr>
<tr>
<td>Command Modes</td>
<td>CONFIGURATION</td>
</tr>
<tr>
<td>Command History</td>
<td>Version 9.3.0.0</td>
</tr>
<tr>
<td></td>
<td>Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module configured as an NPIV proxy gateway.</td>
</tr>
</tbody>
</table>

Usage Information

FCoE storage traffic received from servers on an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway is de-capsulated into Fibre Channel packets and forwarded over FC links to SAN switches in a specified fabric. You must configure a separate FCoE VLAN for each fabric to which FCoE traffic is forwarded. Any non-FCoE traffic sent on a dedicated FCoE VLAN will be dropped.

You configure the association between a dedicated VLAN, which carries FCoE traffic from server CNAs over the NPIV proxy gateway to a SAN fabric in which destination storage arrays are installed, in an FCoE map by using the `fabric id vlan` command.

When you apply an FCoE map to a server-facing Ethernet port, the port is automatically configured as a tagged member of the FCoE VLAN.

For more information about VLANs and the commands to configure them, refer to the Virtual LAN (VLAN) Commands section of the Layer 2 chapter.

Example (Single Range)

```
Dell(conf)#interface vlan 10
Dell(conf-if-vl-3)#
```

Related Commands

- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.
**keepalive**

In an FCoE map, enable the monitoring of FIP keepalive messages (if it is disabled).

### M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

**Syntax**

```
keepalive
```

**Parameters**

None

**Defaults**

FIP keepalive monitoring is enabled on Ethernet and Fibre Channel interfaces.

**Command Modes**

FCOE MAP

**Command History**

Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

FIP keepalive (FKA) messaging is used to detect if other FCoE devices are reachable. To remove FIP keepalive monitoring from an FCoE map, enter the `no keepalive` command.

**Related Commands**

- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

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**priority-group bandwidth pfc**

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

### M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

**Syntax**

```
priority-group group-num {bandwidth percentage | strict-priority} pfc {on | off}
```

**Parameters**

- `priority-group group-num` Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.
- `bandwidth percentage` Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.
- `strict-priority` Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.
**pfc (on | off)** Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

**Defaults** None

**Command Modes** DCB MAP

**Command History**

Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

**Usage Information**

Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.

Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.

**Related Commands**

`dcb-map` — creates a DCB map to configure PFC and ETS parameters and applies the PFC and ETS settings on Ethernet ports.

`priority-pgid` — configures the 802.1p priority traffic in a priority group for a DCB map.
show fcoe-map
Display the Fibre Channel and FCoE configuration parameters in FCoE maps.

M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module

Syntax
show fcoe-map [brief | map-name]

Parameters
- **brief**: Displays an overview of currently configured FCoE maps.
- **map-name**: Displays the FC and FCoE configuration parameters in a specified FCoE map. The FCoE map is applied on Ethernet (FCoE) and FC ports to transmit FC storage traffic to a specified fabric.

Command Modes
- EXEC
- EXEC Privilege

Command History
Version 9.3(0.0) Introduced on the M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module.

Usage Information
Use the `show fcoe-map` command to display the FC and FCoE parameters used to configure server-facing Ethernet (FCoE) and fabric-facing FC ports in all FCoE maps on an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway.

In each FCoE map, the values for the fabric ID and FC-MAP that identify the SAN fabric to which FC storage traffic is sent, and the FCoE VLAN to be used must be unique.

An FCoE map is used to identify the SAN fabric to which FCoE storage traffic is sent and to virtualize M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module FC ports so that they appear to downstream server CNA ports as FCoE Forwarder (FCF) ports on an FCoE network.

The following table describes the `show fcoe-map brief` output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric-Name</td>
<td>Name of a SAN fabric.</td>
</tr>
<tr>
<td>Fabric ID</td>
<td>The ID number of the SAN fabric to which FC traffic is forwarded.</td>
</tr>
<tr>
<td>VLAN ID</td>
<td>The dedicated FCoE VLAN used to transport FCoE storage traffic between servers and a fabric over the NPIV proxy gateway. The configured VLAN ID must be the same as the fabric ID.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FC-MAP</td>
<td>FCoE MAC address-prefix value - The unique 24-bit MAC address prefix that identifies a fabric.</td>
</tr>
<tr>
<td>FCF Priority</td>
<td>The priority used by a server to select an upstream FCoE forwarder.</td>
</tr>
<tr>
<td>Config-State</td>
<td>Indicates whether the configured FCoE and FC parameters in the FCoE map are valid: Active (all mandatory FCoE and FC parameters are correctly configured) or Incomplete (either the FC-MAP value, fabric ID, or VLAN ID are not correctly configured).</td>
</tr>
<tr>
<td>Oper-State</td>
<td>Operational status of link to the fabric: Up (link is up and transmitting FC traffic), Down (link is down and not transmitting FC traffic), Link-wait (link is up and waiting for FLOGI to complete on peer FC port), or Removed (port has been shut down).</td>
</tr>
</tbody>
</table>

The following table describes the `show fcoe-map map-name` output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric-Name</td>
<td>Name of a SAN fabric.</td>
</tr>
<tr>
<td>Fabric ID</td>
<td>The ID number of the SAN fabric to which FC traffic is forwarded.</td>
</tr>
<tr>
<td>VLAN ID</td>
<td>The dedicated FCoE VLAN used to transport FCoE storage traffic between servers and a fabric over the NPIV proxy gateway. The configured VLAN ID must be the same as the fabric ID.</td>
</tr>
<tr>
<td>VLAN priority</td>
<td>FCoE traffic uses VLAN priority 3. (This setting is not user-configurable.)</td>
</tr>
<tr>
<td>FC-MAP</td>
<td>FCoE MAC address-prefix value - The unique 24-bit MAC address prefix that identifies a fabric.</td>
</tr>
<tr>
<td>FKA-ADV-period</td>
<td>Time interval (in seconds) used to transmit FIP keepalive advertisements.</td>
</tr>
<tr>
<td>FCF Priority</td>
<td>The priority used by a server to select an upstream FCoE forwarder.</td>
</tr>
<tr>
<td>Config-State</td>
<td>Indicates whether the configured FCoE and FC parameters in the FCoE map are valid: Active (all mandatory FCoE and FC parameters are correctly configured) or Incomplete (either the FC-MAP value, fabric ID, or VLAN ID are not correctly configured).</td>
</tr>
<tr>
<td>Oper-State</td>
<td>Operational status of link to the fabric: Up (link is up and transmitting FC traffic), Down (link is down and not transmitting FC traffic), Link-wait (link is up and waiting for FLOGI to complete on peer FC port), or Removed (port has been shut down).</td>
</tr>
</tbody>
</table>
Field | Description
--- | ---
 | FLOGI to complete on peer FC port, or Removed (port has been shut down).

**Members**
M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module Ethernet and FC ports that are members of the dedicated FCoE VLAN that carries storage traffic to the specified fabric.

**Example**
```
Dell#show fcoe-map brief
Fabric-Name  Fabric-Id  Vlan-Id  FC-MAP  FCF-Priority Config-State Oper-State
  test        16          16      0efc02  128  ACTIVE        UP
  cnatest     1003        1003    0efc03  128  ACTIVE        UP
  sitest      1004        1004    0efc04  128  ACTIVE        DOWN

Dell#show fcoe-map si
Fabric Name  si
Fabric Id  1004
Vlan Id  1004
Vlan priority  3
FC-MAP  0efc04
FKA-ADV-Period  8
Fcf Priority  128
Config-State  ACTIVE
Oper-State  DOWN
Members
```

**Related Commands**
- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
- `show npiv devices` — Display the FCoE and FC devices currently logged in to an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway.

**Syntax**
```
show npiv devices [brief]
```

**Parameters**
- `brief` Displays an overview of current server CNA-fabric connections over an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway.

**Command Modes**
- EXEC
- EXEC Privilege
Use the `show npiv devices` command to display information on the server CNA, server-facing Ethernet and fabric-facing FC ports, and the SAN fabric in each server-fabric connection over an M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module NPIV proxy gateway.

The following table describes the `show npiv devices brief` output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENode-Intf</td>
<td>M I/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module Ethernet interface (slot/port) to which a server CNA is connected.</td>
</tr>
<tr>
<td>ENode-WWPN</td>
<td>Worldwide port name (WWPN) of a server CNA port.</td>
</tr>
<tr>
<td>FCoE-Vlan</td>
<td>VLAN ID of the dedicated VLAN used to transmit FCoE traffic to and from the fabric.</td>
</tr>
<tr>
<td>Fabric-Intf</td>
<td>Fabric-facing Fibre Channel port (slot/port) on which FC traffic is transmitted to the specified fabric.</td>
</tr>
<tr>
<td>Fabric-Map</td>
<td>Name of the FCoE map containing the FCoE/FC configuration parameters for the server CNA-fabric connection.</td>
</tr>
<tr>
<td>LoginMethod</td>
<td>Method used by the server CNA to log in to the fabric; for example: FLOGI - ENode logged in using a fabric login (FLOGI). FDISC - ENode logged in using a fabric discovery (FDISC).</td>
</tr>
<tr>
<td>Status</td>
<td>Operational status of the link between a server CNA port and a SAN fabric: Logged In - Server has logged in to the fabric and is able to transmit FCoE traffic.</td>
</tr>
</tbody>
</table>

**Example**

Dell# show npiv devices brief

Total NPIV Devices = 2

<table>
<thead>
<tr>
<th>ENode-Intf</th>
<th>ENode-WWPN</th>
<th>FCoE-Vlan</th>
<th>Fabric-Intf</th>
<th>Fabric-Map</th>
<th>LoginMethod</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te 0/12</td>
<td>20:01:00:10:18:f1:94:20</td>
<td>1003</td>
<td>Fc 0/5</td>
<td>fid_1003</td>
<td>FLOGI</td>
<td>LOGGED_IN</td>
</tr>
<tr>
<td>Te 0/13</td>
<td>10:00:00:00:c9:d9:9c:cb</td>
<td>1003</td>
<td>Fc 0/0</td>
<td>fid_1003</td>
<td>FDISC</td>
<td>LOGGED_IN</td>
</tr>
</tbody>
</table>
The following table describes the `show npiv devices` output shown in the example below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENode [number]</td>
<td>A server CNA that has successfully logged in to a fabric over an MI/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module Ethernet port in ENode mode.</td>
</tr>
<tr>
<td>Enode MAC</td>
<td>MAC address of a server CNA port.</td>
</tr>
<tr>
<td>Enode Intf</td>
<td>Port number of a server-facing Ethernet port operating in ENode mode.</td>
</tr>
<tr>
<td>FCF MAC</td>
<td>Fibre Channel forwarder MAC: MAC address of MI/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module FCF interface.</td>
</tr>
<tr>
<td>Fabric Intf</td>
<td>Fabric-facing Fibre Channel port (slot/port) on which FCoE traffic is transmitted to the specified fabric.</td>
</tr>
<tr>
<td>FCoE VLAN</td>
<td>ID of the dedicated VLAN used to transmit FCoE traffic from a server CNA to a fabric and configured on both the server-facing MI/O Aggregator and MXL 10/40GbE Switch with the FC Flex IO module port and server CNA port.</td>
</tr>
<tr>
<td>Fabric Map</td>
<td>Name of the FCoE map containing the FCoE/FC configuration parameters for the server CNA-fabric connection.</td>
</tr>
<tr>
<td>Enode WWPN</td>
<td>Worldwide port name of the server CNA port.</td>
</tr>
<tr>
<td>Enode WWNN</td>
<td>Worldwide node name of the server CNA.</td>
</tr>
<tr>
<td>FCoE MAC</td>
<td>Fabric-provided MAC address (FPMA). The FPMA consists of the FC-MAP value in the FCoE map and the FC-ID provided by the fabric after a successful FLOGI. In the FPMA, the most significant bytes are the FC-MAP; the least significant bytes are the FC-ID.</td>
</tr>
<tr>
<td>FC-ID</td>
<td>FC port ID provided by the fabric.</td>
</tr>
<tr>
<td>LoginMethod</td>
<td>Method used by the server CNA to log in to the fabric; for example, FLOGI or FDISC.</td>
</tr>
<tr>
<td>Secs</td>
<td>Number of seconds that the fabric connection is up.</td>
</tr>
<tr>
<td>State</td>
<td>Status of the fabric connection: logged in.</td>
</tr>
</tbody>
</table>

Example

```plaintext
ENode[0]:
ENode MAC : 00:10:18:f1:94:21
ENode Intf : Te 0/12
FCF MAC    : 5c:f9:dd:ef:10:c8
Fabric Intf : Fc 0/5
FCoE Vlan  : 1003
Fabric Map : fid 1003
ENode WWPN : 20:01:00:10:18:f1:94:20
ENode WWNN : 20:00:00:10:18:f1:94:21
FCoE MAC   : 0e:fc:03:01:02:01
```
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-ID</td>
<td>01:02:01</td>
</tr>
<tr>
<td>LoginMethod</td>
<td>FLOGI</td>
</tr>
<tr>
<td>Secs</td>
<td>5593</td>
</tr>
<tr>
<td>Status</td>
<td>LOGGED_IN</td>
</tr>
</tbody>
</table>

ENode[1]:
- ENode MAC: 00:10:18:f1:94:22
- ENode Intf: Te 0/13
- FCF MAC: 5c:f9:dd:ef:10:c9
- Fabric Intf: Fc 0/0
- FCoE Vlan: 1003
- Fabric Map: fid_1003
- ENode WWPN: 10:00:00:00:c9:9c:cb
- ENode WWNN: 10:00:00:00:c9:9c:cd
- FCoE MAC: 0e:fc:03:01:02:02
- FC-ID: 01:02:01
- LoginMethod: FDISC
- Secs: 5593
- Status: LOGGED_IN

Related Commands
- **dcb-map** — creates a DCB map to configure DCB parameters on Ethernet ports that support converged Ethernet traffic.
- **fcoe-map** — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
PMUX Mode of the I/O Aggregator

This chapter describes the various CLI commands applicable in PMUX mode.

Data Center Bridging (DCB)

Data center bridging (DCB) refers to a set of IEEE Ethernet enhancements that provide data centers with a single, robust, converged network to support multiple traffic types, including local area network (LAN), server, and storage traffic.

The Dell Networking Operating System (OS) commands for data center bridging features include 802.1Qbb priority-based flow control (PFC), 802.1Qaz enhanced transmission selection (ETS), and the data center bridging exchange (DCBX) protocol.

advertise dcbx-appln-tlv

On a DCBX port with a manual role, configure the application priority TLVs advertised on the interface to DCBX peers.

Syntax

advertise dcbx-appln-tlv {fcoe | iscsi}

To remove the application priority TLVs, use the no advertise dcbx-appln-tlv {fcoe | iscsi} command.

Parameters

{fcoe | iscsi} Enter the application priority TLVs, where:

- fcoe: enables the advertisement of FCoE in application priority TLVs.
- iscsi: enables the advertisement of iSCSI in application priority TLVs.

Defaults

Application priority TLVs are enabled to advertise FCoE and iSCSI.

Command Modes

PROTOCOL LLDP

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To disable TLV transmission, use the no form of the command; for example, no advertise dcbx-appln-tlv iscsi.
advertise dcbx-tlv

On a DCBX port with a manual role, configure the PFC and ETS TLVs advertised to DCBX peers.

Syntax

```
advertise dcbx-tlv {ets-conf | ets-reco | pfc} {ets-conf | ets-reco | pfc} {ets-conf | ets-reco | pfc}
```

To remove the advertised ETS TLVs, use the `no advertise dcbx-tlv` command.

Parameters

- `(ets-conf | ets-reco | pfc)`

Enter the PFC and ETS TLVs advertised, where:

- `ets-conf`: enables the advertisement of ETS configuration TLVs.
- `ets-reco`: enables the advertisement of ETS recommend TLVs.
- `pfc`: enables the advertisement of PFC TLVs.

Defaults

All PFC and ETS TLVs are advertised.

Command Modes

PROTOCOL LLDP

Command History

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

You can configure the transmission of more than one TLV type at a time; for example:
```
adVERTISE DCBX-TLV ETS-CONF ETS-RECO
```

You can enable ETS recommend TLVs (`ets-reco`) only if you enable ETS configuration TLVs (`ets-conf`). To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-tlv pfc ets-reco`.

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

bandwidth-percentage

Configure the bandwidth percentage allocated to priority traffic in port queues.

Syntax

```
bandwidth-percentage percentage
```

To remove the configured bandwidth percentage, use the `no bandwidth-percentage` command.
Parameters

**percentage**

(Optional) Enter the bandwidth percentage. The percentage range is from 1 to 100% in units of 1%.

Defaults

none

Command Modes

QOS-POLICY-OUT-ETS

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By default, equal bandwidth is assigned to each port queue and each dot1p priority in a priority group. To configure bandwidth amounts in associated dot1p queues, use the `bandwidth-percentage` command. When specified bandwidth is assigned to some port queues and not to others, the remaining bandwidth (100% minus assigned bandwidth amount) is equally distributed to unassigned nonstrict priority queues in the priority group. The sum of the allocated bandwidth to all queues in a priority group must be 100% of the bandwidth on the link.

ETS-assigned bandwidth allocation applies only to data queues, not to control queues.

The configuration of bandwidth allocation and strict-queue scheduling is not supported at the same time for a priority group. If you configure both, the configured bandwidth allocation is ignored for priority-group traffic when you apply the output policy on an interface.

By default, equal bandwidth is assigned to each priority group in the ETS output policy applied to an egress port if you did not configure bandwidth allocation. The sum of configured bandwidth allocation to dot1p priority traffic in all ETS priority groups must be 100%. Allocate at least 1% of the total bandwidth to each priority group and queue. If bandwidth is assigned to some priority groups but not to others, the remaining bandwidth (100% minus assigned bandwidth amount) is equally distributed to nonstrict-priority groups which have no configured scheduler.

Related Commands

- `qos-policy-output ets` — creates a QoS output policy.
- `scheduler` — schedules priority traffic in port queues.

**dcb-enable**

Enable data center bridging.

Syntax

dcb enable

To disable DCB, use the no dcb enable command.
Defaults

none

Command Modes

CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

DCB is not supported if you enable link-level flow control on one or more interfaces.

dcb-input

To apply pause or flow control for specified priorities using a configure delay time, create a DCB input policy.

Syntax

dcb-input policy-name

To delete the DCB input policy, use the no dcb-input command.

Parameters

policy-name Maximum: 32 alphanumeric characters.

Defaults

none

Command Modes

CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

As soon as you apply a DCB policy with PFC enabled on an interface, DCBx starts exchanging information with PFC-enabled peers. The IEEE802.1Qbb, CEE, and CIN versions of PFC TLV are supported. DCBx also validates PFC configurations received in TLVs from peer devices.

By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to pfc no-drop queues).

To remove a DCB input policy, including the PFC configuration it contains, enter the no dcb-input policy-name command in Interface Configuration mode.

NOTE: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.
dcb-output

To associate an ETS configuration with priority traffic, create a DCB output policy.

Syntax

```
dcb-output policy-name
```

To remove the ETS output policy globally, use the `no dcb output policy-name` command.

Parameters

```
policy-name
```

Enter the DCB output policy name. The maximum is 32 alphanumeric characters.

Defaults

none

Command Modes

CONFIGURATION

Command History

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To associate a priority group with an ETS output policy with scheduling and bandwidth configuration, create a DCB output policy. You can apply a DCB output policy on multiple egress ports. When you apply an ETS output policy on an interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

The ETS configuration associated with 802.1 priority traffic in a DCB output policy is used in DCBX negotiation with ETS peers.

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

Related Commands

dcb-policy output — applies the output policy.

dcb-policy input — applies the input policy with the PFC configuration.
Defaults

none

Command Modes

INTERFACE

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

If you apply an input policy with PFC disabled (no pfc mode on):

- You can enable link-level flow control on the interface. To delete the input policy, first disable link-level flow control. PFC is then automatically enabled on the interface because an interface is by default PFC-enabled.
- PFC still allows you to configure lossless queues on a port to ensure no-drop handling of lossless traffic.

When you apply an input policy to an interface, an error message is displayed if:

- The PFC dot1p priorities result in more than two lossless port queues globally on the switch.
- You already enabled link-level flow control. PFC and link-level flow control cannot be enabled at the same time on an interface.

In a switch stack, configure all stacked ports with the same PFC configuration.

A DCB input policy for PFC applied to an interface may become invalid if you reconfigure the dot1p-queue mapping. This situation occurs when the new dot1p-queue assignment exceeds the maximum number (2) of lossless queues supported globally on the switch. In this case, all PFC configurations received from PFC-enabled peers are removed and resynchronized with the peer devices.

Traffic may be interrupted when you reconfigure PFC no-drop priorities in an input policy or reapply the policy to an interface.

NOTE: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

Related Commands
dcb-input — creates a DCB input policy.

dcb-policy input stack-unit stack-ports all

Apply the specified DCB input policy on all ports of the switch stack or a single stacked switch.

Syntax
dcb-policy input stack-unit {all | stack-unit-id} stack-ports all dcb-input-policy-name

To remove all DCB input policies applied to the stacked ports and rest the PFC to its default settings, use the no dcb-policy input stack-unit all command.
To remove only the DCB input policies applied to the specified switch, use the `no dcb-policy input stack-unit` command.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>stack-unit-id</code></td>
<td>Enter the stack unit identification.</td>
</tr>
<tr>
<td><code>dcb-input-policy-name</code></td>
<td>Enter the policy name for the DCB input policy.</td>
</tr>
</tbody>
</table>

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

The `dcb-policy input stack-unit all` command overwrites any previous `dcb-policy input stack-unit stack-unit-id` configurations. Similarly, a `dcb-policy input stack-unit stack-unit-id` command overwrites any previous `dcb-policy input stack-unit all` configuration.

**NOTE:** Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

**Related Commands**

- `dcb-policy output stack-unit stack-ports all` — applies the specified DCB output policy.

### dcb-policy output

Apply the output policy with the ETS configuration to an egress interface.

**Syntax**

```
dcb-policy output policy-name
```

To delete the output policy, use the `no dcb-policy output` command.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>policy-name</code></td>
<td>Enter the output policy name.</td>
</tr>
</tbody>
</table>

**Defaults**

none

**Command Modes**

INTERFACE

**Command History**

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.
When you apply an ETS output policy to an interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

To remove an ETS output policy from an interface, use the `no dcb-policy output policy-name` command. ETS is enabled by default with the default ETS configuration applied (all dot1p priorities in the same group with equal bandwidth allocation).

**NOTE**: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

**Related Commands**
- `dcb-output` — creates a DCB output policy.

### `dcb-policy output stack-unit stack-ports all`

Apply the specified DCB output policy on all ports of the switch stack or a single stacked switch.

**Syntax**
```
dcb-policy output stack-unit {all | stack-unit-id} stack-ports all dcb-output-policy-name
```

To remove all DCB output policies applied to the stacked ports, use the `no dcb-policy output stack-unit all` command.

To remove only the DCB output policies applied to the specified switch, use the `no dcb-policy output stack-unit stack-unit-id` command.

**Parameters**
- `stack-unit-id`  
Enter the stack unit identification.
- `dcb-output-policy-name`  
Enter the policy name for the DCB output policy.

**Defaults**
none

**Command Modes**
CONFIGURATION

**Command History**
- **Version 9.2(0.0)**  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**  
  Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
- The `dcb-policy output stack-unit all` command overwrites any previous `dcb-policy output stack-unit stack-unit-id` configurations. Similarly, a `dcb-policy output stack-unit stack-unit-id` command overwrites any previous `dcb-policy output stack-unit all` configuration.
You can apply a DCB output policy with ETS configuration to all stacked ports in a switch stack or an individual stacked switch. You can apply different DCB output policies to different stack units.

NOTE: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

**Related Commands**

- `dcb-policy input stack-unit stack-ports all` — applies the specified DCB input policy.

**dcb stack-unit all pfc-buffering pfc-port-count pfc-queues**

Configure the PFC buffer for all switches in the stack.

**Syntax**

```
dcb stack-unit all pfc-buffering pfc-port-count {1-56} pfc-queues {1-2}
```

To remove the configuration for the PFC buffer on all switches in the stack, use the `no dcb stack-unit all pfc-buffering pfc-port-count pfc-queues` command.

**Parameters**

- `pfc-port-count {1-56}`
  - Enter the pfc-port count. The range is 1 to 56.
- `pfc-queues {1-2}`
  - Enter the pfc-queue number. The range is 1 to 2.

**Defaults**

The PFC buffer is enabled on all ports on the stack unit.

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

If you configure PFC on a 40GbE port, count the 40GbE port as four PFC-enabled ports in the `pfc-port-number` you enter in the command syntax.

To achieve lossless PFC operation, the PFC port count and queue number used for the reserved buffer size that is created must be greater than or equal to the buffer size required for PFC-enabled ports and lossless queues on the switch.

You must reload the stack or a specified stack unit (use the reload command in EXEC Privilege mode) for the PFC buffer configuration to take effect.

**Related Commands**

- `dcb stack-unit pfc-buffering pfc-port pfc-queues` — configures the PFC buffer for all port pipes in a specified stack unit.
**dcb stack-unit pfc-buffering pfc-port-count pfc-queues**

Configure the PFC buffer for all port pipes in a specified stack unit by specifying the port-pipe number, number of PFC-enabled ports, and number of configured lossless queues.

**Syntax**

```plaintext
dcb stack-unit stack-unit-id [port-set port-set-id] pfc-buffering pfc-ports {1-56} pfc-queues {1-2}
```

To remove the configuration for the PFC buffer on all port pipes in a specified stack unit, use the `no dcb stack-unit stack-unit-id [port-set port-set-id] pfc-buffering pfc-ports pfc-queues` command.

**Parameters**

- **stack-unit-id**
  - Enter the stack unit identification. The range is from 0 to 5.

- **port-set**
  - Enter the port-set identification. The only valid port-set ID (port-pipe number) on an MXL Switch is 0.

- **pfc-ports**
  - Enter the pfc-ports. The range is from 1 to 56.

- **pfc-queues**
  - Enter the pfc-queue number. The range is from 1 to 2.

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

If you configure PFC on a 40GbE port, count the 40GbE port as four PFC-enabled ports in the pfc-port number you enter in the command syntax.

To achieve lossless PFC operation, the PFC port count and queue number used for the reserved buffer size that is created must be greater than or equal to the buffer size required for PFC-enabled ports and lossless queues on the switch.

You must reload the stack or a specified stack unit (use the `reload` command in EXEC Privilege mode) for the PFC buffer configuration to take effect.

**Related Commands**

- `dcb stack-unit pfc-buffering pfc-port pfc-queues` — configures the PFC buffer for all switches in the stack.

**dcbx port-role**

Configure the DCBX port role the interface uses to exchange DCB information.

**Syntax**

```plaintext
dcbx port-role {config-source | auto-downstream | auto-upstream | manual}
```

PMUX Mode of the I/O Aggregator
To remove DCBX port role, use the `no dcbx port-role {config-source | auto-downstream | auto-upstream | manual}` command.

### Parameters

| config-source | auto-downstream | auto-upstream | manual |

Enter the DCBX port role, where:

- **config-source**: configures the port to serve as the configuration source on the switch.
- **auto-upstream**: configures the port to receive a peer configuration. The configuration source is elected from auto-upstream ports.
- **auto-downstream**: configures the port to accept the internally propagated DCB configuration from a configuration source.
- **manual**: configures the port to operate only on administer-configured DCB parameters. The port does not accept a DCB configuration received from a peer or a local configuration source.

### Defaults

**Manual**

### Command Modes

**INTERFACE PROTOCOL LLDP**

### Command History

**Version 9.2(0.0)**

Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

**Version 8.3.16.1**

Introduced on the MXL 10/40GbE Switch IO Module.

### Usage Information

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

### dcbx version

Configure the DCBX version used on the interface.

**Syntax**

```
dcbx version {auto | cee | cin | ieee-v2.5}
```

To remove the DCBX version, use the `dcbx version {auto | cee | cin | ieee-v2.5}` command.

### Parameters

| auto | cee | cin | ieee-v2.5 |

Enter the DCBX version type used on the interface, where:

- **auto**: configures the port to operate using the DCBX version received from a peer.
- **cee**: configures the port to use CDD (Intel 1.01).
- **cin**: configures the port to use Cisco-Intel-Nuova (DCBX 1.0).
IEEE-v2: configures the port to use IEEE 802.1az (Draft 2.5).

**Defaults**
Auto

**Command Modes**

**Command History**

**Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

**Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

### debug dcbx

Enable DCBX debugging.

**Syntax**

```
debug dcbx {all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}
```

To disable DCBX debugging, use the `no debug dcbx` command.

**Parameters**

(all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv)

Enter the type of debugging, where:

- **all**: enables all DCBX debugging operations.
- **auto-detect-timer**: enables traces for DCBX auto-detect timers.
- **config-exchng**: enables traces for DCBX configuration exchanges.
- **fail**: enables traces for DCBX failures.
- **mgmt**: enables traces for DCBX management frames.
- **resource**: enables traces for DCBX system resource frames.
- **sem**: enables traces for the DCBX state machine.
- **tlv**: enables traces for DCBX TLVs.

**Defaults**
none

**Command Modes**

EXEC Privilege

**Command History**

**Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
**Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**description**

Enter a text description of the DCB policy (PFC input or ETS output).

**Syntax**

description text

To remove the text description, use the no description command.

**Parameters**

text Enter the description of the output policy. The maximum is 32 characters.

**Defaults**

none

**Command Modes**

- DCB INPUT POLICY
- DCB OUTPUT POLICY

**Command History**

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

**Related Commands**

- `dcb-input` — creates a DCB PFC input policy.
- `dcb-policy input` — applies the output policy.
- `dcb-output` — creates a DCBETS output policy.
- `dcb-policy output` — applies the output policy.

**ets mode on**

Enable the ETS configuration so that scheduling and bandwidth allocation configured in an ETS output policy or received in a DCBX TLV from a peer can take effect on an interface.

**Syntax**

ets mode on

To remove the ETS configuration, use the no ets mode on command.

**Defaults**

ETS mode is on.

**Command Modes**

DCB OUTPUT POLICY

**Command History**

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
Usage Information
If you disable ETS in an output policy applied to an interface using the `no ets mode` command, any previously configured QoS settings at the interface or global level take effect. If you configure QoS settings at the interface or global level and in an output policy map (the `service-policy output` command), the QoS configuration in the output policy takes precedence.

NOTE: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

Related Commands
- `dcb-output` — creates a DCB output policy.
- `dcb-policy output` — applies the output policy.

**fcoe priority-bits**

Configure the FCoE priority advertised for the FCoE protocol in application priority TLVs.

**Syntax**
```
fcoe priority-bits priority-bitmap
```

To remove the configured FCoE priority, use the `no fcoe priority-bits` command.

**Parameters**
- `priority-bitmap` Enter the priority-bitmap range. The range is from 1 to FF.

**Defaults**
0x8

**Command Modes**
- PROTOCOL LLDP

**Command History**
- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
This command is available at the global level only.

**iscsi priority-bits**

Configure the iSCSI priority advertised for the iSCSI protocol in application priority TLVs.

**Syntax**
```
iscsi priority-bits priority-bitmap
```

To remove the configured iSCSI priority, use the `no iscsi priority-bits` command.

**Parameters**
- `priority-bitmap` Enter the priority-bitmap range. The range is from 1 to FF.
**Defaults**  
0x10

**Command Modes**  
PROTOCOL LLDP

**Command History**  

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version 9.2(0.0)</strong></td>
<td>Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.</td>
</tr>
<tr>
<td><strong>Version 8.3.16.1</strong></td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Usage Information**  
This command is available at the global level only.

### pfc link-delay

Configure the link delay used to pause specified priority traffic.

**Syntax**  
pfc link-delay value

To remove the link delay, use the `no pfc link-delay` command.

**Parameters**  

| value | The range is (in quanta) from 712 to 65535. One quantum is equal to a 512-bit transmission. |

**Defaults**  
45556 quantum

**Command Modes**  
DCB INPUT POLICY

**Command History**  

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version 9.2(0.0)</strong></td>
<td>Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.</td>
</tr>
<tr>
<td><strong>Version 8.3.16.1</strong></td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Usage Information**  
The minimum link delay must be greater than the round-trip transmission time a peer must honor a PFC pause frame multiplied by the number of PFC-enabled ingress ports.

**Related Commands**  
dcb-input — creates a DCB input policy.

### pfc mode on

Enable the PFC configuration on the port so that the priorities are included in DCBX negotiation with peer PFC devices.

**Syntax**  
pfc mode on

To disable the PFC configuration, use the `no pfc mode on` command.

**Defaults**  
PFC mode is on.
DCB INPUT POLICY

Command Modes

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to pfc no-drop queues).

To disable PFC operation on an interface, enter the no pfc mode on command in DCB Input Policy Configuration mode. PFC is enabled and disabled as global DCB operation is enabled (dcb-enable) or disabled (no dcb-enable).

You cannot enable PFC and link-level flow control at the same time on an interface.

Related Commands

dcb-input — creates a DCB input policy.

pfc no-drop queues

Configure the port queues that still function as no-drop queues for lossless traffic.

Syntax

pfc no-drop queues queue-range

To remove the no-drop port queues, use the no pfc no-drop queues command.

Parameters

queue-range Enter the queue range. Separate the queue values with a comma; specify a priority range with a dash; for example, pfc no-drop queues 1,3 or pfc no-drop queues 2-3. The range is from 0 to 3.

Defaults

No lossless queues are configured.

Command Modes

INTERFACE

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

The maximum number of lossless queues globally supported on the switch is two.

- The following lists the dot1p priority-queue assignments.
<table>
<thead>
<tr>
<th>dot1p Value in the Incoming Frame</th>
<th>Description heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

**pfc priority**

Configure the CoS traffic to be stopped for the specified delay.

**Syntax**

```
pfc priority priority-range
```

To delete the pfc priority configuration, use the `no pfc priority` command.

**Parameters**

- `priority-range` Enter the 802.1p values of the frames to be paused. Separate the priority values with a comma; specify a priority range with a dash; for example, `pfc priority 1,3,5-7`. The range is from 0 to 7.

**Defaults**

```
none
```

**Command Modes**

DCB INPUT POLICY

**Command History**

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

You can enable any number of 802.1p priorities for PFC. Queues to which PFC priority traffic is mapped are lossless by default. Traffic may be interrupted due to an interface flap (going down and coming up) when you reconfigure the lossless queues for no-drop priorities in a PFC input policy and reapply the policy to an interface.

The maximum number of lossless queues supported on the I/O Aggregator switch is four.

A PFC peer must support the configured priority traffic (as DCBX detects) to apply PFC.
NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

Related Commands

dcb-input — creates a DCB input policy.

priority-group
To use with an ETS output policy, create an ETS priority group.

Syntax

priority-group group-name
To remove the priority group, use the no priority-group command.

Parameters

- **group-name**: Enter the name of the ETS priority group. The maximum is 32 characters.

Defaults

none

Command Modes

CONFIGURATION

Command History

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

A priority group consists of 802.1p priority values that are grouped for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

You must configure 802.1p priorities in priority groups associated with an ETS output policy. You can assign each dot1p priority to only one priority group.

The maximum number of priority groups supported in ETS output policies on an interface is equal to the number of data queues (4) on the port. The 802.1p priorities in a priority group can map to multiple queues.

If you configure more than one priority queue as strict priority or more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.
Related Commands

- `priority-list` — configures the 802.1p priorities for an ETS output policy.
- `set-pqid` — configures the priority-group.

priority-group qos-policy

Associate the 802.1p priority traffic in a priority group with the ETS configuration in a QoS output policy.

Syntax

```
priority-group group-name qos-policy ets-policy-name
```

To remove the 802.1p priority group, use the `no priority-group qos-policy` command.

Parameters

- `group-name` Enter the group name of the 802.1p priority group. The maximum is 32 characters.
- `ets-policy-name` Enter the ETS policy name.

Defaults

none

Command Modes

DCB OUTPUT POLICY

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

The ETS configuration associated with 802.1p priority traffic in a DCB output policy is used in DCBX negotiation with ETS peers.

If you disable ETS in an output policy applied to an interface using the `no ets mode` on command, any previously configured QoS settings at the interface or global level take effect. If you configure QoS settings at the interface or global level and in an output policy map (the `service-policy output` command), the QoS configuration in the output policy takes precedence.

**NOTE:** Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

Related Commands

- `dcb-output` — creates a DCB output policy.
- `dcb-policy output` — applies the output policy.
**priority-list**

Configure the 802.1p priorities for the traffic on which you want to apply an ETS output policy.

**Syntax**

```
priority-list value
```

To remove the priority list, use the `no priority-list` command.

**Parameters**

- **value**: Enter the priority list value. Separate priority values with a comma; specify a priority range with a dash, for example, `priority-list 3,5-7`. The range is from 0 to 7.

**Defaults**

none

**Command Modes**

PRIORITY-GROUP

**Command History**

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

By default:
- All 802.1p priorities are grouped in priority group 0.
- 100% of the port bandwidth is assigned to priority group 0. The complete bandwidth is equally assigned to each priority class so that each class has 12 to 13%.

**NOTE**: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

**Related Commands**

- `priority-group qos-policy` — associates an ETS priority group with an ETS output policy.
- `set-pgid` — configures the priority-group.

**scheduler**

Configure the method used to schedule priority traffic in port queues.

**Syntax**

```
scheduler value
```

To remove the configured priority schedule, use the `no scheduler` command.

**Parameters**

- **value**: Enter schedule priority value. The valid values are:
  - `strict`: strict-priority traffic is serviced before any other queued traffic.
**werr:** weighted elastic round robin (werr) provides low-latency scheduling for priority traffic on port queues.

**Defaults**
Weighted elastic round robin (WERR) scheduling is used to queue priority traffic.

**Command Modes**
POLICY-MAP-OUT-ETS

**Command History**
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
dot1p priority traffic on the switch is scheduled to the current queue mapping. dot1p priorities within the same queue must have the same traffic properties and scheduling method.

ETS-assigned scheduling applies only to data queues, not to control queues.

The configuration of bandwidth allocation and strict-queue scheduling is not supported at the same time for a priority group. If you configure both, the configured bandwidth allocation is ignored for priority-group traffic when you apply the output policy on an interface.

**Related Commands**
- `qos-policy-output ets` — configures the ETS bandwidth allocation.
- `bandwidth-percentage` — bandwidth percentage allocated to priority traffic in port queues.

**set-pgid**
Configure the priority-group identifier.

**Syntax**
```
set-pgid value
```
To remove the priority group, use the `no set-pgid` command.

**Parameters**
- **value**
  - Enter the priority group identification. The range is from 0 to 7.

**Defaults**
none

**Command Modes**
PRIOIRTY-GROUP

**Command History**
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.
NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the `dcb-map` commands in the future.

Related Commands
- `priority-group qos-policy` — creates an ETS priority group.
- `priority-list` — configures the 802.1p priorities.

**show dcb**
Displays the data center bridging status, the number of PFC-enabled ports, and the number of PFC-enabled queues.

**Syntax**
```
show dcb [stack-unit unit-number]
```

**Parameters**
- `unit number` Enter the DCB unit number. The range is from 0 to 5.

**Command Modes**
EXEC Privilege

**Command History**
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
Specify a stack-unit number on the Master switch in a stack.

**Example**
```
Dell(conf)#do show dcb
stack-unit 0 port-set 0
DCB Status :Enabled
PFC Queue Count :2
Total Buffer[lossy + lossless] (in KB):7982
PFC Total Buffer (in KB) :5872
PFC Shared Buffer (in KB) :832
PFC Available Buffer (in KB) :4860
Dell (conf)#
```

**show interface dcbx detail**
Displays the DCBX configuration on an interface.

**Syntax**
```
show interface port-type slot/port dcbx detail
```

**Parameters**
- `port-type` Enter the port type.
- `slot/port` Enter the slot/port number.
Command Modes

CONFIGURATION

Command History

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1  Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To clear DCBX frame counters, use the `clear dcbx counters interface stack-unit/port` command.

The following describes the `show interface dcbx detail` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with chassis slot and port number.</td>
</tr>
<tr>
<td>Port-Role</td>
<td>Configured the DCBX port role: auto-upstream, auto-downstream, config-source, or manual.</td>
</tr>
<tr>
<td>DCBX Operational Status</td>
<td>Operational status (enabled or disabled) used to elect a configuration source and internally propagate a DCB configuration. The DCBX operational status is the combination of PFC and ETS operational status.</td>
</tr>
<tr>
<td>Configuration Source</td>
<td>Specifies whether the port serves as the DCBX configuration source on the switch: true (yes) or false (no).</td>
</tr>
<tr>
<td>Local DCBX Compatibility mode</td>
<td>DCBX version accepted in a DCB configuration as compatible. In auto-upstream mode, a port can only receive a DCBX version supported on the remote peer.</td>
</tr>
<tr>
<td>Local DCBX Configured mode</td>
<td>DCBX version configured on the port: CEE, CIN, IEEE v2.5, or Auto (port auto-configures to use the DCBX version received from a peer).</td>
</tr>
<tr>
<td>Peer Operating version</td>
<td>DCBX version that the peer uses to exchange DCB parameters.</td>
</tr>
<tr>
<td>Local DCBX TLVs Transmitted</td>
<td>Transmission status (enabled or disabled) of advertised DCB TLVs (see TLV code at the top of the show command output).</td>
</tr>
<tr>
<td>Local DCBX Status: DCBX Operational Version</td>
<td>DCBX version advertised in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: DCBX Max Version Supported</td>
<td>Highest DCBX version supported in Control TLVs.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Local DCBX Status: Sequence</td>
<td>Sequence number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Local DCBX Status: Acknowledgment Number</td>
<td>Acknowledgement number transmitted in Control TLVs.</td>
</tr>
<tr>
<td>Local DCBX Status: Protocol</td>
<td>Current operational state of the DCBX protocol: ACK or IN-SYNC.</td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX</td>
<td>DCBX version advertised in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Operational Version</td>
<td></td>
</tr>
<tr>
<td>Peer DCBX Status: DCBX Max</td>
<td>Highest DCBX version supported in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Version Supported</td>
<td></td>
</tr>
<tr>
<td>Peer DCBX Status: Sequence</td>
<td>Sequence number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Peer DCBX Status: Acknowledgment Number</td>
<td>Acknowledgement number transmitted in Control TLVs received from the peer device.</td>
</tr>
<tr>
<td>Total DCBX Frames transmitted</td>
<td>Number of DCBX frames sent from the local port.</td>
</tr>
<tr>
<td>Total DCBX Frames received</td>
<td>Number of DCBX frames received from the remote peer port.</td>
</tr>
<tr>
<td>Total DCBX Frame errors</td>
<td>Number of DCBX frames with errors received.</td>
</tr>
<tr>
<td>Total DCBX Frames unrecognized</td>
<td>Number of unrecognizable DCBX frames received.</td>
</tr>
</tbody>
</table>

**Example**

Dell(conf)# show interface tengigabitethernet 0/49 dcbx detail
Dell#show interface te 0/49 dcbx detail

E-ETS Configuration TLV enabled
e-ETS Configuration TLV disabled
R-ETS Recommendation TLV enabled
r-ETS Recommendation TLV disabled
P-PFC Configuration TLV enabled
p-PFC Configuration TLV disabled
F-Application priority for FCOE enabled
f-Application Priority for FCOE disabled
I-Application priority for iSCSI enabled
i-Application Priority for iSCSI disabled
show interface ets
Displays the ETS configuration applied to egress traffic on an interface, including priority groups with priorities and bandwidth allocation.

Syntax
show interface port-type slot/port ets {summary | detail}

Parameters
- **port-type slot/ port ets**
  - Enter the port-type slot and port ETS information.
- **(summary | detail)**
  - Enter the keyword summary for a summary list of results or enter the keyword detail for a full list of results.

Command Modes
- CONFIGURATION

Command History
- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information
- To clear ETS TLV counters, use the **clear ets counters interface port-type slot/port** command.
The following describes the `show interface summary` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Max Supported</td>
<td>Maximum number of priority groups supported.</td>
</tr>
<tr>
<td>TC Group</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Number of Traffic</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Classes</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Admin mode</td>
<td>ETS mode: on or off. When on, the scheduling and bandwidth allocation configured in an ETS output policy or received in a DCBX TLV from a peer can take effect on an interface.</td>
</tr>
<tr>
<td>Admin Parameters</td>
<td>ETS configuration on local port, including priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Remote Parameters</td>
<td>ETS configuration on remote peer port, including admin mode (enabled if a valid TLV was received or disabled), priority groups, assigned dot1p priorities, and bandwidth allocation. If ETS admin mode is enabled on the remote port for DCBX exchange, the Willing bit received in ETS TLVs from the remote peer is included.</td>
</tr>
<tr>
<td>Local Parameters</td>
<td>ETS configuration on local port, including admin mode (enabled when a valid TLV is received from a peer), priority groups, assigned dot1p priorities, and bandwidth allocation.</td>
</tr>
<tr>
<td>Operational status</td>
<td>Port state for current operational ETS configuration:</td>
</tr>
<tr>
<td>(local port)</td>
<td>• <strong>Init</strong>: Local ETS configuration parameters were exchanged with the peer.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Recommend</strong>: Remote ETS configuration parameters were received from the peer.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Internally propagated</strong>: ETS configuration parameters were received from the configuration source.</td>
</tr>
<tr>
<td>ETS DCBX Oper</td>
<td>Operational status of the ETS configuration on the local port: match or mismatch.</td>
</tr>
<tr>
<td>status</td>
<td></td>
</tr>
<tr>
<td>State Machine Type</td>
<td>Type of state machine used for DCBX exchanges of ETS parameters: Feature — for legacy DCBX versions; Asymmetric — for an IEEE version.</td>
</tr>
<tr>
<td>Conf TLV Tx Status</td>
<td>Status of ETS Configuration TLV advertisements: enabled or disabled.</td>
</tr>
<tr>
<td>ETS TLV Statistic:</td>
<td>Number of ETS Configuration TLVs received.</td>
</tr>
<tr>
<td>Input Conf TLV pkts</td>
<td></td>
</tr>
</tbody>
</table>
**Field** | **Description**
--- | ---
ETS TLV Statistic: Output Conf TLV pkts | Number of ETS Configuration TLVs transmitted.
ETS TLV Statistic: Error Conf TLV pkts | Number of ETS Error Configuration TLVs received.

**Example**

Dell(conf)# show interfaces te 0/0 ets summary
Interface TenGigabitEthernet 0/0
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters:

Admin is enabled
TC-grp Priority#     Bandwidth  TSA
0  0,1,2,3,4,5,6,7  100%    ETS
1  0%    ETS
2  0%    ETS
3  0%    ETS
4  0%    ETS
5  0%    ETS
6  0%    ETS
7  0%    ETS

Priority#     Bandwidth  TSA
0  13%    ETS
1  13%    ETS
2  13%    ETS
3  13%    ETS
4  12%    ETS
5  12%    ETS
6  12%    ETS
7  12%    ETS

Remote Parameters:

Remote is disabled
Local Parameters:

Local is enabled
TC-grp Priority#     Bandwidth  TSA
0  0,1,2,3,4,5,6,7  100%    ETS
1  0%    ETS
2  0%    ETS
3  0%    ETS
4  0%    ETS
5  0%    ETS
6  0%    ETS
7  0%    ETS

Priority#     Bandwidth  TSA
0  13%    ETS
1  13%    ETS
2  13%    ETS
3  13%    ETS
4  12%    ETS
5  12%    ETS
6  12%    ETS
7  12%    ETS

Oper status is init
Dell(conf)# show interfaces tengigabitethernet 0/0 ets detail
Interface TenGigabitEthernet 0/0
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters:

<table>
<thead>
<tr>
<th>TC-grp</th>
<th>Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0,1,2,3,4,5,6,7</td>
<td>100%</td>
<td>ETS</td>
</tr>
<tr>
<td>1</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
</tbody>
</table>

Remote Parameters:
Remote is disabled

Local Parameters:

<table>
<thead>
<tr>
<th>TC-grp</th>
<th>Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0,1,2,3,4,5,6,7</td>
<td>100%</td>
<td>ETS</td>
</tr>
<tr>
<td>1</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0%</td>
<td>ETS</td>
<td></td>
</tr>
</tbody>
</table>

Oper status is init
Conf TLV Tx Status is disabled
Traffic Class TLV Tx Status is disabled
0 Input Conf TLV Pkts, 0 Output Conf TLV Pkts, 0 Error Conf TLV Pkts
0 Input Traffic Class TLV Pkts, 0 Output Traffic Class TLV Pkts, 0 Error Traffic Class
show interface pfc

Displays the PFC configuration applied to ingress traffic on an interface, including priorities and link delay.

**Syntax**

```
show interface port-type slot/port pfc {summary | detail}
```

**Parameters**

- `port-type slot/ port pfc` Enter the port-type slot and port PFC information.
- `{summary | detail}` Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results.

**Command Modes**

`INTERFACE`

**Command History**

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

To clear the PFC TLV counters, use the `clear pfc counters interface port-type slot/port` command.

The following describes the `show interface pfc summary` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Interface type with stack-unit and port number.</td>
</tr>
<tr>
<td>Admin mode is on</td>
<td>PFC admin mode is on or off with a list of the configured PFC priorities. When the PFC admin mode is on, PFC advertisements are enabled to be sent and received from peers; received PFC configuration take effect. The admin operational status for a DCBX exchange of PFC configuration is enabled or disabled.</td>
</tr>
<tr>
<td>Admin is enabled</td>
<td></td>
</tr>
<tr>
<td>Remote is enabled</td>
<td>Operational status (enabled or disabled) of peer device for DCBX exchange of PFC configuration with a list of the configured PFC priorities. Willing status of peer device for DCBX exchange (Willing bit received in PFC TLV): enabled or disable.</td>
</tr>
<tr>
<td>Priority list Remote</td>
<td></td>
</tr>
<tr>
<td>Willing Status is enabled</td>
<td></td>
</tr>
<tr>
<td>Local is enabled</td>
<td>DCBX operational status (enabled or disabled) with a list of the configured PFC priorities.</td>
</tr>
<tr>
<td>Operational status (local port)</td>
<td>Port state for current operational PFC configuration:</td>
</tr>
</tbody>
</table>

- **Init**: Local PFC configuration parameters were exchanged with the peer.
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Recommend:</strong> Remote PFC configuration parameters were received from the peer.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Internally propagated:</strong> PFC configuration parameters were received from the configuration source.</td>
<td></td>
</tr>
<tr>
<td>PFC DCBX Oper status</td>
<td>Operational status for the exchange of the PFC configuration on the local port: match (up) or mismatch (down).</td>
</tr>
<tr>
<td><strong>State Machine Type</strong></td>
<td>Type of state machine used for DCBX exchanges of the PFC parameters: Feature — for legacy DCBX versions; Symmetric — for an IEEE version.</td>
</tr>
<tr>
<td>TLV Tx Status</td>
<td>Status of the PFC TLV advertisements: enabled or disabled.</td>
</tr>
<tr>
<td>PFC Link Delay</td>
<td>Link delay (in quanta) used to pause specified priority traffic.</td>
</tr>
<tr>
<td>Application Priority TLV: FCOE TLV Tx Status</td>
<td>Status of FCoE advertisements in application priority TLVs from the local DCBX port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: SCSI TLV Tx Status</td>
<td>Status of iSCSI advertisements in application priority TLVs from the local DCBX port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: Local FCOE Priority Map</td>
<td>Priority bitmap the local DCBX port uses in FCoE advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Local ISCSI Priority Map</td>
<td>Priority bitmap the local DCBX port uses in iSCSI advertisements in application priority TLVs.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote FCOE Priority Map</td>
<td>Status of FCoE advertisements in application priority TLVs from the remote peer port: enabled or disabled.</td>
</tr>
<tr>
<td>Application Priority TLV: Remote ISCSI Priority Map</td>
<td>Status of iSCSI advertisements in application priority TLVs from the remote peer port: enabled or disabled.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Input TLV pkts</td>
<td>Number of PFC TLVs received.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Output TLV pkts</td>
<td>Number of PFC TLVs transmitted.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Error pkts</td>
<td>Number of PFC error packets received.</td>
</tr>
<tr>
<td>PFC TLV Statistics: Pause Tx pkts</td>
<td>Number of PFC pause frames transmitted.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>PFC TLV Statistics:</td>
<td>Number of PFC pause frames received.</td>
</tr>
<tr>
<td>Pause Rx pkts</td>
<td></td>
</tr>
</tbody>
</table>

**Example (Summary)**

Dell# show interfaces tengigabitethernet 0/49 pfc summary

Interface TenGigabitEthernet 0/49
Admin mode is on
Admin is enabled
Remote is enabled, Priority list is 4
Remote Willing Status is enabled
Local is enabled
Oper status is Recommended
PFC DCBX Oper status is Up
State Machine Type is Feature
TLV Tx Status is enabled
PFC Link Delay 45556 pause quantams
Application Priority TLV Parameters :

---

FCOE TLV Tx Status is disabled
ISCSI TLV Tx Status is disabled
Local FCOE PriorityMap is 0x8
Local ISCSI PriorityMap is 0x10
Remote FCOE PriorityMap is 0x8
Remote ISCSI PriorityMap is 0x8

Dell# show interfaces tengigabitethernet 0/49 pfc detail

Interface TenGigabitEthernet 0/49
Admin mode is on
Admin is enabled
Remote is enabled
Remote Willing Status is enabled
Local is enabled
Oper status is recommended
PFC DCBX Oper status is Up
State Machine Type is Feature
TLV Tx Status is enabled
PFC Link Delay 45556 pause quanta
Application Priority TLV Parameters :
---

FCOE TLV Tx Status is disabled
ISCSI TLV Tx Status is disabled
Local FCOE PriorityMap is 0x8
Local ISCSI PriorityMap is 0x10
Remote FCOE PriorityMap is 0x8
Remote ISCSI PriorityMap is 0x8
0 Input TLV pkts, 1 Output TLV pkts, 0 Error pkts,
0 Pause Tx pkts, 0 Pause Rx pkts

**show interface pfc statistics**

Displays counters for the PFC frames received and transmitted (by dot1p priority class) on an interface.

**Syntax**

```
show interface port-type slot/port pfc statistics
```

**Parameters**

| port-type | Enter the port type. |
| slot/port | Enter the slot/port number. |
show qos dcb-input

Displays the PFC configuration in a DCB input policy.

Syntax

show qos dcb-input [pfc-profile]

Parameters

pfc-profile Enter the PFC profile.

Command Modes

CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommend to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

Example

Dell(conf)# show qos dcb-input
dcb-input pfc-profile
  pfc link-delay 32
  pfc priority 0-1
dcb-input pfc-profile1
  no pfc mode on
  pfc priority 6-7
show qos dcb-output
Displays the ETS configuration in a DCB output policy.

Syntax
show qos dcb-output [ets-profile]

Parameters
[ets-profile] Enter the ETS profile.

Command Modes
EXEC Privilege

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information
NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

Example
Dell# show qos dcb-output
dcb-output ets
  priority-group san qos-policy san
  priority-group ipc qos-policy ipc
  priority-group lan qos-policy lan

show qos priority-groups
Displays the ETS priority groups configured on the switch, including the 802.1p priority classes and ID of each group.

Syntax
show qos priority-groups

Command Modes
EXEC Privilege

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information
NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

Example
Dell# show qos priority-groups
priority-group ipc

PMUX Mode of the I/O Aggregator
priority-list 4
set-pgid 2

**show stack-unit stack-ports ets details**

Displays the ETS configuration applied to egress traffic on stacked ports, including ETS Operational mode on each unit and the configured priority groups with dot1p priorities, bandwidth allocation, and scheduler type.

**Syntax**

```
show stack-unit {all | stack-unit} stack-ports {all | port-number} ets details
```

**Parameters**

- **stack-unit**: Enter the stack unit identification.
- **port-number**: Enter the port number.

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

**Example**

```
Dell(conf)# show stack-unit all stack-ports all ets details
Stack unit 0 stack port all
Max Supported TC Groups is 4
Number of Traffic Classes is 1
Admin mode is on
Admin Parameters:
-------------------
Admin is enabled
TC-grp Priority#    Bandwidth TSA
---------------------
0 0,1,2,3,4,5,6,7 100%  ETS
1                       - -
2                       - -
3                       - -
4                       - -
5                       - -
6                       - -
7                       - -
8                       - -
```

```
Dell(conf)# show stack-unit all stack-ports all ets details
Stack unit 1 stack port all
Max Supported TC Groups is 4
Number of Traffic Classes is 1
Admin mode is on
Admin Parameters:
-------------------
Admin is enabled
TC-grp Priority#    Bandwidth TSA
---------------------
0 0,1,2,3,4,5,6,7 100%  ETS
1                       - -
2                       - -
```

**PMUX Mode of the I/O Aggregator**
show stack-unit stack-ports pfc details

Displays the PFC configuration applied to ingress traffic on stacked ports, including PFC Operational mode on each unit with the configured priorities, link delay, and number of pause packets sent and received.

Syntax

show stack-unit {all | stack-unit} stack-ports {all | port-number} pfc details

Parameters

stack-unit Enter the stack unit.
port-number Enter the port number.

Command Modes

CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Example

Dell(conf)# show stack-unit all stack-ports all pfc details

stack unit 0 stack-port all
  Admin mode is On
  Admin is enabled, Priority list is 4-5
  Local is enabled, Priority list is 4-5
  Link Delay 45556 pause quantum
  0 Pause Tx pkts, 0 Pause Rx pkts

stack unit 1 stack-port all
  Admin mode is On
  Admin is enabled, Priority list is 4-5
  Local is enabled, Priority list is 4-5
  Link Delay 45556 pause quantum
  0 Pause Tx pkts, 0 Pause Rx pkts
FIP Snooping

In a converged Ethernet network, an MXL Switch can operate as an intermediate Ethernet bridge to snoop on Fibre Channel over Ethernet initialization protocol (FIP) packets during the login process on Fibre Channel over Ethernet (FCoE) forwarders (FCFs).

Acting as a transit FIP snooping bridge, the switch uses dynamically-created ACLs to permit only authorized FCoE traffic to be transmitted between an FCoE end-device and an FCF. The following Dell Networking Operating System (OS) commands are used to configure and verify the FIP snooping feature.

clear fip-snooping database interface vlan

Clear FIP snooping information on a VLAN for a specified FCoE MAC address, ENode MAC address, or FCF MAC address, and remove the corresponding ACLs FIP snooping generates.

Syntax

```
clear fip-snooping database interface vlan vlan-id {fcoe-mac-address | enode-mac-address | fcf-mac-address}
```

Parameters

- **fcoe-mac-address**: Enter the FCoE MAC address to be cleared of FIP snooping information.
- **enode-mac-address**: Enter the ENode MAC address to be cleared of FIP snooping information.
- **fcf-mac-address**: Enter the FCF MAC address to be cleared of FIP snooping information.

Command Modes

EXEC Privilege

Command History

- **Version 9.2(0.0)**
  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  
  Introduced on the MXL 10/40GbE Switch IO Module.

clear fip-snooping statistics

Clears the statistics on the FIP packets snooped on all VLANs, a specified VLAN, or a specified port interface.

Syntax

```
clear fip-snooping statistics [interface vlan vlan-id | interface port-type port/slot | interface port-channel port-channel-number]
```

Parameters

- **vlan-id**: Enter the VLAN ID of the FIP packet statistics to be cleared.
- **port-type port/slot**: Enter the port-type and slot number of the FIP packet statistics to be cleared.
- **port-channel-number**: Enter the port channel number of the FIP packet statistics to be cleared.

PMUX Mode of the I/O Aggregator
**feature fip-snooping**

Enable FCoE transit and FIP snooping on a switch.

**Syntax**
```plaintext
feature fip-snooping
To disable the FCoE transit feature, use the no feature fip-snooping command.
```

**Defaults**
Disabled

**Command Modes**
- CONFIGURATION

**Command History**
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.
The maximum number of FIP snooping sessions supported per ENode server is 16.

---

**fip-snooping enable**

Enable FIP snooping on all VLANs or on a specified VLAN.

**Syntax**
```plaintext
fip-snooping enable
To disable the FIP snooping feature on all or a specified VLAN, use the no fip-snooping enable command.
```

**Defaults**
FIP snooping is disabled on all VLANs.

**Command Modes**
- CONFIGURATION
- VLAN INTERFACE

**Command History**
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.
The maximum number of FIP snooping sessions supported per ENode server is 16.
**fip-snooping fc-map**

Configure the FC-MAP value FIP snooping uses on all VLANs.

**Syntax**

```
fip-snooping fc-map fc-map-value
```

To return the configured FC-MAP value to the default value, use the `no fip-snooping fc-map` command.

**Parameters**

- `fc-map-value` Enter the FC-MAP value FIP snooping uses. The range is from 0EFC00 to 0EFCFF.

**Defaults**

- **0x0EFC00**

**Command Modes**

- CONFIGURATION
- VLAN INTERFACE

**Command History**

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**fip-snooping port-mode fcf**

Configure the port for bridge-to-FCF links.

**Syntax**

```
fip-snooping port-mode fcf
```

To disable the bridge-to-FCF link on a port, use the `no fip-snooping port-mode fcf` command.

**Command Modes**

- INTERFACE

**Command History**

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.
iSCSI Optimization

Internet small computer system interface (iSCSI) optimization enables quality-of-service (QoS) treatment for iSCSI storage traffic.

To configure and verify the iSCSI optimization feature, use the following Dell Networking Operating System (OS) commands.

advertise dcbx-app-tlv

Configure DCBX to send iSCSI TLV advertisements.

Syntax
advertise dcbx-app-tlv iscsi
To disable DCBX iSCSI TLV advertisements, use the no advertise dcbx-app-tlv iscsi command.

Defaults
Disabled.

Command Modes
PROTOCOL LLDP

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information
You can configure iSCSI TLVs to send either globally or on a specified interface. The interface configuration takes priority over global configuration.

iscsi aging time

Set the aging time for iSCSI sessions.

Syntax
iscsi aging time time
To remove the iSCSI session aging time, use the no iscsi aging time command.

Parameters
time
Enter the aging time for the iSCSI session. The range is from 5 to 43,200 minutes.

Defaults
10 minutes

Command Modes
CONFIGURATION

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
**iscsi cos**

Set the QoS policy that is applied to the iSCSI flows.

**Syntax**

```
iscsi cos {enable | disable | dot1p vlan-priority-value [remark] | dscp dscp-value [remark]}
```

To disable the QoS policy, use the `no iscsi cos dscp` command.

**Parameters**

- **enable**
  - Enter the keyword `enable` to allow the application of preferential QoS treatment to iSCSI traffic so that the iSCSI packets are scheduled in the switch with a dot1p priority 4 regardless of the VLAN priority tag in the packet. The default is: the iSCSI packets are handled with dot1p priority 4 without remark.

- **disable**
  - Enter the keyword `disable` to disable the application of preferential QoS treatment to iSCSI frames.

- **dot1p vlan-priority-value**
  - Enter the dot1p value of the VLAN priority tag assigned to the incoming packets in an iSCSI session. The range is from 0 to 7. The default is: the dot1p value in ingress iSCSI frames is not changed and is the same priority is used in iSCSI TLV advertisements if you did not enter the `iscsi priority-bits` command.

- **dscp dscp-value**
  - Enter the DSCP value assigned to the incoming packets in an iSCSI session. The valid range is from 0 to 63. The default is: the DSCP value in ingress packets is not changed.

- **remark**
  - Marks the incoming iSCSI packets with the configured dot1p or DSCP value when they egress to the switch. The default is: the dot1and DSCP values in egress packets are not changed.

**Defaults**

The default dot1p VLAN priority value is 4 without the `remark` option.

**Command Modes**

CONFIGURATION

**Command History**

- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

**iscsi enable**

Globally enable iSCSI optimization.

**Syntax**

```
iscsi enable
```

To disable iSCSI optimization, use the `no iscsi enable` command.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable</td>
<td>Enter the keyword enable to enable the iSCSI optimization feature.</td>
</tr>
</tbody>
</table>

Defaults

Disabled.

Command Modes

- CONFIGURATION

Command History

- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

When you enable the iSCSI feature using the iscsi enable command, flow control settings are set to rx on tx off on all interfaces.

iscsi priority-bits

Configure the priority bitmap that advertises in the iSCSI application TLVs.

**Syntax**

```
iscsi priority-bits
```

To remove the configured priority bitmap, use the no iscsi priority-bits command.

**Defaults**

4 (0x10 in the bitmap)

**Command Modes**

- PROTOCOL LLDP (only on the global, not on the interface)

**Command History**

- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

iscsi profile-compellant

Configure the auto-detection of Dell Compellent arrays on a port.

**Syntax**

```
iscsi profile-compellant
```

**Defaults**

Dell Compellent disk arrays are not detected.

**Command Modes**

- INTERFACE

**Command History**

- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
**iscsi target port**

Configure the iSCSI target ports and optionally, the IP addresses on which iSCSI communication is monitored.

**Syntax**

```
iscsi target port [tcp-port-2...tcp-port-16]ip-address [ip-address]
```

To remove the configured iSCSI target ports or IP addresses, use the `no iscsi target port` command.

**Parameters**

- **tcp-port-2...tcpport-16**
  
Enter the tcp-port number of the iSCSI target ports. The `tcp-port-n` is the TCP port number or a list of TCP port numbers on which the iSCSI target listens to requests. Separate port numbers with a comma. The default is 860, 3260.

- **ip-address**
  
(Optional) Enter the ip-address that the iSCSI monitors. The `ip-address` specifies the IP address of the iSCSI target.

**Defaults**

860, 3260

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.2(0.0)**
  
Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  
Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

You can configure up to 16 target TCP ports on the switch in one command or multiple commands.

When you use the `no iscsi target port` command and the TCP port you wish to delete is one bound to a specific IP address, the IP address value must be included in the command.

**Interfaces**

The commands in this chapter are supported by Dell Networking Operating System (OS).

This chapter contains the following sections:

- Basic Interface Commands
- Port Channel Commands
Basic Interface Commands

The following commands are for Physical interfaces.

clear counters

Clear the counters used in the show interfaces commands for all virtual router redundancy protocol (VRRP) groups, virtual local area networks (VLANs), and physical interfaces, or selected ones.

Syntax

```
clear counters interface
```

Parameters

- **interface** (OPTIONAL) Enter any of the following keywords and slot/port or number to clear counters from a specified interface:
  - For the management interface on the stack-unit, enter the keyword management ethernet followed by slot/port information. The slot and port range is 0.
  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet followed by the slot/port information.
  - For a Port Channel interface, enter the keyword port-channel followed by a number. Range: 1-128

Defaults

Without an interface specified, the command clears all interface counters.

Command Modes

EXEC Privilege

Command History

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

Example

```
Dell#clear counters
Clear counters on all interfaces [confirm]
```

Related Commands

- `mac learning-limit` — allows aging of MACs even though a learning-limit is configured or disallow station move on learned MACs.
- `show interfaces` — displays information on the interfaces.

description

Assign a descriptive text string to the interface.

Syntax

```
description desc_text
```

To delete a description, use the `no description` command.
Parameters

**desc_text**
Enter a text string up to 240 characters long. To use special characters as a part of the description string, you must enclose the whole string in double quotes.

Defaults
none

Command Modes
INTERFACE

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

**Important Points to Remember:**

- Spaces between characters are not preserved after entering this command unless you enclose the entire description in quotation marks ("desc_text").
- Entering a text string after the description command overwrites any previous text string that you previously configured as the description.
- The shutdown and description commands are the only commands that you can configure on an interface that is a member of a port-channel.
- Use the show interfaces description command to display descriptions configured for each interface.

Related Commands

**show interfaces description** — displays the description field of the interfaces.

**flowcontrol**

Control how the system responds to and generates 802.3x pause frames on 10G and 40Gig stack units.

**Syntax**

```
flowcontrol rx {off | on} tx {off | on} threshold
```

**Parameters**

- **rx on**
Enter the keywords `rx on` to process the received flow control frames on this port. This is the default value for the receive side.

- **rx off**
Enter the keywords `rx off` to ignore the received flow control frames on this port.

- **tx on**
Enter the keywords `tx on` to send control frames from this port to the connected device when a higher rate of traffic is received. This is the default value on the send side.

- **tx off**
Enter the keywords `tx off` so that flow control frames are not sent from this port to the connected device when a higher rate of traffic is received.

**Defaults**

- `rx off`

PMUX Mode of the I/O Aggregator
• tx off

INTERFACE

Command Modes

Command History

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1  Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

The globally assigned 48-bit Multicast address 01-80-C2-00-00-01 is used to send and receive pause frames. To allow full-duplex flow control, stations implementing the pause operation instruct the MAC to enable the reception of frames with a destination address equal to this multicast address.

The pause:

• Starts when either the packet pointer or the buffer threshold is met (whichever is met first). When the discard threshold is met, packets are dropped.
• Ends when both the packet pointer and the buffer threshold fall below 50% of the threshold settings.

The discard threshold defines when the interface starts dropping the packet on the interface. This may be necessary when a connected device does not honor the flow control frame sent by the switch. The discard threshold should be larger than the buffer threshold so that the buffer holds at least three packets.

On 4–port 10G stack units: Changes in the flow-control values may not be reflected automatically in the show interface output for 10G interfaces. This is because 10G interfaces do not support auto-negotiation.

Important Points to Remember

• Do not enable tx pause when buffer carving is enabled. For information and assistance, consult Dell Networking TAC.
• Asymmetric flow control (rx on tx off, or rx off tx on) setting for the interface port less than 100 Mb/s speed is not permitted. The following error is returned:
  Can’t configure Asymmetric flowcontrol when speed <1G, config ignored
• The only configuration applicable to half duplex ports is rx off tx off. The following error is returned:
  Cannot configure Asymmetric flowcontrol when speed <1G, config ignored
• You cannot configure half duplex when the flow control configuration is on (default is rx on tx on). The following error is returned: Cannot configure half duplex when flowcontrol is on, config ignored

NOTE: The flow control must be off (rx off tx off) before configuring the half duplex.
Example (partial)

```
Dell(conf-if-tengig-0/1)#show config
!
interface TenGigabitEthernet 0/1
no ip address
switchport
no negotiation auto
flowcontrol rx off tx on
no shutdown
...
```

Example (Values)

This Example shows how the Dell Networking OS negotiates the flow control values between two Dell Networking chassis connected back-to-back using 1G copper ports.

<table>
<thead>
<tr>
<th>LocRxConf</th>
<th>LocTxConf</th>
<th>RemoteRxConf</th>
<th>RemoteTxConf</th>
</tr>
</thead>
<tbody>
<tr>
<td>off</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>off</td>
<td>on</td>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>off</td>
<td>on</td>
<td>off</td>
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<tr>
<td>on</td>
<td>off</td>
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<tr>
<td>on</td>
<td>on</td>
<td>off</td>
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</tr>
<tr>
<td>on</td>
<td>on</td>
<td>on</td>
<td>on</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LocNegRx</th>
<th>LocNegTx</th>
<th>RemNegRx</th>
<th>RemNegTx</th>
</tr>
</thead>
<tbody>
<tr>
<td>off</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>off</td>
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<tr>
<td>off</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
</tbody>
</table>

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PMUX Mode of the I/O Aggregator
**Related Commands**

- `show running-config` — displays the flow configuration parameters (non-default values only).
- `show interfaces` — displays the negotiated flow control parameters.

**interface**

Configure a physical interface on the switch.

**Syntax**

```
interface interface
```

**Parameters**

- `interface` Enter one of the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
  - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
  - For a Fibre Channel interface, enter the keyword `FibreChannel`, then the slot/port information.

**Defaults**

Not configured.

**Command Modes**

- `CONFIGURATION`

**Command History**

- **Version 9.4(0.0)** Added the support for interfaces.
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

- You cannot delete a physical interface.
- By default, physical interfaces are disabled (`shutdown`) and are in Layer 3 mode. To place an interface in mode, ensure that the interface’s configuration does not contain an IP address and enter the `Port Channel Commands` command.
- The tunnel interface operates as an ECMP (equal cost multi path) only when the next hop to the tunnel destination is over a physical interface. If you select any other interface as the next hop to the tunnel destination, the tunnel interface does not operate as an ECMP.

**Example**

```
Dell (conf)#interface tengig 0/0
Dell (conf-if-tengig-0/0)#exit#
```

**Related Commands**

- `interface port-channel` — configures a port channel.
- `interface vlan` — configures a VLAN.
show interfaces — displays the interface configuration.

interface ManagementEthernet

Configure the Management port on the system.

Syntax

```
interface ManagementEthernet slot/port
```

Parameters

- **slot/port**
  Enter the keyword ManagementEthernet, then the slot number (0 or 1) and port number zero (0).

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

- You cannot delete a Management port.

- The Management port is enabled by default (no shutdown). To assign an IP address to the Management port, use the ip address command.

Example

```bash
Dell(conf)#interface managementethernet 0/0
Dell(conf-if-ma-0/0)#
```

interface range

This command permits configuration of a range of interfaces to which subsequent commands are applied (bulk configuration). Using the interface range command, you can enter identical commands for a range of interface.

Syntax

```
interface range interface, interface,...
```

Parameters

- **interface, interface,...**
  Enter the keywords interface range and one of the interfaces — slot/port, port-channel, or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma-separated ranges. Spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels, and physical interfaces.

  Slot/Port information must contain a space before and after the dash. For example, interface range
gigabitethernet 0/1 - 5 is valid; interface range
gigabitethernet 0/1-5 is NOT valid.

- For a Port Channel interface, enter the keywords port-channel then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.
- For a VLAN interface, enter the keyword vlan then a number from 1 to 4094.

Defaults none

Command Modes CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

When creating an interface range, interfaces appear in the order they are entered; they are not sorted. The command verifies that interfaces are present (physical) or configured (logical).

Important Points to Remember:

- Bulk configuration is created if at least one interface is valid.
- Non-existing interfaces are excluded from the bulk configuration with a warning message.
- The interface range prompt includes interface types with slot/port information for valid interfaces. The prompt allows for a maximum of 32 characters. If the bulk configuration exceeds 32 characters, it is represented by an ellipsis (...).
- When the interface range prompt has multiple port ranges, the smaller port range is excluded from the prompt.
- If overlapping port ranges are specified, the port range is extended to the smallest start port and the biggest end port.

Example (Bulk)

Dell(conf)#interface range so 2/0-1, te 10/0, gi 3/0, fa 0/0
% Warning: Non-existing ports (not configured) are ignored by interface-range

Example (Multiple Ports)

Dell(conf)#interface range gi 2/0 - 23, gi 2/1 - 10
Dell(conf-if-range-gi-2/0-23#)

Example (Overlapping Ports)

Dell(conf)#interface range gi 2/1 - 11, gi 2/1 - 23
Dell(conf-if-range-gi-2/1-23#)
Usage Information

Only VLAN and port-channel interfaces created using the `interface vlan` and `interface port-channel` commands can be used in the `interface range` command.

Use the `show running-config` command to display the VLAN and port-channel interfaces. VLAN or port-channel interfaces that are not displayed in the `show running-config` command cannot be used with the bulk configuration feature of the `interface range` command. You cannot create virtual interfaces (VLAN, Port-channel) using the `interface range` command.

**NOTE:** If a range has VLAN, physical, port-channel, and SONET interfaces, only commands related to physical interfaces can be bulk configured. To configure commands specific to VLAN or port-channel, only those respective interfaces should be configured in a particular range.

Example (Single Range)

This example shows a single range bulk configuration.

Dell(config)# interface range gigabitethernet 5/1 - 23
Dell(config-if-range)# no shutdown
Dell(config-if-range)#

Example (Multiple Range)

This example shows how to use commas to add different interface types to the range enabling all Gigabit Ethernet interfaces in the range 5/1 to 5/23 and both Ten-Gigabit Ethernet interfaces 1/1 and 1/2.

Dell(config-if)# interface range gigabitethernet5/1-23, tengigabitethernet1/1-2
Dell(config-if-range)# no shutdown
Dell(config-if-range)#

Example (Multiple Range)

This example shows how to use commas to add SONET, VLAN, and port-channel interfaces to the range.

Dell(config-if)# interface range gigabitethernet5/1-23, tengigabitethernet1/1-2,
Vlan 2-100, Port 1-25
Dell(config-if-range)# no shutdown
Dell(config-if-range)#

Related Commands

- `interface port-channel` — configures a port channel group.
- `interface vlan` — configures a VLAN interface.
- `show config (from INTERFACE RANGE mode)` — shows the bulk configuration interfaces.
- `show range` — shows the bulk configuration ranges.
interface vlan

Configure a VLAN. You can configure up to 4096 VLANs.

Syntax

```
interface vlan vlan-id
```

To delete a VLAN, use the `no interface vlan vlan-id` command.

Parameters

- **vlan-id**: Enter a number as the VLAN Identifier. The range is from 1 to 4096.

Defaults

Not configured, except for the Default VLAN, which is configured as VLAN 1.

Command Modes

- **CONFIGURATION**

Command History

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

For more information about VLANs and the commands to configure them, refer to the Virtual LAN (VLAN) Commands.

FTP, TFTP, and SNMP operations are not supported on a VLAN. MAC/IP ACLs are not supported.

Example

```
Dell(conf)#int vlan 3
Dell(conf-if-vl-3)#
```

Related Commands

- `interface` — configures a physical interface.
- `interface port-channel` — configures a port channel group.

intf-type cr4 autoneg

Set the interface type as CR4 with auto-negotiation enabled.

Syntax

```
intf-type cr4 autoneg
```

If you configure `intf-type cr4 autoneg`, use the `no intf-type cr4 autoneg` command to set the interface type as cr4 with autonegotiation disabled.

Defaults

Not configured

Command Modes

- **CONFIGURATION**

Command History

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
keepalive

Send keepalive packets periodically to keep an interface alive when it is not transmitting data.

Syntax

```
keepalive [seconds]
```

To stop sending keepalive packets, use the `no keepalive` command.

Parameters

- **seconds**
  - (OPTIONAL) For interfaces with PPP encapsulation enabled, enter the number of seconds between keepalive packets. The range is from 0 to 23767. The default is 10 seconds.

Defaults

Enabled.

Command Modes

INTERFACE

Command History

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

When you configure `keepalive`, the system sends a self-addressed packet out of the configured interface to verify that the far end of a WAN link is up. When you configure `no keepalive`, the system does not send keepalive packets and so the local end of a WAN link remains up even if the remote end is down.

mtu

Set the link maximum transmission unit (MTU) (frame size) for an Ethernet interface.

Syntax

```
mtu value
```

To return to the default MTU value, use the `no mtu` command.

Parameters

- **value**
  - Enter a maximum frame size in bytes. The range is from 594 to 9252. MXL Switch Range is from 594 to 12000. The default is 1554.
Defaults

Command Modes
- INTERFACE

Command History
- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information
If the packet includes a Layer 2 header, the difference between the link MTU and IP MTU (ip mtu command) must be enough bytes to include the Layer 2 header.

- The IP MTU is adjusted automatically when you configure the Layer 2 MTU with the mtu command.

When you enter the no mtu command, The Dell Networking OS reduces the IP MTU value to 1536 bytes.

Link MTU and IP MTU considerations for port channels and VLANs are as follows.

port channels:
- All members must have the same link MTU value and the same IP MTU value.
- The port channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if the members have a link MTU of 2100 and an IP MTU 2000, the port channel's MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

VLANs:
- All members of a VLAN must have same IP MTU value.
- Members can have different Link MTU values. Tagged members must have a link MTU 4 bytes higher than untagged members to account for the packet tag.
- The VLAN link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the VLAN members. For example, the VLAN contains tagged members with Link MTU of 1522 and IP MTU of 1500 and untagged members with Link MTU of 1518 and IP MTU of 1500. The VLAN's Link MTU cannot be higher than 1518 bytes and its IP MTU cannot be higher than 1500 bytes.

The following shows the difference between Link MTU and IP MTU.

<table>
<thead>
<tr>
<th>Layer 2 Overhead</th>
<th>Link MTU and IP MTU Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet (untagged)</td>
<td>18 bytes</td>
</tr>
<tr>
<td>VLAN Tag</td>
<td>22 bytes</td>
</tr>
<tr>
<td>Untagged Packet with VLAN-Stack Header</td>
<td>22 bytes</td>
</tr>
</tbody>
</table>

PMUX Mode of the I/O Aggregator
Layer 2 Overhead  
Link MTU and IP MTU Delta

Tagged Packet  
with VLAN-Stack Header  
26 bytes

### negotiation auto

Enable auto-negotiation on an interface.

**Syntax**

```
negotiation auto
```

To disable auto-negotiation, use the `no negotiation auto` command.

**Defaults**

Enabled.

**Command Modes**

INTERFACE

**Command History**

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**
  Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

The `no negotiation auto` command is only available if you first manually set the speed of a port to `10Mbits` or `100Mbits`.

The `negotiation auto` command provides a `mode` option for configuring an individual port to forced-master/forced slave after you enable auto-negotiation.

If you do not use the `mode` option, the default setting is `slave`. If you do not configure forced-master or forced-slave on a port, the port negotiates to either a master or a slave state. Port status is one of the following:

- Forced-master
- Force-slave
- Master
- Slave
- Auto-neg Error — typically indicates that both ends of the node are configured with forced-master or forced-slave.

**CAUTION:** Ensure that one end of your node is configured as forced-master and one is configured as forced-slave. If both are configured the same (that is, forced-master or forced-slave), the `show interfaces` command flaps between an auto-neg-error and forced-master/slave states.

You can display master/slave settings with the `show interfaces` command.

**Example**

```
Dell(conf)# int tengig 0/0
Dell(conf-if)#neg auto
Dell(conf-if-autoneg)# ?
```

426  
PMUX Mode of the I/O Aggregator
end    Exit from configuration mode
exit   Exit from autoneg configuration mode
mode   Specify autoneg mode	no     Negate a command or set its defaults
show   Show autoneg configuration information
Dell(conf-if-autoneg)#mode ?
forced-master Force port to master mode
forced-slave Force port to slave mode
Dell(conf-if-autoneg)#

Example
(Master/Slave, partial)

Dell#show interfaces configured
TenGigabitEthernet 13/18 is up, line protocol is up
   Hardware is Dell Force10Eth, address is 00:01:e8:05:f7:fc
       Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
Input Statistics:
   ...

User
Information

Both sides of the link must have auto-negotiation enabled or disabled for the link to come up.

The following details the possible speed and auto-negotiation combinations for a line between two 10/100/1000 Base-T Ethernet interfaces.

Port 0
- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled* speed 1000 or auto

Port 1
- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100

Link Status Between Port 1 and Port 2
- Up at 1000 Mb/s
- Up at 100 Mb/s
- Up at 100 Mb/s
- Down
- Down

* You cannot disable auto-negotiation when the speed is set to 1000 or auto.
Related Commands

- **speed (for 1000/10000 interfaces)** — sets the link speed to 1000, 10000, or auto-negotiate the speed.

**portmode hybrid**

To accept both tagged and untagged frames, set a physical port or port-channel. A port configured this way is identified as a hybrid port in report displays.

**Syntax**

```
portmode hybrid
```

To return a port to accept either tagged or untagged frames (non-hybrid), use the

```
no portmode hybrid
```

**Defaults**

non-hybrid

**Command Modes**

INTERFACE (conf-if-interface-slot/port)

**Command History**

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

The following describes the `interface` command shown in the following example. This example sets a port as hybrid, makes the port a tagged member of VLAN 20, and an untagged member of VLAN 10, which becomes the native VLAN of the port. The port now accepts:

- untagged frames and classify them as VLAN 10 frames
- VLAN 20 tagged frames

The following describes the `do show interfaces` command shown in the following example. This example shows output with "Hybrid" as the newly added value for 802.1QTagged. The options for this field are:

- True — port is tagged
- False — port is untagged
- Hybrid — port accepts both tagged and untagged frames

The following describes the `interface vlan` command shown in the following example. This example shows unconfiguration of the hybrid port using the `no portmode hybrid` command.

**NOTE:** Remove all other configurations on the port before you can remove the hybrid configuration from the port.

**Example**

```
Dell(conf)#interface tengig 0/20
Dell(conf-if-te-0/20)#no shut
Dell(conf-if-te-0/20)#portmode hybrid
Dell(conf-if-te-0/20)#sw
Dell(conf-if-te-0/20)#int vlan 10
Dell(conf-if-vl-10)#tag tengig 0/20
Dell(conf-if-vl-10)#int vlan 20
```
Example
(tagged hybrid)

Dell(conf-if-vl-20)#untag tengig 0/20
Dell(conf-if-vl-20)#

Dell(conf)#interface tengig 0/20
Dell(conf-if-te-0/20)#no shut
Dell(conf-if-te-0/20)#portmode hybrid
Dell(conf-if-te-0/20)#sw
Dell(conf-if-te-0/20)#int vlan 10
Dell(conf-if-vl-10)#int tengig 0/20
Dell(conf-if-vl-20)# untag tengig 0/20

Dell (conf-if-vl-20)#

Dell(conf)#do show interfaces switchport tengigabitethernet 3/20

Codes: U - Untagged, T - Tagged
x - Dot1x untagged, X - Dot1x tagged
G - GVRP tagged, M - Trunk, H - VSN tagged
i - Internal untagged, I - Internal tagged, v - VLT
untagged,
V - VLT tagged

Name: TenGigabitEthernet 3/20

802.1QTagged: Hybrid
Vlan membership:
  Q  Vlans
  U  20
  T  10

Native VlanId: 20.
Dell(conf)#

Example
(unconfigure the hybrid port)

Dell(conf-if-vl-20)#interface vlan 10
Dell(conf-if-vl-10)#no untagged tengig 0/20
Dell(conf-if-vl-10)#interface vlan 20
Dell(conf-if-vl-20)#no tagged tengig 0/20
Dell(conf-if-vl-20)#interface tengig 0/20
Dell(conf-if-vl-20)#no portmode hybrid
Dell(conf-if-vl-20)#

Related Commands

show interfaces switchport — displays the configuration of switchport (Layer 2) interfaces on the switch.

vlan-stack trunk — specifies an interface as a trunk port to the Stackable VLAN network.

stack-unit portmode

Split a single 40G port into 4-10G ports on the MXL switch.

Syntax

stack-unit stack-unit port number portmode quad

Parameters

stack-unit Enter the stack member unit identifier of the stack member to reset. The range is 0 to 5.
NOTE: The MXL switch commands accept Unit ID numbers from 0 to 5, though the MXL switch supports stacking up to three units only with the Dell Networking OS version 8.3.7.1.

**number**
Enter the port number of the 40G port to be split. Enter one of the following port numbers for the MXL switch: 48, 52, 56, or 60.

**Defaults**
Disabled.

**Command Modes**
CONFIGURATION

**Command History**

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

Splitting a 40G port into 4x10G port is supported on standalone and stacked units.

- You cannot use split ports as stack-link to stack an MXL Switch.
- The split ports MXL switch unit cannot be a part of any stacked system.
- The unit number with the split ports must be the default (stack-unit 0).
- This set up can be verified using `show system brief` command. If the unit ID is different than 0, it must be renumbered to 0 before ports are split by using the `stackunit id renumber 0` command in EXEC mode.

The quad port must be in a default configuration before it can be split into 4x10G ports. The 40G port is lost in the config when the port is split, so be sure that the port is also removed from other L2/L3 feature configurations.

The system must be reloaded after issuing the CLI for the change to take effect.

**Port Channel Commands**

A link aggregation group (LAG) is a group of links that appear to a MAC client as if they were a single link according to IEEE 802.3ad. In the Dell Networking OS, a LAG is referred to as a Port Channel.

- For the MXL switch, the maximum port channel ID is 128 and the maximum members per port channel is 16.

Because each port can be assigned to only one Port Channel, and each Port Channel must have at least one port, some of those nominally available Port Channels might have no function because they could have no members if there are not enough ports installed. In the MXL 10/40GbE Switch IO Module, those ports could be provided by stack members.
The Dell Networking OS implementation of LAG or Port Channel requires that you configure a LAG on both switches manually. For information about Dell Networking OS link aggregation control protocol (LACP) for dynamic LAGs, refer to the Link Aggregation Control Protocol (LACP) chapter. For more information about configuring and using Port Channels, refer to the Dell Networking OS Configuration Guide.

channel-member

Add an interface to the Port Channel, while in INTERFACE PORTCHANNEL mode.

**Syntax**

```
channel-member interface
```

To delete an interface from a Port Channel, use the no channel-member interface command.

**Parameters**

- **interface**
  - *OPTIONAL* Enter any of the following keywords and slot/port or number information:
  - For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.
  - For a 40-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.

**Defaults**

Not configured.

**Command Modes**

INTERFACE PORTCHANNEL

**Command History**

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

Use the interface port-channel command to access this command.

You cannot add an interface to a Port Channel if the interface contains an IP address in its configuration.

Link MTU and IP MTU considerations for Port Channels are:
- All members must have the same link MTU value and the same IP MTU value.
- The Port Channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if the members have a link MTU of 2100 and an IP MTU 2000, the Port Channel’s MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

When an interface is removed from a Port Channel with the no channel-member command, the interface reverts to its configuration prior to joining the Port Channel.

An interface can belong to only one Port Channel.

You can add up to 16 interfaces to a Port Channel on the MXL switch. The interfaces can be located on different line cards but must be the same physical...
type and speed (for example, all 10-Gigabit Ethernet interfaces). However, you can combine 100/1000 interfaces and GE interfaces in the same Port Channel.

If the Port Channel contains a mix of interfaces with 100 Mb/s speed and 1000 Mb/s speed, the software disables those interfaces whose speed does not match the speed of the first interface configured and enabled in the Port Channel. If that first interface goes down, the Port Channel does not change its designated speed; disable and re-enable the Port Channel or change the order of the channel members configuration to change the designated speed. If the Port Channel contains a mix of interfaces with 100 Mb/s speed and 1000 Mb/s speed, the software disables those interfaces whose speed does not match the speed of the first interface configured and enabled in the Port Channel. If that first interface goes down, the Port Channel does not change its designated speed; disable and re-enable the Port Channel or change the order of the channel members configuration to change the designated speed. For more information about Port Channels, refer to the Dell Networking OS Configuration Guide.

Related Commands

- **description** — assigns a descriptive text string to the interface.
- **interface port-channel** — creates a Port Channel interface.
- **shutdown** — disables/enables the port channel.

### interface port-channel

Create a Port Channel interface, which is a link aggregation group (LAG) containing 16 physical interfaces on the XML switch.

**Syntax**

```
interface port-channel channel-number
```

To delete a Port Channel, use the `no interface port-channel channel-number` command.

**Parameters**

- **channel-number**
  
  For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.

**Defaults**

Not configured.

**Command Modes**

CONFIGURATION

**Command History**

- **Version 9.2(0.0)**
  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  
  Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

Port Channel interfaces are logical interfaces and can be either in Layer 2 mode (by using the `switchport` command) or Layer 3 mode (by configuring an IP address). You can add a Port Channel in Layer 2 mode to a VLAN.
A Port Channel can contain both 100/1000 interfaces and GE interfaces. Based on the first interface configured in the Port Channel and enabled, the Dell Networking OS determines if the Port Channel uses 100 Mb/s or 1000 Mb/s as the common speed. For more information, refer to `channel-member`.

If the line card is in a Jumbo mode chassis, you can also configure the `mtu` and `ip mtu` commands. The Link MTU and IP MTU values configured on the channel members must be greater than the Link MTU and IP MTU values configured on the Port Channel interface.

**NOTE:** In a Jumbo-enabled system, you must configure all members of a Port Channel with the same link MTU values and the same IP MTU values.

```markdown
Example

Dell(conf)#int port-channel 2
Dell(conf-if-po-2)#
```

**Related Commands**

- `channel-member` — adds a physical interface to the LAG.
- `interface` — configures a physical interface.
- `interface vlan` — configures a VLAN.
- `shutdown` — disables/enables the port channel.

### minimum-links

Configure the minimum number of links in a LAG (Port Channel) that must be in "oper up" status for the LAG to be also in "oper up" status.

**Syntax**

```
minimum-links number
```

**Parameters**

- `number` — Enter the number of links in a LAG that must be in "oper up" status. The range is from 1 to 16. The default is 1.

**Defaults**

1

**Command Modes**

- INTERFACE

**Command History**

- **Version 9.2(0.0)** — Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** — Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

If you use this command to configure the minimum number of links in a LAG that must be in "oper up" status, the LAG must have at least that number of "oper up" links before it can be declared as up. For example, if the required minimum is four, and only three are up, the LAG is considered down.
Internet Group Management Protocol (IGMP)

The IGMP commands are supported by the Dell Networking operating software on the Aggregator. This chapter contains the following sections:

- IGMP Commands
- IGMP Snooping Commands

IGMP Commands

Dell Networking OS supports IGMPv1/v2/v3 and is compliant with RFC-3376.

Important Points to Remember

- IGMPv2 is the default version of IGMP on interfaces. You can configure IGMPv3 on interfaces. It is backward compatible with IGMPv2.
- There is no hard limit on the maximum number of groups supported.
- IGMPv3 router interoperability with IGMPv2 and IGMPv1 routers on the same subnet is not supported.
- An administrative command (`ip igmp version`) is added to manually set the IGMP version.
- All commands previously used for IGMPv2 are compatible with IGMPv3.

`ip igmp group-join-limit`

To limit the number of IGMP groups that can be joined in a second, use this feature.

**Syntax**

`ip igmp group-join-limit number`

**Parameters**

- `number` Enter the number of IGMP groups permitted to join in a second. The range is from 1 to 10000.

**Defaults**

none

**Command Modes**

CONFIGURATION (conf-if-interface-slot/port)

**Command History**

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0** Introduced on the S6000.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 7.8.1.1** Introduced on the Z9000.
- **Version 7.8.1.0** Introduced on the C-Series and S-Series.

PMUX Mode of the I/O Aggregator
ip igmp querier-timeout
Change the interval that must pass before a multicast router decides that there is no longer another multicast router that should be the querier.

Syntax
ip igmp querier-timeout seconds
To return to the default value, use the no ip igmp querier-timeout command.

Parameters
seconds Enter the number of seconds the router must wait to become the new querier. The range is from 60 to 300. The default is 125 seconds.

Defaults 125 seconds

Command Modes INTERFACE

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0 Introduced on the S6000.
Version 8.3.19.0 Introduced on the S4820T.
Version 8.3.11.1 Introduced on the Z9000.
Version 8.3.7.0 Introduced on the S4810.
Version 7.8.1.0 Introduced on the S-Series.
Version 7.7.1.0 Introduced on the C-Series.
Version 7.6.1.0 Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
Version 7.5.1.0 Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.

E-Series legacy command.
ip igmp query-interval

Change the transmission frequency of IGMP general queries the Querier sends.

Syntax

```
ip igmp query-interval seconds
```

To return to the default values, use the `no ip igmp query-interval` command.

Parameters

- **seconds**
  
Enter the number of seconds between queries sent out. The range is from 1 to 18000. The default is **60 seconds**.

Defaults

**60 seconds**

Command Modes

**INTERFACE**

Command History

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

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

- **Version 9.2(0.0)**
  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 9.0.2.0**
  
  Introduced on the S6000.

- **Version 8.3.19.0**
  
  Introduced on the S4820T.

- **Version 8.3.11.1**
  
  Introduced on the Z9000.

- **Version 8.3.7.0**
  
  Introduced on the S4810.

- **Version 7.8.1.0**
  
  Introduced on the S-Series.

- **Version 7.7.1.0**
  
  Introduced on the C-Series.

- **Version 7.6.1.0**
  
  Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.

- **Version 7.5.1.0**
  
  Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.

- **E-Series legacy command.**

ip igmp query-max-resp-time

Set the maximum query response time advertised in general queries.

Syntax

```
ip igmp query-max-resp-time seconds
```

To return to the default values, use the `no ip igmp query-max-resp-time` command.
Parameters

seconds

Enter the number of seconds for the maximum response time. The range is from 1 to 25. The default is 10 seconds.

Defaults

10 seconds

Command Modes

INTERFACE

Command History

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0 Introduced on the S6000.

Version 8.3.11.1 Introduced on the Z9000.

Version 8.3.7.0 Introduced on the S4810.

Version 7.6.1.0 Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.

Version 7.5.1.0 Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.

E-Series legacy command.

ip igmp version

Manually set the version of the router to IGMPv2 or IGMPv3.

Syntax

ip igmp version {2 | 3}

Parameters

2

Enter the number 2 to set the IGMP version number to IGMPv2.

3

Enter the number 3 to set the IGMP version number to IGMPv3.

Defaults

2 (that is, IGMPv2)

Command Modes

INTERFACE

PMUX Mode of the I/O Aggregator
This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.19.0 Introduced on the S4820T.

Version 8.3.11.1 Introduced on the Z9000.

Version 8.3.7.0 Introduced on the S4810.

Version 7.8.1.0 Introduced on the S-Series.

Version 7.7.1.0 Introduced on the C-Series.

Version 7.5.1.0 Introduced on the E-Series.

IGMP Snooping Commands

Dell Networking OS supports IGMP Snooping version 2 and 3 on all Dell Networking systems.

Important Points to Remember for IGMP Snooping

- Dell Networking OS supports version 1, version 2, and version 3 hosts.
- Dell Networking OS IGMP snooping implementation is based on IP multicast address (not based on Layer 2 multicast mac address) and the IGMP snooping entries are in Layer 3 flow table not in Layer 2 forwarding information base (FIB).
- Dell Networking OS IGMP snooping implementation is based on draft-ietf-magma-snoop-10.
- Dell Networking OS supports IGMP snooping on JUMBO-enabled cards.
- IGMP snooping is not enabled by default on the switch.
- A maximum of 1800 groups and 600 VLAN are supported.
- IGMP snooping is not supported on a default VLAN interface.
- IGMP snooping is not supported over VLAN-Stack-enabled VLAN interfaces (you must disable IGMP snooping on a VLAN interface before configuring VLAN-Stack-related commands).

ip igmp snooping enable

Enable IGMP snooping on all or a single VLAN. This command is the master on/off switch to enable IGMP snooping.

Syntax

ip igmp snooping enable

To disable IGMP snooping, use the no ip igmp snooping enable command.

Defaults Disabled.

Command Modes

- CONFIGURATION
- INTERFACE VLAN
### Command History

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

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

<table>
<thead>
<tr>
<th>Version</th>
<th>Introduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.</td>
</tr>
<tr>
<td>9.0.2.0</td>
<td>Introduced on the S6000.</td>
</tr>
<tr>
<td>8.3.19.0</td>
<td>Introduced on the S4820T.</td>
</tr>
<tr>
<td>8.3.11.1</td>
<td>Introduced on the Z9000.</td>
</tr>
<tr>
<td>8.3.7.0</td>
<td>Introduced on the S4810.</td>
</tr>
<tr>
<td>7.6.1.0</td>
<td>Introduced on the S-Series.</td>
</tr>
<tr>
<td>7.5.1.0</td>
<td>Introduced on the C-Series.</td>
</tr>
<tr>
<td>E-Series legacy command</td>
<td></td>
</tr>
</tbody>
</table>
Queriers normally send some queries when a leave message is received prior to deleting a group from the membership database. There may be situations when you require a fast deletion of a group. When you enable IGMP fast leave processing, the switch removes an interface from the multicast group as soon as it detects an IGMP version 2 leave message on the interface.

**ip igmp snooping last-member-query-interval**

The last member query interval is the maximum response time inserted into Group-Specific queries sent in response to Group-Leave messages.

**Syntax**

```
ip igmp snooping last-member-query-interval milliseconds
```

To return to the default value, use the `no ip igmp snooping last-member-query-interval` command.

**Parameters**

- `milliseconds`: Enter the interval in milliseconds. The range is from 100 to 65535. The default is 1000 milliseconds.

**Defaults**

1000 milliseconds

**Command Modes**

INTERFACE VLAN

**Command History**

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0** Introduced on the S6000.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 8.3.11.1** Introduced on the Z9000.
- **Version 8.3.7.0** Introduced on the S4810.
- **Version 7.6.1.0** Introduced on the S-Series.
- **Version 7.5.1.0** Introduced on the C-Series.
- **E-Series legacy command.**
Version 7.6.1.0  Introduced on the S-Series.
Version 7.5.1.0  Introduced on the C-Series.
E-Series legacy command

Usage Information
This last-member-query-interval is also the interval between successive Group-Specific Query messages. To change the last-member-query interval, use this command.

ip igmp snooping mrouter
Statically configure a VLAN member port as a multicast router interface.

Syntax
ip igmp snooping mrouter interface
To delete a specific multicast router interface, use the no igmp snooping mrouter interface command.

Parameters
interface

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

- For a 100/1000 Ethernet interface, enter the keyword gigabitethernet followed by the slot/port information.
- For a 1-Gigabit Ethernet interface, enter the keyword gigabitethernet followed by the slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.
- For a Port Channel interface, enter the keywords port-channel then a number. For the C-Series and S-Series, the range is from 1 to 128.

Defaults
Not configured.

Command Modes
INTERFACE VLAN — (conf-if-vl-n)

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

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

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0  Introduced on the S6000.
Dell Networking OS provides the capability of statically configuring the interface to which a multicast router is attached. To configure a static connection to the multicast router, enter the `ip igmp snooping mrouter interface` command in the VLAN context. The interface to the router must be a part of the VLAN where you are entering the command.

**ip igmp snooping querier**

Enable IGMP querier processing for the VLAN interface.

**Syntax**

```
ip igmp snooping querier
```

To disable IGMP querier processing for the VLAN interface, use the `no ip igmp snooping querier` command.

**Defaults**

Not configured.

**Command Modes**

INTERFACE VLAN — (conf-if-vl-)

**Command History**

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0** Introduced on the S6000.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 8.3.11.1** Introduced on the S4810.
- **Version 8.3.7.0** Introduced on the Z9000.
- **Version 7.6.1.0** Introduced on the S-Series.
- **Version 7.5.1.0** Introduced on the C-Series.
- **E-Series legacy command**

442 PMUX Mode of the I/O Aggregator
Usage Information
This command enables the IGMP switch to send General Queries periodically. This behavior is useful when there is no multicast router present in the VLAN because the multicast traffic is not routed. Assign an IP address to the VLAN interface for the switch to act as a querier for this VLAN.

Layer 2
This chapter describes commands to configure Layer 2 features.
This chapter contains:
- MAC Addressing Commands

MAC Addressing Commands
The following commands are related to configuring, managing, and viewing MAC addresses.

mac-address-table aging-time
Specify an aging time for MAC addresses to remove from the MAC address table.

Syntax
mac-address-table aging-time seconds
To delete the configured aging time, use the no mac-address-table aging-time seconds command.

Parameters
seconds Enter either zero (0) or a number as the number of seconds before MAC addresses are relearned. To disable aging of the MAC address table, enter 0. The range is from 10 to 1000000. The default is 1800 seconds.

Defaults
1800 seconds

Command Modes
CONFIGURATION

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

mac-address-table static
Associate specific MAC or hardware addresses to an interface and virtual local area networks (VLANs).

Syntax
mac-address-table static mac-address output interface vlan vlan-id
To remove a MAC address, use the no mac-address-table static mac-address output interface vlan vlan-id command.
Parameters

- **mac-address**
  - Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.

- **output interface**
  - Enter the keyword `output` then one of the following interfaces for which traffic is forwarded:
    - For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
    - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
    - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

- **vlan vlan-id**
  - Enter the keyword `vlan` then a VLAN ID number from 1 to 4094.

Defaults

- Not configured.

Command Modes

- **CONFIGURATION**

Command History

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

**mac-address-table station-move refresh-arp**

Ensure that address resolution protocol (ARP) refreshes the egress interface when a station move occurs due to a topology change.

**Syntax**

```plaintext
[no] mac-address-table station-move refresh-arp
```

**Defaults**

- none

**Command Modes**

- **CONFIGURATION**

**Command History**

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

For details about using this command, refer to the "NIC Teaming" section of the Layer 2 chapter in the *Dell Networking OS Configuration Guide*. 

444  
PMUX Mode of the I/O Aggregator
Link Aggregation Control Protocol (LACP)

This chapter contains commands for Dell Networks’s implementation of the link aggregation control protocol (LACP) for creating dynamic link aggregation groups (LAGs) — known as port-channels in the Dell Networking Operating System (OS).

**NOTE:** For static LAG commands, refer to the [Interfaces chapter](#), based on the standards specified in the IEEE 802.3 Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

### lacp long-timeout

Configure a long timeout period (30 seconds) for an LACP session.

**Syntax**

```
lacp long-timeout
```

To reset the timeout period to a short timeout (1 second), use the `no lacp long-timeout` command.

**Defaults**

1 second

**Command Modes**

INTERFACE (conf-if-po-number)

**Command History**

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

This command applies to dynamic port-channel interfaces only. When applied on a static port-channel, this command has no effect.

### lacp port-priority

To influence which ports will be put in Standby mode when there is a hardware limitation that prevents all compatible ports from aggregating, configure the port priority.

**Syntax**

```
lacp port-priority priority-value
```

To return to the default setting, use the `no lacp port-priority priority-value` command.

**Parameters**

- `priority-value` Enter the port-priority value. The higher the value number, the lower the priority. The range is from 1 to 65535. The default is **32768**.

**Defaults**

32768

**Command Modes**

INTERFACE

**Command History**

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

PMUX Mode of the I/O Aggregator
port-channel mode

Configure the LACP port channel mode.

Syntax

```
port-channel number mode [active] [passive] [off]
```

Parameters

- **number**: Enter the keywords `number` then a number.
- **active**: Enter the keyword `active` to set the mode to the active state.
- **passive**: Enter the keyword `passive` to set the mode to the passive state.
- **off**: Enter the keyword `off` to set the mode to the off state.

Defaults

```
off
```

Command Modes

```
INTERFACE
```

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.</td>
</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

Usage Information

**LACP Modes**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>active</td>
<td>An interface is in an active negotiating state in this mode. LACP runs on any link configured in the active state and also automatically initiates negotiation with other ports by initiating LACP packets.</td>
</tr>
<tr>
<td>passive</td>
<td>An interface is not in an active negotiating state in this mode. LACP runs on any link configured in the passive state. Ports in a passive state respond to negotiation requests from other ports that are in active states. Ports in a passive state respond to LACP packets.</td>
</tr>
<tr>
<td>off</td>
<td>An interface cannot be part of a dynamic port channel in off mode. LACP does not run on a port configured in off mode.</td>
</tr>
</tbody>
</table>
port-channel-protocol lacp

Enable LACP on any LAN port.

Syntax

```
port-channel-protocol lacp
```

To disable LACP on a LAN port, use the `no port-channel-protocol lacp` command.

Command Modes

INTERFACE

Command History

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1  Introduced on the MXL 10/40GbE Switch IO Module.

Example

```
Dell (conf)#interface TenGigabitethernet 3/15
Dell (conf-if-tengig-3/15)#no shutdown
Dell (conf-if-tengig-3/15)#port-channel-protocol lacp
Dell (conf-if-tengig-3/15-lacp)#port-channel 32 mode active
...
Dell (conf)#interface TenGigabitethernet 3/16
Dell (conf-if-tengig-3/16)#no shutdown
Dell (conf-if-tengig-3/16)#port-channel-protocol lacp
Dell (conf-if-tengig-3/16-lacp)#port-channel 32 mode active
```

Link Layer Discovery Protocol (LLDP)

Link layer discovery protocol (LLDP) advertises connectivity and management from the local station to the adjacent stations on an IEEE 802 LAN.

LLDP facilitates multi-vendor interoperability by using standard management tools to discover and make available a physical topology for network management. The Dell Networking operating software implementation of LLDP is based on IEEE standard 801.1ab.

The starting point for using LLDP is invoking LLDP with the `protocol lldp` command in either CONFIGURATION or INTERFACE mode.

The information LLDP distributes is stored by its recipients in a standard management information base (MIB). You can access the information by a network management system through a management protocol such as simple network management protocol (SNMP).

For details about implementing LLDP/LLDP-MED, refer to the Link Layer Discovery Protocol chapter of the Dell Networking OS Configuration Guide.
advertise dot3-tlv
Advertise dot3 TLVs (Type, Length, Value).

Syntax
advertise dot3-tlv {max-frame-size}
To remove advertised dot3-tlv, use the no advertise dot3-tlv {max-frame-size} command.

Parameters
max-frame-size Enter the keywords max-frame-size to advertise the dot3 maximum frame size.

Defaults
none

Command Modes
CONFIGURATION (conf-lldp) and INTERFACE (conf-if-interface-lldp)

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

advertise management-tlv
Advertise management TLVs (Type, Length, Value).

Syntax
advertise management-tlv {system-capabilities | system-description | system-name}
To remove advertised management TLVs, use the no advertise management-tlv {system-capabilities | system-description | system-name} command.

Parameters
system-capabilities Enter the keywords system-capabilities to advertise the system capabilities TLVs to the LLDP peer.

system-description Enter the keywords system-description to advertise the system description TLVs to the LLDP peer.

system-name Enter the keywords system-name to advertise the system name TLVs to the LLDP peer.

Defaults
none

Command Modes
CONFIGURATION (conf-lldp)

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
clear lldp counters

Clear LLDP transmitting and receiving counters for all physical interfaces or a specific physical interface.

Syntax

```
clear lldp counters interface
```

Parameters

- **interface**
  - Enter the following keywords and slot/port or number information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information.
    - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

`none`

Command Modes

- **EXEC Privilege**

Command History

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.

clear lldp neighbors

Clear LLDP neighbor information for all interfaces or a specific interface.

Syntax

```
clear lldp neighbors {interface}
```

Parameters

- **interface**
  - Enter the following keywords and slot/port or number information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information.
    - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

`none`

Command Modes

- **EXEC Privilege**

Command History

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**
  - Introduced on the MXL 10/40GbE Switch IO Module.
debug lldp interface

To display timer events, neighbor additions or deletions, and other information about incoming and outgoing packets, enable LLDP debugging.

Syntax

    debug lldp interface {interface | all} {events | packet {brief | detail} {tx | rx | both}}

To disable debugging, use the no debug lldp interface {interface | all} {events} {packet {brief | detail} {tx | rx | both}} command.

Parameters

    interface

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

- For a 10-Gigabit Ethernet interface, enter the keyword tenGigabitEthernet then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.

    all

(Optional) Enter the keyword all to display information on all interfaces.

    events

(Optional) Enter the keyword events to display major events such as timer events.

    packet

(Optional) Enter the keyword packet to display information regarding packets coming in or going out.

    brief

(Optional) Enter the keyword brief to display brief packet information.

    detail

(Optional) Enter the keyword detail to display detailed packet information.

    tx

(Optional) Enter the keyword tx to display transmit-only packet information.

    rx

(Optional) Enter the keyword rx to display receive-only packet information.

    both

(Optional) Enter the keyword both to display both receive and transmit packet information.

Defaults

    none

Command Modes

    EXEC Privilege

Command History

    Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
disable

Enable or disable LLDP.

Syntax

disable

To enable LLDP, use the no disable command.

Defaults

Enabled, that is no disable.

Command Modes

CONFIGURATION (conf-lldp) and INTERFACE (conf-if-interface-lldp)

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Related Commands

protocol lldp (Configuration) — enables LLDP globally.
d debug lldp interface — debugs LLDP.
 show lldp neighbors — displays the LLDP neighbors.

hello

Configure the rate at which the LLDP control packets are sent to its peer.

Syntax

hello seconds

To revert to the default, use the no hello seconds command.

Parameters

seconds Enter the rate, in seconds, at which the control packets are sent to its peer. The rate is from 5 to 180 seconds. The default is 30 seconds.

Defaults

30 seconds

Command Modes

CONFIGURATION (conf-lldp) and INTERFACE (conf-if-interface-lldp)

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
multiplier

Set the number of consecutive misses before LLDP declares the interface dead.

Syntax

```
multiplier integer
```

To return to the default, use the `no multiplier integer` command.

Parameters

```
integer
```

Enter the number of consecutive misses before the LLDP declares the interface dead. The range is from 2 to 10.

Defaults

```
4 x hello
```

Command Modes

```
CONFIGURATION (conf-lldp) and INTERFACE (conf-if-lldp)
```

Command History

```
Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
```

```
Version 8.3.16.1  Introduced on the MXL 10/40GbE Switch IO Module.
```

Quality of Service (QoS)

The Dell Networking operating software commands for quality of service (QoS) include traffic conditioning and congestion control. QoS commands are not universally supported on all Dell Networking Products.

Per-Port QoS Commands

Per-port QoS (port-based QoS) allows you to define the QoS configuration on a per-physical-port basis.

**dot1p-priority**

Assign a value to the IEEE 802.1p bits on the traffic this interface receives.

Syntax

```
dot1p-priority priority-value
```

To delete the IEEE 802.1p configuration on the interface, use the `no dot1p-priority` command.

Parameters

```
priority-value
```

Enter a value from 0 to 7.

<table>
<thead>
<tr>
<th>dot1p</th>
<th>Queue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
The `dot1p-priority` command changes the priority of incoming traffic on the interface. The system places traffic marked with a priority in the correct queue and processes that traffic according to its queue.

When you set the priority for a port channel, the physical interfaces assigned to the port channel are configured with the same value. You cannot assign the `dot1p-priority` command to individual interfaces in a port channel.

**service-class dynamic dot1p**

Honor all 802.1p markings on incoming switched traffic on an interface (from INTERFACE mode) or on all interfaces (from CONFIGURATION mode). A CONFIGURATION mode entry supersedes an INTERFACE mode entry.

**Syntax**

```
service-class dynamic dot1p
```

To return to the default setting, use the `no service-class dynamic dot1p` command.

**Defaults**

All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command. The default mapping is as follows:

<table>
<thead>
<tr>
<th>dot1p</th>
<th>Queue ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
### Command Modes
- INTERFACE
- CONFIGURATION

### Command History
- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** Introduced on the MXL 10/40GbE Switch IO Module.

### Usage Information
To honor all incoming 802.1p markings on incoming switched traffic on the interface, enter this command. By default, this facility is not enabled (that is, the 802.1p markings on incoming traffic are not honored).

You can apply this command on both physical interfaces and port channels. When you set the service-class dynamic for a port channel, the physical interfaces assigned to the port channel are automatically configured; you cannot assign the `service-class dynamic dot1p` command to individual interfaces in a port channel.

- All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command on an interface or globally.
- Layer 2 or Layer 3 service policies supersede dot1p service classes.

---

### service-class dot1p-mapping
Configure a service-class criterion based on a dot1p value.

#### Syntax
```
service-class dot1p-mapping {dot1p0 value | dot1p1 value | dot1p2 queue | dot1p3 value | dot1p4 value | dot1p5 value | dot1p6 value | dot1p7 value}
```

#### Parameters
- **value**
  - Enter a dot1p list number and value. The list number range is from 0 to 7. The range is from 0 to 3.

#### Defaults
For each dot1p Priority, the default CoS queue value is:
- **dot1p CoS Queue**
  - 0 0-7
  - 1 0-7
  - 2 0-7
  - 3 0-7

---

<table>
<thead>
<tr>
<th>dot1p</th>
<th>Queue ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>
This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0**: Introduced on the S6000.
- **Version 8.3.19.0**: Introduced on the S4820T.
- **Version 8.3.11.1**: Introduced on the Z9000.
- **Version 8.3.7.0**: Introduced on the S4810.

Usage Information

To apply dot1p-queue-mapping, use the `service-class dynamic dot1p` command.

Related Commands

- `service-class dot1p-mapping` — displays the dot1p priority to queue mapping on the switch.

**service-class bandwidth-percentage**

Specify a minimum bandwidth for queues.

**Syntax**

```
service-class bandwidth-percentage queue0 number queue1 number queue2 number queue3 number
```

**Parameters**

- `number`: Enter the bandwidth-weight, as a percentage. The range is from 1 to 100.

**Defaults**

- none

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1**: Introduced on the MXL 10/40GbE Switch IO Module.
Usage Information

Guarantee a minimum bandwidth to different queues globally using the `service-class bandwidth-percentage` command from CONFIGURATION mode. The command is applied in the same way as the `bandwidth-percentage` command in an output QoS policy. The `bandwidth-percentage` command in QOS-POLICY-OUT mode supersedes the `service-class bandwidth-percentage` command.

When you enable ETS, the egress QoS features in the output QoS policy-map (such as `service-class bandwidth-percentage` and `bandwidth-percentage`), the default bandwidth allocation ratio for egress queues are superseded by ETS configurations. This is to provide compatibility with DCBX. Therefore, Dell Networking OS recommends disabling ETS when you wish to apply these features exclusively. After you disable ETS on an interface, the configured parameters are applied.

Policy-Based QoS Commands

Policy-based traffic classification is handled with class maps. These maps classify unicast traffic into one of four classes. The system allows you to match multiple class maps and specify multiple match criteria. Policy-based QoS is not supported on logical interfaces, such as port-channels, VLANs, or Loopbacks.

bandwidth-percentage

Assign a percentage of weight to the class/queue.

Syntax

```
bandwidth-percentage percentage

To remove the bandwidth percentage, use the `no bandwidth-percentage` command.
```

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>percentage</td>
<td>Enter the percentage assignment of weight to the class/queue. The range is from 1 to 100% (granularity 1%).</td>
</tr>
</tbody>
</table>

Defaults

none

Command Modes

CONFIGURATION (conf-qos-policy-out)

Command History

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.16.1**
  Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

The unit of bandwidth percentage is 1%. A bandwidth percentage of 0 is allowed and disables the scheduling of that class. If the sum of the bandwidth percentages given to all eight classes exceeds 100%, the bandwidth percentage automatically scales down to 100%.

Related Commands

- **qos-policy-output** — creates a QoS output policy.
description

Add a description to the selected policy map or QoS policy.

Syntax

description {description}
To remove the description, use the no description {description} command.

Parameters

description
Enter a description to identify the policies (80 characters maximum).

Defaults
none

Command Modes
CONFIGURATION (policy-map-input and policy-map-output; conf-qos-policy-in and conf-qos-policy-out; wred)

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Related Commands
policy-map-output — creates an output policy map.
qos-policy-output — creates an output QoS-policy on the router.

policy-aggregate

Allow an aggregate method of configuring per-port QoS via policy maps. An aggregate QoS policy is part of the policy map (input/output) applied on an interface.

Syntax

policy-aggregate qos-policy-name
To remove a policy aggregate configuration, use the no policy-aggregate qos-policy-name command.

Parameters

qos-policy-name
Enter the name of the policy map in character format (32 characters maximum).

Defaults
none

Command Modes
CONFIGURATION (policy-map-input and policy-map-output)

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
Aggregate input/output QoS policy applies to all the port ingoing/outgoing traffic. Aggregate input/output QoS policy can coexist with per queue input/output QoS policies.

1. If only aggregate input QoS policy exists, input traffic conditioning configurations (rate-police) apply. Any marking configurations in aggregate input QoS policy are ignored.
2. If aggregate input QoS policy and per class input QoS policy coexist, aggregate input QoS policy preempts per class input QoS policy on input traffic conditioning (rate-police). In other words, if rate police configuration exists in the aggregate QoS policy, the rate police configurations in per class QoS are ignored. Marking configurations in per class input QoS policy still apply to each queue.

Related Commands

`policy-map-output` — creates an output policy map.

**policy-map-output**

Create an output policy map.

**Syntax**

```
policy-map-output policy-map-name
```

To remove a policy map, use the `no policy-map-output policy-map-name` command.

**Parameters**

- `policy-map-name`  
  Enter the name for the policy map in character format (32 characters maximum).

**Defaults**

- none

**Command Modes**

- CONFIGURATION

**Command History**

- **Version 9.2(0.0)** — Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.16.1** — Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**

To assign traffic to different flows using QoS policy, use the Output Policy map. This command enables Policy-Map-Output Configuration mode (conf-policy-map-out).

**Related Commands**

- `service-queue` — assigns a class map and QoS policy to different queues.
- `policy-aggregate` — allows an aggregate method of configuring per-port QoS using policy maps.
- `service-policy output` — applies an output policy map to the selected interface.
**qos-policy-output**
Create a QoS output policy.

**Syntax**
```
qos-policy-output qos-policy-name
```
To remove an existing output QoS policy, use the `no qos-policy-output qos-policy-name` command.

**Parameters**
- `qos-policy-name`: Enter your output QoS policy name in character format (32 characters maximum).

**Defaults**
none

**Command Modes**
CONFIGURATION

**Command History**
Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

**Usage Information**
To specify the name of the output QoS policy, use this command. After the output policy is specified, rate-limit, bandwidth-percentage, and WRED can be defined. This command enables Qos-Policy-Output Configuration mode — (conf-qos-policy-out).

**Related Commands**
- `bandwidth-percentage` — assigns weight to the class/queue percentage.
- `rate-shape` — shape the traffic output on the selected interface.

**rate-shape**
Shape the traffic output on the selected interface.

**Syntax**
```
rate-shape [kbps] rate [burst-KB]
```

**Parameters**
- `kbps`: Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Make the following value a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
- `rate`: Enter the outgoing rate in multiples of 10 Mbps. The range is from 10 to 10000.
- `burst-KB`: (OPTIONAL) Enter the burst size in KB. The range is from 0 to 10000. The default is 50.

**Defaults**
Granularity for rate is Mbps unless you use the kbps option.

**Command Modes**
QOS-POLICY-OUT

**Command History**
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
When you apply rate-shape in QoS policy both on the Queue Level and in Aggregate mode, the queue-based shaping occurs first then aggregate rate shaping.

**service-policy output**

Apply an output policy map to the selected interface.

**Syntax**

```
service-policy output policy-map-name
```

To remove the output policy map from the interface, use the `no service-policy output policy-map-name` command.

**Parameters**

- `policy-map-name` Enter the name for the policy map in character format (16 characters maximum). You can identify an existing policy map or name one that does not yet exist.

**Defaults**

none

**Command Modes**

INTERFACE

**Command History**

- Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

A single policy-map can be attached to one or more interfaces to specify the service-policy for those interfaces. A policy map attached to an interface can be modified.

**Related Commands**

- `policy-map-output` — creates an output policy map.

**service-queue**

Assign a class map and QoS policy to different queues.

**Syntax**

```
service-queue queue-id [class-map class-map-name] [qos-policy qos-policy-name]
```

To remove the queue assignment, use the `no service-queue queue-id [class-map class-map-name] [qos-policy qos-policy-name]` command.

**Parameters**

- `queue-id` Enter the value used to identify a queue. The range is from 0 to 3 (four queues per interface; four queues are reserved for control traffic).
class-map name

(Optional) Enter the keyword class-map then the class map name assigned to the queue in character format (32 character maximum).

NOTE: This option is available under policy-map-input only.

qos-policy name

(Optional) Enter the keywords qos-policy then the QoS policy name assigned to the queue in text format (32 characters maximum). This specifies the input QoS policy assigned to the queue under policy-map-input and output QoS policy under policy-map-output context.

Defaults none

Command Modes CONFIGURATION (conf-policy-map-in and conf-policy-map-out)

Command History
Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information There are four queues per interface on the MXL switch. This command assigns a class map or QoS policy to different queues.

Related Commands service-policy output — applies an output policy map to the selected interface.

show qos qos-policy-output

View the output QoS policy details.

Syntax show qos qos-policy-output [qos-policy-name]

Parameters qos-policy-name Enter the QoS policy name.

Defaults none

Command Modes • EXEC
• EXEC Privilege

Command History
Version 8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

Example

Dell\#show qos qos-policy-output
Qos-policy-output qmap_out
Bandwidth-percentage 10
Qos-policy-output qmap_wg
Rate-shape 100 50
Wred yellow wy

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reload-type

Configure a switch to reload as a DHCP client in BMP mode with all ports configured for Layer 3 traffic or in Normal mode.

Syntax

reload-type {bmp | normal-reload {[auto-save {enable | disable}] | [config-scr-download {enable | disable}] | [dhcp-timeout minutes] | retry-count number | vendor-class-identifier description}

Use the disable bmp command to stop the BMP process.

Parameters

bmp

(Default) Enable the BMP reload type. The system acts as a DHCP client and downloads the Dell Networking OS image, configuration and boot files from a specified DHCP server.

normal-reload

Enable the normal reload type and disable BMP reload type. The system retrieves the Dell Networking OS image and startup-configuration files from the flash after performing a reload.

auto-save

Configure the auto save option to save the downloaded configuration or script file. They are not saved by default. When auto save is configured, downloaded configurations are automatically saved to the startup configuration. Auto saving the downloaded configurations also requires enabling the config-scr-download parameter. Downloaded scripts are automatically saved to the autoexec script.

config-scr-download

(Optional.) Configure whether the configuration file must be downloaded from the DHCP/file servers (enable).

config-download

(Optional.) Configure if the downloaded file will not be downloaded from the DHCP/file servers.

dhcp-timeout minutes

(Optional) Configure the DHCP timeout (in minutes) after which the BMP reload stops. The range is from 0 to 50. If a range of 0 is entered, the timeout is 0 (no limit). The default is disabled.

>> NOTE:

Dell Networking recommends setting the value to 2 or higher.
retry-count number

Configure the number of times to retry loading the Dell Networking OS image and configuration download. The retry limit is 0–6. If the retry limit is 0, no retry is performed. The default is 0.

vendor-class-identifier description

(Optional) Enter a brief description for DHCP Option 60. Maximum is 64 characters long.

NOTE:

This parameter replaces the deprecated parameter user-defined-string.

Defaults

BMP

Switches running BMP reload in BMP mode as a DHCP client with all ports configured for Layer 3 traffic.

Command Modes

GLOBAL CONFIGURATION

Command History

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.2(0.0) Introduced support for vendor-class-identifier that replaces deprecated parameter user-defined-string. Also added support for retry-count.

Version 9.1(0.0) Introduced on the Z9000. Updated the command mode from EXEC Privilege to GLOBAL CONFIGURATION. Updated the parameter from jumpstart to bmp. Added support for the config-scr-download and user-defined-string commands.

Version 8.3.19.0 Introduced on the S4820T.

Version 8.3.1.0 Introduced on the S4810.

Usage Information

For an initial setup, the config-scr-download parameter of the reload-type command is enabled. After the configuration file is successfully downloaded, the config-scr-download parameter is automatically disabled. You can enable it again using the reload-type command.

Set the Auto Configuration mode (BMP or Normal reload) using the reload-type command. Next, enter the reload command to reload the switch in the configured mode.

When a switch reloads in BMP mode, all ports, including the management port, are automatically configured as Layer 3 physical ports. The switch runs DHCP client on all interfaces. You can reconfigure the default startup configuration and DHCP timeout values.

If the switch attempts to contact a DHCP server and one is not found, it enters a loop while reloading in BMP mode. To interrupt the reload and boot up in Normal
mode, enter the `stop bmp` command. The startup configuration is then loaded from the local flash on the switch.

To toggle between Normal and BMP Auto Configuration modes, use the `reload-type` command in BMP. Reload settings for Auto Configuration mode that you configure are stored in memory and retained for future reboots and BMP software upgrades. To reload the switch in the last configured mode: Normal reload or BMP mode, you can enter the `reload` command at any time.

Upgrade any configuration changes that have changed the NVRAM content by performing a reload on the chassis.

While BMP is on, the Dell Networking OS Command Line Reference Guide prompt changes to “Dell-BMP”.

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**Simple Network Management Protocol (SNMP) and Syslog**

This chapter contains commands to configure and monitor the simple network management protocol (SNMP) v1/v2/v3 and Syslog.

The chapter contains the following sections:

- [SNMP Commands](#)
- [Syslog Commands](#)

**SNMP Commands**

The following SNMP commands are available in the Dell Networking operating software.

The simple network management protocol (SNMP) is used to communicate management information between the network management stations and the agents in the network elements. Dell Networking OS supports SNMP versions 1, 2c, and 3, supporting both read-only and read-write modes. Dell Networking OS sends SNMP traps, which are messages informing an SNMP management system about the network. Dell Networking OS supports up to 16 SNMP trap receivers.

**Important Points to Remember**

- Typically, 5-second timeout and 3-second retry values on an SNMP server are sufficient for both LAN and WAN applications. If you experience a timeout with these values, the recommended best practice on Dell Networking switches (to accommodate their high port density) is to increase the timeout and retry values on your SNMP server to the following:
  - SNMP Timeout — greater than 3 seconds.
  - SNMP Retry count — greater than 2 seconds.
- If you want to query an E-Series switch using SNMP v1/v2/v3 with an IPv6 address, configure the IPv6 address on a non-management port on the switch.
- If you want to send SNMP v1/v2/v3 traps from an E-Series using an IPv6 address, use a non-management port.
- SNMP v3 informs are not currently supported with IPv6 addresses.
• If you are using access control lists (ACLs) in an SNMP v3 configuration, group ACL overrides user ACL if the user is part of that group.
• SNMP operations are not supported on a virtual local area network (VLAN).

**snmp-server enable traps**

Enable SNMP traps.

**Syntax**

```plaintext
snmp-server enable traps [notification-type] [notification-option]
```

To disable traps, use the `no snmp-server enable traps [notification-type] [notification-option]` command.

**Parameters**

`notification-type`  
Enter the type of notification from the following list:

- `bgp` — Notification of changes in the BGP process.
- `config` — Notification of changes to the startup or running configuration.
- `ecfm` — Notification of changes to ECFM.
- `ecmp` — Enable an ECMP trap to notify of ECMP or link bundle traffic imbalances.
- `envmon` — For Dell Networking device notifications when an environmental threshold is exceeded.
- `isis` — Notification of intermediate service traps.
- `lacp` — Notification of changes.
- `snmp` — Notification of RFC 1157 traps.
- `stp` — Notification of a state change in the spanning tree protocol (RFC 1493).
- `vlt` — Notification of virtual link trunking.
- `vrrp` — Notification of a state change in a VRRP group.
- `xstp` — Notification of a state change in MSTP (802.1s), RSTP (802.1w), and PVST+.

`notification-option`  
For the `envmon` notification-type, enter one of the following optional parameters:

- `cam-utilization`
- `fan`
- `supply`
- `temperature`

For the `snmp` notification-type, enter one of the following optional parameters:

- `authentication`
- `coldstart`
- `linkdown`
- `linkup`
Defaults: Not enabled.

Command Modes: CONFIGURATION

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

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

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.1(0.0)**: Added support for copy-config and ecmp traps.
- **Version 8.3.19.0**: Introduced on the S4820T.
- **Version 8.3.11.1**: Introduced on the Z9000.
- **Version 8.3.7.0**: Introduced on the S4810.
- **Version 8.4.1.0**: Added support for VRRP traps.
- **Version 7.6.1.0**: Added support for STP and xSTP traps. Introduced on the S-Series.
- **Version 7.5.1.0**: Introduced on the C-Series.

Usage Information:
Dell Networking OS supports up to 16 SNMP trap receivers. If you do not configure this command, no traps controlled by this command are sent. If you do not specify a notification-type and notification-option, all traps are enabled.

**snmp-server host**
Configure the recipient of an SNMP trap operation.

**Syntax:**
snmp-server host ip-address | ipv6-address

To remove the SNMP host, use the no snmp-server host ip-address command.

**Parameters:**
- **ip-address**: Enter the keyword host then the IP address of the host (configurable hosts is limited to 16).
- **ipv6-address**: Enter the keyword host then the IPv6 address of the host in the x::x::x format.

**NOTE:** The :: notation specifies successive hexadecimal fields of zero.
traps  (OPTIONAL) Enter the keyword traps to send trap notifications to the specified host. The default is traps.

informs  (OPTIONAL) Enter the keyword informs to send inform notifications to the specified host. The default is traps.

version 1 | 2c | 3  (OPTIONAL) Enter the keyword version to specify the security model then the security model version number 1, 2c, or 3:

- Version 1 is the least secure version.
- Version 3 is the most secure of the security modes.
- Version 2c allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed.

The default is version 1.

auth  (OPTIONAL) Enter the keyword auth to specify authentication of a packet without encryption.

noauth  (OPTIONAL) Enter the keyword noauth to specify no authentication of a packet.

priv  (OPTIONAL) Enter the keyword priv to specify both authentication and then scrambling of the packet.

community-string  Enter a text string (up to 20 characters long) as the name of the SNMP community.

NOTE: For version 1 and version 2c security models, this string represents the name of the SNMP community. The string can be set using this command; however, Dell Networking OS recommends setting the community string using the snmp-server community command before executing this command. For version 3 security model, this string is the USM user security name.

udp-port port-number  (OPTIONAL) Enter the keywords udp-port followed by the port number of the remote host to use. The range is from 0 to 65535. The default is 162.

notification-type  (OPTIONAL) Enter one of the following keywords for the type of trap to be sent to the host:

- bgp — Enable BGP state change traps.
- ecfm — Enable ECFM state change traps.
- entity — Enable entity change traps.
- envmon — Enable SNMP environmental monitor traps.
- eoam — Enable EOAM state change traps
- ets — Enable ets traps
- fips — Enable FIP Snooping state change traps
- lacp — Enable LACP state change traps.
- **isis** — Enable ISIS adjacency change traps
- **pfc** — Enable pfc traps
- **snmp** — Enable SNMP trap
- **stp** — Enable 802.1d state change traps
- **vlt** — Enable VLT traps
- **vrrp** — Enable VRRP state change traps
- **xstp** — Enable 802.1s, 802.1w, and PVST+ state change traps

The default is all trap types are sent to host.

### Defaults

As above.

### Command Modes

**CONFIGURATION**

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

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

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 9.1(0.0)**
  - Added support for config and ecmp traps.

- **Version 8.3.19.0**
  - Introduced on the S4820T.

- **Version 8.3.11.1**
  - Introduced on the Z9000.

- **Version 8.3.7.0**
  - Introduced on the S4810.

- **Version 8.4.1.0**
  - Added support for VRRP traps.

- **Version 7.6.1.0**
  - Added support for STP and xSTP notification types.

  - Introduced on the S-Series.

- **Version 7.5.1.0**
  - Introduced on the C-Series.

### Usage Information

In order to configure the router to send SNMP notifications, enter at least one `snmp-server host` command. If you enter the command with no keywords, all trap types are enabled for the host. If you do not enter an `snmp-server host` command, no notifications are sent.

In order to enable multiple hosts, issue a separate `snmp-server host` command for each host. You can specify multiple notification types in the command for each host.

When multiple `snmp-server host` commands are given for the same host and type of notification (trap or inform), each succeeding command overwrites the

PMUX Mode of the I/O Aggregator
previous command. Only the last `snmp-server host` command will be in effect. For example, if you enter an `snmp-server host inform` command for a host and then enter another `snmp-server host inform` command for the same host, the second command replaces the first command.

The `snmp-server host` command is used with the `snmp-server enable` command. Use the `snmp-server enable` command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one `snmp-server enable` command and the `snmp-server host` command for that host must be enabled.

**NOTE:** For v1 / v2c trap configuration, if the community-string is not defined using the `snmp-server community` command prior to using this command, the default form of the `snmp-server community` command automatically is configured with the community-name the same as specified in the `snmp-server host` command.

### Configuring Informs

To send an inform, use the following steps:

1. Configure a remote engine ID.
2. Configure a remote user.
3. Configure a group for this user with access rights.
4. Enable traps.
5. Configure a host to receive informs.

### Related Commands

`snmp-server enable traps` — enables SNMP traps.

### Syslog Commands

The following commands allow you to configure logging functions on all Dell Networking switches.

**clear logging**

Clear the messages in the logging buffer.

**Syntax**

```
clear logging
```

**Defaults**

none

**Command Modes**

EXEC Privilege

**Command History**

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

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

**Version 9.2(0.0)**

Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
logging

Configure an IP address or host name of a Syslog server where logging messages are sent. Multiple logging servers of both IPv4 and/or IPv6 can be configured.

Syntax

logging {ip-address | ipv6-address | hostname} [vrf vrf-name]

To disable logging, use the no logging command.

Parameters

- **ip-address**: Enter the IPv4 address in dotted decimal format.
- **ipv6-address**: Enter the IPv6 address in the x:x:x::X format.
- **hostname**: Enter the name of a host already configured and recognized by the switch.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

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

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

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.19.0**
  - Introduced on the S4820T.
- **Version 8.3.11.1**
  - Introduced on the Z9000.
- **Version 8.3.7.0**
  - Introduced on the S4810.
- **Version 7.6.1.0**
  - Introduced on the S-Series.
- **Version 7.5.1.0**
  - Introduced on the C-Series.

E-Series legacy command

Related Commands

- **show logging** — displays logging settings and system messages in the internal buffer.
logging buffered

Enable logging and specify which messages are logged to an internal buffer. By default, all messages are logged to the internal buffer.

Syntax

logging buffered [level] [size]

To return to the default values, use the default logging buffered command.

To disable logging stored to an internal buffer, use the no logging buffered command.

Parameters

level (OPTIONAL) Indicate a value from 0 to 7 or enter one of the following equivalent words: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 7 or debugging.

size (OPTIONAL) Indicate the size, in bytes, of the logging buffer. The number of messages buffered depends on the size of each message. The range is from 40960 to 524288. The default is 40960 bytes.

Defaults

level = 7; size = 40960 bytes

Command Modes

CONFIGURATION

Command History

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0 Introduced on the S6000.

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logging console

Specify which messages are logged to the console.

```
logging console [level]
```

To return to the default values, use the `default logging console` command.

To disable logging to the console, use the `no logging console` command.

**Parameters**

- `level` (OPTIONAL) Indicate a value from 0 to 7 or enter one of the following parameters: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 7 or debugging.

**Defaults**

level = 7; size = debugging

**Command Modes**

CONFIGURATION

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 8.3.11.1** Introduced on the Z9000.
- **Version 8.3.7.0** Introduced on the S4810.
- **Version 7.6.1.0** Introduced on the S-Series.
- **Version 7.5.1.0** Introduced on the C-Series.
- **E-Series legacy command**

**Usage Information**

When you decrease the buffer size, all messages stored in the buffer are lost. Increasing the buffer size does not affect messages stored in the buffer.
logging monitor

Specify which messages are logged to Telnet applications.

Syntax

logging monitor [level]

To disable logging to terminal connections, use the no logging monitor command.

Parameters

level

Indicate a value from 0 to 7 or enter one of the following parameters: emergencies, alerts, critical, errors, warnings, notifications, informational, or debugging. The default is 7 or debugging.

Defaults

7 or debugging

Command Modes

CONFIGURATION

Command History

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

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

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0  Introduced on the S6000.

Version 8.3.19.0  Introduced on the S4820T.

Version 8.3.11.1  Introduced on the Z9000.

Version 8.3.7.0  Introduced on the S4810.

Version 7.6.1.0  Introduced on the S-Series.

Version 7.5.1.0  Introduced on the C-Series.

E-Series legacy command

Related Commands

clear logging — clears the logging buffer.

display logging — displays the logging setting and system messages in the internal buffer.
logging source-interface

Specify that the IP address of an interface is the source IP address of Syslog packets sent to the Syslog server.

Syntax

logging source-interface interface

To disable this command and return to the default setting, use the no logging source-interface command.

Parameters

interface

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

- For a 100/1000 Ethernet interface, enter the keyword GigabitEthernet then the slot/port information.
- For Loopback interfaces, enter the keyword loopback then a number from zero (0) to 16383.
- For the management interface on the RPM, enter the keyword ManagementEthernet then the slot/port information. The slot range is from 0 to 1 and the port range is 0.
- For a Port Channel interface, enter the keywords port-channel then a number. The range is from 1 to 128.
- For a ten-Gigabit Ethernet interface, enter the keyword TenGigabitEthernet then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword fortyGigE then the slot/port information.
- For VLAN interface, enter the keyword vlan then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0 Introduced on the S6000.

Version 8.3.19.0 Introduced on the S4820T.

Version 8.3.11.1 Introduced on the Z9000.

Version 8.3.7.0 Introduced on the S4810.

Version 8.5.1.0 Added support for 4-port 40G line cards on ExaScale.
show logging

Display the logging settings and system messages logged to the internal buffer of the switch.

Syntax

```
show logging [number | history [reverse][number] | reverse [number] | summary]
```

Parameters

- **number** (OPTIONAL) Enter the number of messages displayed in the output. The range is from 1 to 65535.
- **history** (OPTIONAL) Enter the keyword `history` to view only information in the Syslog history table.
- **reverse** (OPTIONAL) Enter the keyword `reverse` to view the Syslog messages in FIFO (first in, first out) order.
- **summary** (OPTIONAL) Enter the keyword `summary` to view a table showing the number of messages per type and per slot. Slots *7* and *8* represent RPMs.

Command Modes

- EXEC
- EXEC Privilege

Command History

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0** Introduced on the S6000.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 8.3.11.1** Introduced on the Z9000.
- **Version 8.3.7.0** Introduced on the S4810.
Example (Partial)

Dell#show logging
Syslog logging: enabled
  Console logging: level debugging
  Monitor logging: level debugging
  Buffer logging: level debugging, 5604 Messages Logged,
  Size (524288 bytes)
  Trap logging: level informational
Oct 8 09:25:37: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
  neighbor 223.80.255.254 closed. Hold time expired
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.200.13.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.1.1.13 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.14.2
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.1.1.14 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.11.2
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.5
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.4.1.3
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.4
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.6
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.1.1.12 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.1.1.15 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.3
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.200.12.2
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.10.2
  Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Session closed by
  neighbor 1.1.10.2 (Hold time expired)
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
  192.200.14.7 Up
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
  neighbor 1.1.11.2 closed. Neighbor recycled
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
  neighbor 1.1.14.2 closed. Neighbor recycled
  --More--

Example (History)

Dell#show logging history
Syslog History Table: 1 maximum table entries,
  saving level Warnings or higher
  SNMP notifications not Enabled

PMUX Mode of the I/O Aggregator
show logging driverlog stack-unit

Display the driver log for the specified stack member.

**Syntax**

```
show logging driverlog stack-unit unit#
```

**Parameters**

- `stack-unit`
- `unit#`

Enter the keywords `stack-unit` followed by the stack member ID of the switch for which you want to display the driver log. The range is from 0 to 7.

**defaults**

none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

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

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

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0**
  Introduced on the S6000.
- **Version 8.3.19.0**
  Introduced on the S4820T.
- **Version 8.3.11.1**
  Introduced on the Z9000.
- **Version 8.3.7.0**
  Introduced on the S4810.
- **Version 7.6.1.0**
  Introduced on the S-Series.

**Usage Information**

This command displays internal software driver information, which may be useful during troubleshooting switch initialization errors, such as a downed Port-Pipe.

**terminal monitor**

Configure the Dell Networking OS to display messages on the monitor/terminal.

**Syntax**

```
terminal monitor
```

To return to default settings, use the `terminal no monitor` command.

**Defaults**

Disabled.

**Command Modes**

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

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

```
Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0  Introduced on the S6000.
Version 8.3.19.0  Introduced on the S4820T.
Version 8.3.11.1  Introduced on the Z9000.
Version 8.3.7.0  Introduced on the S4810.
Version 7.6.1.0  Introduced on the S-Series.
Version 7.5.1.0  Introduced on the C-Series.
```

E-Series legacy command

**Related Commands**

logging monitor — sets the logging parameters on the monitor/terminal.

---

**Storm Control**

The Dell Networking operating software storm control feature allows you to limit or suppress traffic during a traffic storm.

**Important Points to Remember**

- Interface commands can only be applied on physical interfaces (virtual local area networks [VLANs] and link aggregation group [LAG] interfaces are not supported).
- An INTERFACE-level command only supports storm control configuration on ingress.
- An INTERFACE-level command overrides any CONFIGURATION-level ingress command for that physical interface, if both are configured.
- You can apply the CONFIGURATION-level storm control commands at ingress or egress and are supported on all physical interfaces.
- When storm control is applied on an interface, the percentage of storm control applied is calculated based on the advertised rate of the line card. It is not based on the speed setting for the line card.
- Do not apply per-VLAN quality of service (QoS) on an interface that has storm control enabled (either on an interface or globally).
- When you enable broadcast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 1 is configured for the data traffic, the traffic goes to queue 1 instead of queue 0.
- Similarly, if you enable unicast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 2 is configured for the data traffic, the traffic goes to queue 2 instead of queue 0.
NOTE: Bi-directional traffic (unknown unicast and broadcast) along with egress storm control causes the configured traffic rates split between the involved ports. The percentage of traffic that each port receives after the split is not predictable. These ports can be in the same/different port pipes or the same/different line cards.

NOTE: The policy discard drop counters are common across storm-control drops, ACL drops and QoS drops. Therefore, if your configuration includes ACL and QoS, those drops are also computed and displayed in the policy discard drops counter field along with storm-control drops. The packets dropped by the storm control feature can be monitored by viewing the value of the Policy Discard Drops field of the output of the show hardware stack-unit 0 drops command.

**show storm-control unknown-unicast**

Display the storm control unknown-unicast configuration.

**Syntax**

```
show storm-control unknown-unicast [interface]
```

**Parameters**

- **interface** (OPTIONAL) Enter one of the following interfaces to display the interface specific storm control configuration:
  - For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
  - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
  - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

**Defaults**

none

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

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

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

- **Version 9.2(0.0)** Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.19.0** Introduced on the S4820T.
- **Version 8.3.11.1** Introduced on the Z9000.
- **Version 8.5.1.0** Added support for 4-port 40G line cards on ExaScale.
- **Version 8.3.7.0** Introduced on the S4810.
- **Version 7.6.1.0** Introduced on the S-Series.
- **Version 7.5.1.0** Introduced on the C-Series.
Uplink Failure Detection (UFD)

Uplink failure detection (UFD) provides detection of the loss of upstream connectivity and, if you use this with network interface controller (NIC) teaming, automatic recovery from a failed link.

NOTE: In Standalone, VLT, and Stacking modes, the UFD group number is 1 by default and cannot be changed.

clear ufd-disable

Re-enable one or more downstream interfaces on the switch/router that are in a UFD-Disabled Error state so that an interface can send and receive traffic.

Syntax

```
clear ufd-disable {interface interface | uplink-state-group group-id}
```

Parameters

- **interface**
  - Specify one or more downstream interfaces. For *interface*, enter one of the following interface types:
    - Fast Ethernet: `fastethernet {slot/port | slot/port-range}`
    - 1 Gigabit Ethernet: `gigabitethernet {slot/port | slot/port-range}`
    - 10 Gigabit Ethernet: `tengigabitethernet {slot/port | slot/port-range}`
    - Port channel: `port-channel {1-512 | port-channel-range}`

  Where *port-range* and *port-channel-range* specify a range of ports separated by a dash (-) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

- **uplink-state-group group-id**
  - Re-enables all UFD-disabled downstream interfaces in the group. The valid group-id values are from 1 to 16.

Defaults

A downstream interface in a UFD-disabled uplink-state group is also disabled and is in a UFD-Disabled Error state.

Command Modes

- CONFIGURATION

Command History

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

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

- **downstream** — assigns a port or port-channel to the uplink-state group as a downstream interface.
- **uplink-state-group** — creates an uplink-state group and enables the tracking of upstream links.

### debug uplink-state-group

Enable debug messages for events related to a specified uplink-state group or all groups.

**Syntax**

```
depup-grpe uplink-state-group [group-id]
```

To turn off debugging event messages, enter the
```
no debug uplink-state-group [group-id]
```
command.

**Parameters**

- **group-id**
  
  Enables debugging on the specified uplink-state group. The valid group-id values are from 1 to 16.

**Defaults**

none

**Command Modes**

EXEC Privilege

**Command History**

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

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

- Version 9.2(0.0)  
  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**  
  
  Introduced on the S4820T.

- **Version 8.3.12.0**  
  
  Introduced on the S4810.

- **Version 8.4.2.3**  
  
  Introduced on the S-Series S50.

**Related Commands**

- clear ufd-disable — re-enables downstream interfaces that are in a UFD-Disabled Error state.
**description**

Enter a text description of an uplink-state group.

**Syntax**

```
description text
```

**Parameters**

- **text**
  
  Text description of the uplink-state group. The maximum length is 80 alphanumeric characters.

**Defaults**

none

**Command Modes**

UPLINK-STATE-GROUP

**Command History**

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

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

- **Version 9.2(0.0)**
  
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**
  
  Introduced on the S4820T.

- **Version 8.3.12.0**
  
  Introduced on the S4810.

- **Version 8.4.2.3**
  
  Introduced on the S-Series S50.

**Example**

```
Dell(conf-uplink-state-group-16)# description test
Dell(conf-uplink-state-group-16)#
```

**Related Commands**

- `uplink-state-group` — creates an uplink-state group and enables the tracking of upstream links.

**downstream**

Assign a port or port-channel to the uplink-state group as a downstream interface.

**Syntax**

```
downstream interface
```

To delete an uplink-state group, enter the `no downstream interface` command.

**Parameters**

- **interface**
  
  Enter one of the following interface types:
  
  - Fast Ethernet: `fastethernet {slot/port | slot/port-range}`
  - 1 Gigabit Ethernet: `gigabitethernet {slot/port | slot/port-range}`
  - 10 Gigabit Ethernet: `tengigabitethernet {slot/port | slot/port-range}`
• **Port channel:** `port-channel {1-512 | port-channel-range}`

Where `port-range` and `port-channel-range` specify a range of ports separated by a dash (-) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

**Defaults**

- none

**Command Modes**

- UPLINK-STATE-GROUP

**Command History**

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

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

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**
  - Introduced on the S4820T.

- **Version 8.3.12.0**
  - Introduced on the S4810.

- **Version 8.4.2.3**
  - Introduced on the S-Series S50.

**Usage Information**

You can assign physical port or port-channel interfaces to an uplink-state group.

You can assign an interface to only one uplink-state group. Configure each interface assigned to an uplink-state group as either an upstream or downstream interface, but not both.

You can assign individual member ports of a port channel to the group. An uplink-state group can contain either the member ports of a port channel or the port channel itself, but not both.

**Related Commands**

- `upstream` — assigns a port or port-channel to the uplink-state group as an upstream interface.
- `uplink-state-group` — creates an uplink-state group and enables the tracking of upstream links.
downstream auto-recover

Enable auto-recovery so that UFD-disabled downstream ports in an uplink-state group automatically come up when a disabled upstream port in the group comes back up.

Syntax

downstream auto-recover

To disable auto-recovery on downstream links, use the no downstream auto-recover command.

Defaults

The auto-recovery of UFD-disabled downstream ports is enabled.

Command Modes

UPLINK-STATE-GROUP

Command History

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

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

Version 9.2(0.0)  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 8.3.19.0  Introduced on the S4820T.

Version 8.3.12.0  Introduced on the S4810.

Version 8.4.2.3  Introduced on the S-Series S50.

Related Commands

• downstream — assigns a port or port-channel to the uplink-state group as a downstream interface.
• uplink-state-group — creates an uplink-state group and enables the tracking of upstream links.

downstream disable links

Configure the number of downstream links in the uplink-state group that are disabled if one upstream link in an uplink-state group goes down.

Syntax

downstream disable links {number | all}

To revert to the default setting, use the no downstream disable links command.

Parameters

number  Enter the number of downstream links to be brought down by UFD. The range is from 1 to 1024.

all  Brings down all downstream links in the group.
No downstream links are disabled when an upstream link in an uplink-state group goes down.

**Command Modes**

UPLINK-STATE-GROUP

**Command History**

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

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

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**
  Introduced on the S4820T.

- **Version 8.3.12.0**
  Introduced on the S4810.

- **Version 8.4.2.3**
  Introduced on the S-Series S50.

**Usage Information**

A user-configurable number of downstream interfaces in an uplink-state group are put into a link-down state with an UFD-Disabled error message when one upstream interface in an uplink-state group goes down.

If all upstream interfaces in an uplink-state group go down, all downstream interfaces in the same uplink-state group are put into a link-down state.

**Related Commands**

- `downstream` — assigns a port or port-channel to the uplink-state group as a downstream interface.
- `uplink-state-group` — creates an uplink-state group and enables the tracking of upstream links.

### enable

Enable uplink state group tracking for a specific UFD group.

**Syntax**

```
enable
```

To disable upstream-link tracking without deleting the uplink-state group, use the no enable command.

**Defaults**

Upstream-link tracking is automatically enabled in an uplink-state group.

**Command Modes**

UPLINK-STATE-GROUP

**Command History**

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

The following is a list of the Dell Networking OS version history for this command.
show running-config uplink-state-group

Display the current configuration of one or more uplink-state groups.

Syntax
show running-config uplink-state-group [group-id]

Parameters
- **group-id**: Displays the current configuration of all uplink-state groups or a specified group. The valid group-id values are from 1 to 16.

Defaults
none

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

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

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 8.3.19.0**: Introduced on the S4820T.
- **Version 8.3.12.0**: Introduced on the S4810.
- **Version 8.4.2.3**: Introduced on the S-Series S50.

Example
Dell#show running-config uplink-state-group
!
no enable
uplink state track 1
downstream GigabitEthernet 0/2,4,6,11-19
upstream TengigabitEthernet 0/48, 52
upstream PortChannel 1

Related Commands
- **uplink-state-group** — creates an uplink-state group and enables the tracking of upstream links.
show uplink-state-group

Display status information on a specified uplink-state group or all groups.

**Syntax**

```
show uplink-state-group [group-id] [detail]
```

**Parameters**

- `group-id` Displays status information on a specified uplink-state group or all groups. The valid `group-id` values are from 1 to 16.
- `detail` Displays additional status information on the upstream and downstream interfaces in each group

**Defaults**

None

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

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

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

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**
  Introduced on the S4820T.

- **Version 8.3.12.0**
  Introduced on the S4810.

- **Version 8.4.2.3**
  Introduced on the S-Series S50.

**Example**

```
Dell# show uplink-state-group
Uplink State Group: 1 Status: Enabled, Up
Uplink State Group: 3 Status: Enabled, Up
Uplink State Group: 5 Status: Enabled, Down
Uplink State Group: 6 Status: Enabled, Up
Uplink State Group: 7 Status: Enabled, Up
Uplink State Group: 16 Status: Disabled, Up

Dell# show uplink-state-group 16
Uplink State Group: 16 Status: Disabled, Up
```
Dell#show uplink-state-group detail
(Up): Interface up (Dwn): Interface down (Dis): Interface
disabled
Uplink State Group   : 1 Status: Enabled, Up
Upstream Interfaces  :
Downstream Interfaces:

Uplink State Group   : 3 Status: Enabled, Up
Upstream Interfaces  : Gi 0/46(Up) Gi 0/47(Up)
Downstream Interfaces: Te 13/0(Up) Te 13/1(Up) Te 13/3(Up) Te
13/5(Up) Te 13/6(Up)

Uplink State Group   : 5 Status: Enabled, Down
Upstream Interfaces  : Gi 0/0(Dwn) Gi 0/3(Dwn) Gi 0/5(Dwn)
Downstream Interfaces: Te 13/2(Dis) Te 13/4(Dis) Te
13/11(Dis) Te 13/12(Dis) Te 13/13(Dis) Te 13/14(Dis) Te
13/15(Dis)

Uplink State Group   : 6 Status: Enabled, Up
Upstream Interfaces  :
Downstream Interfaces:

Uplink State Group   : 7 Status: Enabled, Up
Upstream Interfaces  :
Downstream Interfaces:

Uplink State Group   : 16 Status: Disabled, Up
Upstream Interfaces  : Gi 0/41(Dwn) Po 8(Dwn)
Downstream Interfaces: Gi 0/40(Dwn)

Related Commands
- show running-config uplink-state-group — displays the current configuration of
  one or more uplink-state groups.
- uplink-state-group — create an uplink-state group and enables the tracking of
  upstream links.

uplink-state-group
Create an uplink-state group and enable the tracking of upstream links on a switch/ router.

Syntax
uplink-state-group group-id

To delete an uplink-state group, enter the no uplink-state-group group-id
command.

Parameters
- group-id
  Enter the ID number of an uplink-state group. The range is
  from 1 to 16.

Defaults
- none

Command Modes
- CONFIGURATION

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

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

488 PMUX Mode of the I/O Aggregator
Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Introduced on the S4820T.

Introduced on the S4810.

Introduced on the S-Series S50.

After you enter the command, to assign upstream and downstream interfaces to the group, enter Uplink-State-Group Configuration mode.

An uplink-state group is considered to be operationally up if at least one upstream interface in the group is in the Link-Up state.

An uplink-state group is considered to be operationally down if no upstream interfaces in the group are in the Link-Up state. No uplink-state tracking is performed when a group is disabled or in an operationally down state.

To disable upstream-link tracking without deleting the uplink-state group, use the no enable command in uplink-state-group configuration mode.

Dell(conf)#uplink-state-group 16
Dell(conf)#

02:23:17: %RPM0-P:CP %IFMGR-5-ASTATE_UP: Changed uplink state group Admin state to up: Group 16

• show running-config uplink-state-group — displays the current configuration of one or more uplink-state groups.

• show uplink-state-group — displays the status information on a specified uplink-state group or all groups.

Assign a port or port-channel to the uplink-state group as an upstream interface.

upstream interface

To delete an uplink-state group, use the no upstream interface command.

Enter one of the following interface types:

- Fast Ethernet: fastethernet {slot/port | slot/port-range}
- 1 Gigabit Ethernet: gigabitethernet {slot/port | slot/port-range}
- 10 Gigabit Ethernet: tengigabitethernet {slot/port | slot/port-range}
- 40 Gigabit Ethernet: fortyGigE {slot/port | slot/port-range}
- Port channel: `port-channel {1-512 | port-channel-range}`

Where `port-range` and `port-channel-range` specify a range of ports separated by a dash (-) and/or individual ports/port channels in any order; for example: `gigabitethernet 1/1-2,5,9,11-12 port-channel 1-3,5`. A comma is required to separate each port and port-range entry.

**Defaults**

`none`

**Command Modes**

`UPLINK-STATE-GROUP`

**Command History**

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

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

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 8.3.19.0**
  Introduced on the S4820T.

- **Version 8.3.12.0**
  Introduced on the S4810.

- **Version 8.4.2.3**
  Introduced on the S-Series S50.

**Usage Information**

You can assign physical port or port-channel interfaces to an uplink-state group.

You can assign an interface to only one uplink-state group. Configure each interface assigned to an uplink-state group as either an upstream or downstream interface, but not both.

You can assign individual member ports of a port channel to the group. An uplink-state group can contain either the member ports of a port channel or the port channel itself, but not both.

**Example**

Dell(conf-uplink-state-group-16)# upstream gigabitethernet 1/10-15
Dell(conf-uplink-state-group-16)#

**Related Commands**

- `downstream` — assigns a port or port-channel to the uplink-state group as a downstream interface.
- `uplink-state-group` — creates an uplink-state group and enables the tracking of upstream links.
Virtual Link Trunking (VLT)

VLT allows physical links between two chassis to appear as a single virtual link to the network core. VLT eliminates the requirement for Spanning Tree protocols by allowing link aggregation group (LAG) terminations on two separate distribution or core switches, and by supporting a loop-free topology. VLT provides Layer 2 multipathing, creating redundancy through increased bandwidth and enabling multiple parallel paths between nodes and load-balancing traffic where alternative paths exist.

NOTE: When you launch the VLT link, the VLT peer-ship is not established if any of the following is TRUE:

- The VLT System-MAC configured on both the VLT peers do not match.
- The VLT Unit-Id configured on both the VLT peers are identical.
- The VLT System-MAC or Unit-Id is configured only on one of the VLT peers.
- The VLT domain ID is not the same on both peers.

If the VLT peer-ship is already established, changing the System-MAC or Unit-Id does not cause VLT peer-ship to go down.

Also, if the VLT peer-ship is already established and the VLT Unit-Id or System-MAC are configured on both peers, then changing the CLI configurations on the VLT Unit-Id or System-MAC is rejected if any of the following become TRUE:

- After making the CLI configuration change, the VLT Unit-Id becomes identical on both peers.
- After making the CLI configuration change, the VLT System-MAC do not match on both peers.

When the VLT peer-ship is already established, you can remove the VLT Unit-Id or System-MAC configuration from either or both peers. However, removing configuration settings can cause the VLT ports to go down if you configure the Unit-Id or System-MAC on only one of the VLT peers.

back-up destination

Configure the IPv4 or IPv6 address of the management interface on the remote VLT peer to be used as the endpoint of the VLT backup link for sending out-of-band hello messages.

Syntax  
```
back-up destination {[ipv4-address] | [ipv6 ipv6-address]} [interval seconds]
```

Parameters

- **ipv4-address**: Enter the IPv4 address of the backup destination.
- **ipv6**: Enter the keyword ipv6 then an IPv6 address in the X::X::X::X format.
- **interval seconds**: Enter the keyword interval to specify the time interval to send hello messages. The range is from 1 to 5 seconds. The default is 1 second.

Defaults  

- **1 second**

Command Modes  

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.2(0.2) Added support for IPv6.

Version 9.0.2.0 Introduced on the S6000.

Version 9.0.0.0 Introduced on the Z9000.

Version 8.3.19.0 Introduced on the S4820T.

Version 8.3.8.0 Introduced on the S4810.

clear vlt statistics
Clear the statistics on VLT operations.

Syntax

```
clear vlt statistics [arp | domain | igmp-snoop | mac | multicast | ndp]
```

Parameters

domain Clear the VLT statistics for the domain.

multicast Clear the VLT statistics for multicast.

mac Clear the VLT statistics for the MAC address.

arp Clear the VLT statistics for ARP.

igmp-snoop Clear the VLT statistics for IGMP snooping.

ndp Clear the VLT statistics for NDP.

Command Modes

EXEC

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.2(0.2) Added multicast and ndp parameters.

Version 9.0.2.0 Introduced on the S6000.

Version 9.0.0.0 Introduced on the Z9000.
lacp ungroup member-independent

Prevent possible loop during the bootup of a VLT peer switch or a device that accesses the VLT domain.

Syntax

lacp ungroup member-independent {vlt | port-channel}

Parameters

- **port-channel**: Force all LACP port-channel members to become switchports.
- **vlt**: Force all VLT LACP members to become switchports.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

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

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

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0**: Introduced on the S6000.
- **Version 9.0.0.0**: Introduced on the Z9000.
- **Version 8.3.19.0**: Introduced on the S4820T.
- **Version 8.3.12.0**: Added port-channel parameter on the S4810.
- **Version 8.3.8.0**: Added port-channel parameter on the S4810.

Usage Information

LACP on the VLT ports (on a VLT switch or access device), which are members of the virtual link trunk, is not brought up until the VLT domain is recognized on the access device.
On the S4810, during boot-up in a stacking configuration, the system must be able to reach the DHCP server with the boot image and configuration image. During boot-up, only untagged DHCP requests are sent to the DHCP server to receive an offer on static LAGs between switches. The DHCP server must be configured to start in BMP mode. If switches are connected using LACP port-channels like the VLT peer and Top of Rack (ToR), use the **port-channel** parameter on the ToR-side configuration to allow member ports of an ungrouped LACP port-channel to inherit vlan membership of that port channel to ensure untagged packets that are sent by a VLT peer device reach the DHCP server located on the ToR.

To ungroup the VLT and port-channel configurations, use the **no lACP ungroup member independent** command on a VLT port channel, depending on whether the port channel is VLT or non-VLT.

**Example**

Dell(conf)#lacp ungroup member-independent?
port-channel LACP port-channel members become switchports
vlt All VLT LACP members become switchports

**peer-link port-channel**

Configure the specified port channel as the chassis interconnect trunk between VLT peers in the domain.

**Syntax**

```
peer-link port-channel port-channel-number [peer-down-vlan vlan id]
```

**Parameters**

- **port-channel-number**: Enter the port-channel number that acts as the interconnect trunk.
- **peer-down-vlan vlan id**: Enter the keyword peer-down-vlan then a VLAN ID to configure the VLAN that the VLT peer link uses when the VLT peer is down.

**Defaults**

Not configured.

**Command Modes**

VLT DOMAIN

**Command History**

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

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

- **Version 9.2(0.0)**: Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
- **Version 9.0.2.0**: Introduced on the S6000.
- **Version 9.0.0.0**: Introduced on the Z9000.
- **Version 8.3.19.0**: Introduced on the S4820T.
Version 8.3.12.0 Added support for the `peer-down-vlan` parameter.

Version 8.3.8.0 Introduced on the S4810.

Usage Information
To configure the VLAN from where the VLT peer forwards packets received over the VLTi from an adjacent VLT peer that is down, use the `peer-down-vlan` parameter. When a VLT peer with bare metal provisioning (BMP) is booting up, it sends untagged DHCP discover packets to its peer over the VLTi. To ensure that the DHCP discover packets are forwarded to the VLAN that has the DHCP server, use this configuration.

show vlt mismatch
Display mismatches in VLT parameters.

Syntax
```
show vlt mismatch
```

Command Modes EXEC

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.2(0.2) Introduced on the Z9000, S4810, and S4820T.

Example
```
Dell#show vlt mismatch
Domain ----------------
Parameters                      Local     Peer
------------  -----------  -----------
Unit-ID          0            15
Vlan-config
Vlan-ID    Local Mode  Peer Mode
--------   ----------------
100        --             L3
Vlan IPV4 Multicast Status
---------------------------------
Vlan-ID    Local Status  Peer Status
--------  ---------------  ---------------
4094      Active         Inactive
Dell#
```
system-mac
Reconfigure the default MAC address for the domain.

```
Syntax
system-mac mac-address
```

**Parameters**

- `mac-address` Enter the system MAC address for the VLT domain.

**Defaults**
Not configured.

**Command Modes**
VLT DOMAIN

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

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

- **Version 9.2(0.0)**
  Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 9.0.0.0**
  Introduced on the Z9000.

- **Version 8.3.19.0**
  Introduced on the S4820T.

- **Version 8.3.8.0**
  Introduced on the S4810.

**Usage Information**
When you create a VLT domain on a switch, Dell Networking OS automatically creates a VLT-system MAC address used for internal system operations.

To reconfigure the default MAC address for the domain by entering a new MAC address in the format nn:nn:nn:nn:nn:nn, use the `system-mac` command.

You must also reconfigure the same MAC address on the VLT peer switch.

unit-id
Explicitly configure the default unit ID of a VLT peer switch.

```
Syntax
unit-id [0 | 1]
```

**Parameters**

- `0 | 1` Configure the default unit ID of a VLT peer switch. Enter 0 for the first peer or enter 1 for the second peer.

**Defaults**
Automatically assigned based on the MAC address of each VLT peer. The peer with the lower MAC address is assigned unit 0; the peer with the higher MAC address is assigned unit 1.

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0 Introduced on the S6000.

Version 9.0.0.0 Introduced on the Z9000.

Version 8.3.19.0 Introduced on the S4820T.

Version 8.3.8.0 Introduced on the S4810.

Usage Information

When you create a VLT domain on a switch, Dell Networking OS automatically assigns a unique unit ID (0 or 1) to each peer switch. The unit IDs are used for internal system operations. Use the unit-id command to explicitly configure the unit ID of a VLT peer. Configure a different unit ID (0 or 1) on each peer switch.

To minimize the time required for the VLT system to determine the unit ID assigned to each peer switch when one peer reboots, use this command.

vlt domain

Enable VLT on a switch, configure a VLT domain, and enter VLT-domain configuration mode.

Syntax

vlt domain domain-id

Parameters
domain-id Enter the Domain ID number. Configure the same domain ID on the peer switch. The range of domain IDs is from 1 to 1000.

Command Modes

CONFIGURATION

Command History

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

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

Version 9.2(0.0) Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0 Introduced on the S6000.

Version 9.0.0.0 Introduced on the Z9000.

Version 8.3.19.0 Introduced on the S4820T.
The VLT domain ID must be the same between the two VLT devices. If the domain ID is not the same, a syslog message is generated and VLT does not launch.

**Usage Information**

Related Commands

**show vlt brief** — uses the `show vlt brief` command to display the delay-restore value.

**vlt-peer-lag port-channel**

Associate the port channel to the corresponding port channel in the VLT peer for the VLT connection to an attached device.

**Syntax**

```
vlt-peer-lag port-channel id-number
```

**Parameters**

- `id-number` Enter the respective vlt port-channel number of the peer device.

**Defaults**

Not configured.

**Command Modes**

INTERFACE PORT-CHANNEL

**Command History**

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

- **Version 9.2(0.0)**
  - Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

- **Version 9.0.2.0**
  - Introduced on the S6000.

- **Version 9.0.0.0**
  - Introduced on the Z9000.

- **Version 8.3.19.0**
  - Introduced on the S4820T.

- **Version 8.3.8.0**
  - Introduced on the S4810.
Internet Control Message Protocol (ICMP) Message Types

This chapter lists and describes the possible ICMP message type resulting from a ping. The first three columns list the possible symbol or type/code. For example, you would receive a ! or 03 as an echo reply from your ping.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Type</th>
<th>Code</th>
<th>Description</th>
<th>Query</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td></td>
<td></td>
<td>Timeout (no reply)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>!</td>
<td>0</td>
<td>3</td>
<td>echo reply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>3</td>
<td></td>
<td>destination unreachable:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td>network unreachable</td>
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<td></td>
<td>1</td>
<td></td>
<td>host unreachable</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2</td>
<td></td>
<td>protocol unreachable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>port unreachable</td>
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<td></td>
<td>4</td>
<td></td>
<td>fragmentation needed but don’t fragment bit set</td>
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<tr>
<td></td>
<td>5</td>
<td></td>
<td>source route failed</td>
<td></td>
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<td></td>
<td>6</td>
<td></td>
<td>destination network unknown</td>
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<td>7</td>
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<td>destination host unknown</td>
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<td></td>
<td>8</td>
<td></td>
<td>source host isolated (obsolete)</td>
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<td></td>
<td>9</td>
<td></td>
<td>destination network administratively prohibited</td>
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<td>10</td>
<td></td>
<td>destination host administratively prohibited</td>
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<td>11</td>
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<td>network unreachable for TOS</td>
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<tr>
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<td>12</td>
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<td>host unreachable for TOS</td>
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<td>13</td>
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<td>communication administratively prohibited by filtering</td>
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<td>14</td>
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<td>host precedence violation</td>
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<td>C</td>
<td>4</td>
<td>0</td>
<td>source quench</td>
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<td></td>
<td>5</td>
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<td>redirect</td>
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<td>Symbol</td>
<td>Type</td>
<td>Code</td>
<td>Description</td>
<td>Query</td>
<td>Error</td>
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<td>redirect for network</td>
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<td>redirect for type-of-service and network</td>
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<td>3</td>
<td>redirect for type-of-service and host</td>
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<td></td>
<td></td>
<td>8</td>
<td>echo request</td>
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<td>router advertisement</td>
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<td>10</td>
<td>router solicitation</td>
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<td>11</td>
<td>time exceeded:</td>
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<td>11</td>
<td>time-to-live equals 0 during transit</td>
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<td>1</td>
<td>time-to-live equals 0 during reassembly</td>
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<td>IP header bad (catchall error)</td>
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<td>required option missing</td>
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<td>13</td>
<td>timestamp request</td>
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<td>timestamp reply</td>
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<td>15</td>
<td>information request (obsolete)</td>
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<td>16</td>
<td>information reply (obsolete)</td>
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<td>17</td>
<td>address mask request</td>
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<td>18</td>
<td>address mask reply</td>
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