Notes, cautions, and warnings

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

**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

Topics:

- Objectives
- Audience
- Conventions

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.
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 allow you to choose any or all of the options.

Information Icons

This book uses the following information symbols:

- **NOTE**: The Note icon signals important operational information.

- **CAUTION**: The Caution icon signals information about situations that could result in equipment damage or loss of data.

- **WARNING**: The Warning icon signals information about hardware handling that could result in injury.
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.

Topics:
- Operational Modes
- Default Settings
- Other Auto-Configured Settings
- Where to Go From Here

Operational Modes

The FN I/O Module 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. (Manageable through CMC also)
- 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 six 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, see 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`)
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.


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, and disabling storm control on interfaces connected to an iSCSI equallogic (EQL) 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.

**Uplink Failure Detection**

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:

```bash
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.
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.
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.

Topics:
- Accessing the Command Line
- Multiple Configuration Users
- Navigating the CLI
- Obtaining Help
- Using the Keyword no Command
- Filtering show Commands
- Command Modes

## 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

```bash
 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:

```bash
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)
User "Irene" on line vty3 (123.12.1.321)

Dell#conf

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 1. CLI Command Modes and Prompts

<table>
<thead>
<tr>
<th>Prompt</th>
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</tr>
</thead>
<tbody>
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<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-0/1)#</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>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

```plaintext
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

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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 TenGig|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:
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 VLAN 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-1)#</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 Dell(config-lldp).

You can return to CONFIGURATION mode by using the exit command.
This chapter contains commands needed to manage the configuration files and includes other file management commands.

### 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

**Supported Modes**

All Modes

**Command History**

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

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>
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

Supported Modes  All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
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</tr>
</tbody>
</table>

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

Supported Modes  All Modes

Command History

<table>
<thead>
<tr>
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</table>
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.

**NOTE:** Dell Networking OS imposes a length limit on the password you create for performing the secure copy operation. Your password can be no longer than 32 characters.

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 to the startup configuration file, Dell Networking OS creates a backup file on the internal flash of the startup configuration.

When you load the startup configuration or a configuration file from a network server such as TFTP to the running configuration, the configuration is added to the running configuration. This does not replace the existing running configuration. Commands in the configuration file has precedence over commands in the running 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:

**NOTE:** Dell Networking OS imposes a length limit on the password you create for accessing the FTP server. Your password can be no longer than 32 characters.

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 (copy scp):**

```
Dell#copy scp:
Address or name of remote host []: 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: 
Password to login remote host? dilling
```

**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 cd — Changes the working directory.

copy running-config startup-config

Copy running configuration to the startup configuration.

Syntax copy running-config startup-config {duplicate}

Command Modes EXEC Privilege

Supported Modes All Modes

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

Supported Modes All Modes

Command History

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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.
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

Supported Modes

All Modes

Command History

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

Example

```
Dell#dir
Directory of flash:

1 drwx 4096 Jan 01 1980 00:00:00 +00:00 .
2 drwx 2048 Mar 06 2010 00:36:21 +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 03:25:40 +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

```
flash memory
```

Command Modes

EXEC Privilege

Supported Modes

All Modes
### Command History

<table>
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</table>

### Usage Information

You must include the colon (:) when entering this command.

⚠️ **CAUTION:** This command deletes all files, including the startup configuration file. So, after executing this command, consider saving the running config as the startup config (use the `write memory` command or `copy run start` command).

### Related Commands

- `copy` — copies the current configuration to either the startup-configuration file or the terminal.
- `show file` — displays the contents of a text file in the local filesystem.
- `show file-systems` — displays information about the file systems on the system.

---

### HTTP Copy via CLI

Copy one file to another location. Dell Networking OS supports IPv4 and IPv6 addressing for FTP, TFTP, and SCP (in the `hostip` field).

**Syntax**

```plaintext
```

You can copy from the server to the switch and vice-versa.

**Parameters**

- `copy http:`
  - Address or name of remote host []: 10.16.206.77
  - Port number of the server [80]:
  - Source file name []: sample_file
  - User name to login remote host: x
  - Password to login remote host:
  - Destination file name [sample_file]:

**Defaults**

None.

**Command Modes**

- EXEC

**Supported Modes**

- All Modes

**Command History**

<table>
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</tr>
<tr>
<td>9.3(0.1)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
**Example**

```
copy http://admin:admin123@10.16.206.77/sample_file flash://sample_file
```

**Related Commands**

- `copy ftp:flash`
  Copy files from FTP server to switch

---

### logging coredump stack-unit

Enable the coredump.

**Syntax**

```
logging coredump stack-unit all
```

**Command Modes**

`CONFIGURATION`

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
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**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
```

**Command Modes**

`EXEC Privilege`

**Supported Modes**

All Modes

**Command History**

<table>
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</table>

**Example**

```
Dell#pwd
flash:
Dell#
```

**Related Commands**

- `cd` – changes the directory.
# 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

**Supported Modes**

- All Modes

**Command History**

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---

# restore factory-defaults

Restore factory defaults.

**Syntax**

```
restore factory-defaults stack-unit id {clear-all | nvram}
```

**Parameters**

- `factory-defaults`
  - Return the system to its factory default mode.
- `id`
  - Enter the stack member unit identifier to restore the mentioned stack-unit. The range is from 0 to 6. 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

**Supported Modes**

- All Modes

**Command History**

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</table>

**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**

Dell#restore factory-defaults stack-unit 0 clear-all

```
*Warning - Restoring factory defaults will delete the existing*
*startup-config and resets all persistent settings (stacking, *
*fanout, etc.) and boot environment variables (boot config, console*
*baud rate, management interface settings, 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    Bootvar
-----------------------------------
0    Success   Success   Success
```

Dell#

**Example (NvRAM, all)**

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 1 nvram

```
*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

Supported Modes
All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
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

Supported Modes
All Modes
show file-systems

Displays information about the file systems on the system.

Syntax

show file-systems

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
8.3.17.0 Supported on the M I/O Aggregator.

Example

Dell#show file-systems
Size(b) Free(b) Feature Type Flags Prefixes
2143281152 836874240 FAT32 USERFLASH rw flash:
- - - network rw ftp:
- - - network rw tftp:
- - - network rw scp:
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

**Supported Modes**
All Modes

**Command History**

- **Version 9.9(0.0)**
  Introduced on the FN IOM.
- **Version 9.4(0.0)**
  Supported on the FN I/O Aggregator.
- **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
IOM-Series: XL      8-3-17-38  31603078  Jul 19 2012 06:02:28
----------------------------------------------------------------------------------
TARGET IMAGE INFORMATION :
---------------------------------------
Type      Version  Target   checksum
runtime   8-3-17-38  Control Processor passed
```
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.

Command Modes

- EXEC Privilege

Supported Modes

- All Modes

Command History

- **Version**
  - 9.9(0.0) Introduced on the FN IOM.
  - 9.4(0.0) Supported on the FN I/O aggregator.
**show version**

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

**Syntax**

```plaintext
show version
```

**Command Modes**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
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</tbody>
</table>

**Example**

```plaintext
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
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), 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.
```

**Usage Information**

The `status` option allows you to display the size and checksum of the running configuration and the startup configuration.
256M bytes of boot flash memory.
1 34-port GE/TE (XL)
56 Ten GigabitEthernet/IEEE 802.3 interface(s)

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

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.

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.

Enter this keyword to upgrade the bootflash partition A.

Enter this keyword to upgrade the bootflash partition B.

**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#
```

**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.
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.

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.

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

```
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
tftp: Copy from remote file system, IPv4 or IPv6, (tftp://hostip/filepath)
usbflash: Copy from usbflash file system (usbflash://filepath)
Dell#
```
This chapter describes control and monitoring for the 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

Supported Modes

- All Modes

Command History

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</tr>
</tbody>
</table>

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

Supported Modes

- All Modes

Command History

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</table>
clear command history

Clear the command history log.

Syntax

```
clear command history
```

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

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Related Commands

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<tbody>
<tr>
<td>show command-history</td>
<td>— displays a buffered log of all the commands all users enter along with a time stamp.</td>
</tr>
</tbody>
</table>

configure

Enter CONFIGURATION mode from EXEC Privilege mode.

Syntax

```
configure [terminal]
```

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>terminal</td>
<td>(OPTIONAL) Enter the keyword terminal to specify that you are configuring from the terminal.</td>
</tr>
</tbody>
</table>

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

```
Dell#configure
Dell(conf)#
```
**debug cpu-traffic-stats**

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

**Syntax**

```
debug cpu-traffic-stats
```

**Defaults**

Disabled

**Command Modes**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
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</tr>
</tbody>
</table>

**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 statics.

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**

```
depbug 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

**Supported Modes**

All Modes

**Command History**

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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</tbody>
</table>

**Usage Information**

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.

**Related Commands**

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

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
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</table>

**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

**Supported Modes**

All Modes

**Command History**

<table>
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<tr>
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</tr>
</tbody>
</table>

**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

**Supported Modes**

All Modes

**Command History**

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</table>

**Related Commands**

- `end` — returns to EXEC Privilege mode.
feature unique-name

Set a unique host name for the system.

Syntax
feature unique-name

Defaults
None

Command Modes
CONFIGURATION

Supported Modes
• Standalone
• VLT
• Stacking
• PMUX
• STOMP Full Switch

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Introduced on the M I/O Aggregator, the FN IOM and MXL.</td>
</tr>
</tbody>
</table>

Usage Information

If you use the feature unique-name command, the system generates a host name using the platform type and system serial number. It overwrites any existing host name configured on the system using the hostname command. The feature unique-name command is also added to the running configuration.

If you disable the feature using the no feature unique-name command, the system reverts to the default host name of Dell.

If you use the hostname or the no hostname command after enabling the feature unique-name command, the system displays an error message stating that the feature unique-name is already enabled and provides an option to disable it.

Related Commands
hostname

ftp-server enable

Enable FTP server functions on the system.

Syntax
ftp-server enable

Defaults
Disabled

Command Modes
CONFIGURATION

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
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</table>
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 topdir` — sets the directory to be used for incoming FTP connections.
- `ftp-server username` — sets a username and password for incoming FTP connections.

### ftp-server topdir

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

**Syntax**

```
ftp-server topdir directory
```

**Parameters**

- `directory` Enter the directory path.

**Defaults**

The internal flash is the default directory.

**Command Modes**

- **CONFIGURATION**

**Supported Modes**

- All Modes

**Command History**

<table>
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**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 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

**Supported Modes**
All Modes

**Command History**

<table>
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</table>

**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

**Supported Modes**
All Modes

**Command History**

<table>
<thead>
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<th>Version</th>
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</table>

**Usage Information**

The host name is used in the prompt.

**Related Commands**

feature unique-name
http-server

Disable / Enable the Blade I/O Manager Software.

Syntax

http-server blademgr

Parameters

blademgr

Enter the keyword blademgr and specify the port for HTTP.

Defaults

ENABLED

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell Networking OS Command Line Reference Guide.

Version | Description
--- | ---
9.11(0.0) | Introduced on the Stomp IOA and MXL-IOA

Usage Information

By default, the Blade I/O Manager is enabled and there is no entry in the running configuration. Using the command no http-server blademgr, disables the Blade I/O Manager and also a “no http-server” entry is made in the running configuration. To re-enable the Blade I/O Manager, use the command http-server blademgr which enables the feature and also removes the entry from the running configuration. On reload, if the system detects a “no http-server” entry in the start-config, the feature will be disabled.

NOTE: Please ensure to save and reload the configuration for the changes to take effect.

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

Supported Modes

All Modes

Command History

Version | Description
--- | ---
9.9(0.0) | Introduced on the FN IOM.
9.4(0.0) | Supported on the FN I/O Aggregator.
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**

```plaintext
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**

**Supported Modes**

- All Modes

**Command History**

<table>
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**Related Commands**

- `telnet` — 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**

```plaintext
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**

**Supported Modes**

- All Modes
ping

Test connectivity between the system and another device by sending echo requests and waiting for replies.

Syntax

```
ping [host | ip-address] [count {number | continuous}] [datagram-size] [timeout] [source (ip src-ipv4-address) | interface] [tos] [df-bit (y\|n)] [validate-reply(y\|n)] [pattern pattern] [sweep-min-size] [sweep-max-size] [sweep-interval] [interface (ip src-ipv4-address) | interface]
```

Parameters

- **host** (OPTIONAL) Enter the host name of the devices to which you are testing connectivity.
- **ip-address** (OPTIONAL) Enter the IPv4 address of the device to which you are testing connectivity. The address must be in the dotted decimal format.
- **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.

sweep-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

Supported Modes
All Modes

Command History
Version Description
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

Supported Modes
All Modes

Command History
Version Description
9.9(0.0) Introduced on the FN IOM.
### service timestamps

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

**Syntax**

```plaintext
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

**Supported Modes**

All Modes

**Command History**

<table>
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</table>

**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.

---

**Related Commands**

- **reset stack-unit** — resets any designated stack member except the management unit.
**show alarms**

Display the active major and minor alarms on the system.

**Syntax**

```
show alarms
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>8.3.17.0</td>
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</table>

**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

**Supported Modes**

All Modes

**Command History**

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**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
[4/20 10:27:23]: CMD-(CLI):[logging 10.10.10.4]by default from console
[4/20 10:27:24]: CMD-(CLI):[logging 10.1.2.4]by default from console
[4/20 10:27:24]: CMD-(CLI):[logging 172.31.1.4]by default from console
[4/20 10:27:24]: CMD-(CLI):[management route 172.16.1.0 /24 10.11.209.4]by default from console
[4/20 10:27:24]: CMD-(CLI):[service timestamps log datetime]by default from console
[4/20 10:27:24]: CMD-(CLI):[line console 0]by default from console
[4/20 10:27:24]: CMD-(CLI):[exec-timeout 0]by default from console
[4/20 10:27:29]: CMD-(CLI):[show version]by default from console
[4/20 10:27:56]: CMD-(CLI):[show interfaces tengigabitethernet 0/3]by default from console
[4/20 10:55:8]: CMD-(CLI):[show lldp neighbors]by default from console
[4/20 15:17:6]: CMD-(CLI):[show cam-acl]by default from console
[4/20 16:34:59]: CMD-(CLI):[show running-config interface tengigabitethernet 0/55]by default from console
[5/4 9:11:52]: CMD-(TEL0):[show version]by admin from vty0 (10.11.68.14)
[5/4 9:12:9]: CMD-(TEL0):[show hosts]by admin from vty0 (10.11.68.14)
[5/4 9:14:38]: CMD-(TEL0):[show arp]by admin from vty0 (10.11.68.14)
[5/4 9:19:29]: CMD-(TEL0):[enable]by admin from vty0 (10.11.68.14)
[5/4 9:19:35]: CMD-(TEL0):[configure]by admin from vty0 (10.11.68.14)
  - Repeated 1 time.
[5/4 9:19:50]: CMD-(TEL0):[interface tengigabitethernet 0/16]by admin from vty0 (10.11.68.14)
[5/4 9:20:11]: CMD-(TEL0):[exit]by admin from vty0 (10.11.68.14)
Dell#

Related Commands
clear command history — clears the command history log.

show configuration lock

Display the configuration lock status.

Syntax
show configuration lock

Defaults
None

Command Modes
EXEC Privilege

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information
The type may be auto, manual, or rollback. When set to auto, Dell Networking OS automatically denies access to CONFIGURATION mode to all other users every time the user on the listed VTY line enters CONFIGURATION mode. When set to manual, the user on the listed VTY line must explicitly set the lock each time before entering CONFIGURATION mode. Rollback indicates that Dell Networking OS is in a rollback process. The line number shown in the output can be used to send the messages to that session or release a lock on a VTY line.
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

Supported Modes

All Modes

Command History

- **Version**
  - 9.9(0.0) Introduced on the FN IOM.
  - 9.4(0.0) Supported on the FN I/O Aggregator.
  - 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

Supported Modes

All Modes

Command History

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

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.
- **stack-unit unit-id**: (OPTIONAL) Enter the keywords stack-unit then 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.
- **testcase**: Enter the keyword testcase to view current diagnostics testcases available in the system.

Defaults

Summary

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>
show environment

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

 **Syntax**

    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

 **Supported Modes**

 All Modes

 **Command History**

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

**Example (all)**

```
Dell#show environment all
 -- Unit Environment Status --
 Unit Status Temp Voltage TempStatus
--------------------------------------
* 1   online   66C   ok       2
* Management Unit
-- Thermal Sensor Readings (deg C) --
 Sensor0 Sensor1 Sensor2 Sensor3 Sensor4 Sensor5 Sensor6 Sensor7 Sensor8 Sensor9
-----------------------------------------------------------------
 1     51      51      63     61      61       61      67     61 64      66
Dell#
```

**Example (stack-unit)**

```
Dell#show environment stack-unit
 -- Unit Environment Status --
 Unit Status Temp Voltage TempStatus
--------------------------------------
* 1   online   66C   ok       2
* Management Unit
Dell#
```

**Example (thermal-sensor)**

```
Dell#show environment thermal-sensor
 -- Thermal Sensor Readings (deg C) --
```
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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3.170</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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)

Unit Type                  Serial Number  Part Number  Rev  Piece Part ID            Rev  Svc Tag  Exprs Svc Code
---------------------------------------------------------------------------------------------------------------
* 0  PowerEdge-FN-410S-IOA TW000000000020 07NVPVX01    X01  TW-07NVPV-00000-000-0020 X01  N/A      N/A
  - Management Unit

Software Protocol Configured
--------------------------------------------------------------
DCBX
FIP Snooping
iSCSI
LLDP
SNMP
Dell#
```

**Example (media)**

```
Dell#show inventory media 7
<0-5>                   Slot number
|                       Pipe through a command
Dell#show inventory media
Slot Port   Type        Media               Serial Number        F10Qualified
------------------------------------------------------------------------------
 0     9     SFP+        10GBASE-CU1M        APP11380028XGQ           Yes
 0    10     SFP+        10GBASE-CU2M        APP12090032BRD1         Yes
 0    11     SFP+        10GBASE-CU2M        APP12090032HPB           Yes
 0    12     SFP+        10GBASE-CU0.5M       APP12490013FP2          Yes
Dell#
```

**Example (optional-module)**

```
Dell#show inventory optional-module
Unit  Slot   Expected    Inserted    Next Boot    Status/Power(On/Off)
------------------------------------------------------------------------
 1  0       SFP+        SFP+          AUTO     Good/On
 1  1       QSFP+       QSFP+         AUTO     Good/On
```
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

Supported Modes

All Modes

Command History

- Version 9.9(0.0) Introduced on the FN IOM.
- Version 9.4(0.0) Supported on the FN I/O Aggregator.
- 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).

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

### Supported Modes

All Modes

### Command History

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

### Example (summary)

Dell# show processes cpu summary

<table>
<thead>
<tr>
<th>CPU utilization</th>
<th>5Sec</th>
<th>1Min</th>
<th>5Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT1</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Example (management-unit)

Dell# show processes cpu management-unit 5

CPU utilization for five seconds: 4%/0%; one minute: 4%; five minutes: 4%

<table>
<thead>
<tr>
<th>PID</th>
<th>Runtime(ms)</th>
<th>Invoked</th>
<th>uSecs</th>
<th>5Sec</th>
<th>1Min</th>
<th>5Min</th>
<th>TTY</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00000000</td>
<td>2120</td>
<td>212</td>
<td>10000</td>
<td>3.77%</td>
<td>3.77%</td>
<td>3.77%</td>
<td>0</td>
<td>system</td>
</tr>
<tr>
<td>0x00000112</td>
<td>2472940</td>
<td>247294</td>
<td>10000</td>
<td>0.79%</td>
<td>0.61%</td>
<td>0.65%</td>
<td>0</td>
<td>sysdlp</td>
</tr>
<tr>
<td>0x000000e4</td>
<td>495560</td>
<td>49556</td>
<td>10000</td>
<td>0.20%</td>
<td>0.25%</td>
<td>0.24%</td>
<td>0</td>
<td>sysd</td>
</tr>
<tr>
<td>0x0000013d</td>
<td>34310</td>
<td>3431</td>
<td>10000</td>
<td>0.00%</td>
<td>0.02%</td>
<td>0.00%</td>
<td>0</td>
<td>lacp</td>
</tr>
<tr>
<td>0x00000121</td>
<td>4190</td>
<td>419</td>
<td>10000</td>
<td>0.00%</td>
<td>0.02%</td>
<td>0.00%</td>
<td>0</td>
<td>iscsiOpt</td>
</tr>
</tbody>
</table>

### Example (stack-unit)

Dell# show process cpu stack-unit 1

CPU utilization for five seconds: 4%/0%; one minute: 3%; five minutes: 2%

<table>
<thead>
<tr>
<th>PID</th>
<th>Runtime(ms)</th>
<th>Invoked</th>
<th>uSecs</th>
<th>5Sec</th>
<th>1Min</th>
<th>5Min</th>
<th>TTY</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x763a3000</td>
<td>17981680</td>
<td>1798168</td>
<td>10000</td>
<td>3.00%</td>
<td>2.67%</td>
<td>2.67%</td>
<td>0</td>
<td>KP</td>
</tr>
<tr>
<td>0x762ba000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>debugagt</td>
</tr>
<tr>
<td>0x762d9000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>F10StkMgr</td>
</tr>
<tr>
<td>0x762f8000</td>
<td>214590</td>
<td>21459</td>
<td>10000</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>lcMgr</td>
</tr>
<tr>
<td>0x76319000</td>
<td>7890</td>
<td>789</td>
<td>10000</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>dla</td>
</tr>
<tr>
<td>0x76344000</td>
<td>155770</td>
<td>15577</td>
<td>10000</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>sysAdmTsk</td>
</tr>
<tr>
<td>0x76363000</td>
<td>583230</td>
<td>58323</td>
<td>10000</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.02%</td>
<td>0</td>
<td>timerMgr</td>
</tr>
<tr>
<td>0x76381000</td>
<td>658850</td>
<td>65885</td>
<td>10000</td>
<td>0.00%</td>
<td>0.17%</td>
<td>0.08%</td>
<td>0</td>
<td>PM</td>
</tr>
<tr>
<td>0x76299000</td>
<td>80110</td>
<td>8011</td>
<td>10000</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
<td>diagagt</td>
</tr>
</tbody>
</table>

---

Control and Monitoring
### Example (Memory)

**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>fcocntl</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>7389184</td>
</tr>
<tr>
<td>ndpm</td>
<td>618496</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>7127678</td>
</tr>
<tr>
<td>vrrp</td>
<td>335872</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>7129576</td>
</tr>
<tr>
<td>frrp</td>
<td>180224</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>9445376</td>
</tr>
<tr>
<td>xstp</td>
<td>2740224</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>7585792</td>
</tr>
<tr>
<td>pim</td>
<td>1007616</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>14774272</td>
</tr>
<tr>
<td>igmp</td>
<td>417792</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>12636160</td>
</tr>
<tr>
<td>mrtm</td>
<td>5496832</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>42471424</td>
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<td>l2mgr</td>
<td>1040384</td>
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<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>24166400</td>
</tr>
<tr>
<td>l2pm</td>
<td>176128</td>
<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>6955008</td>
</tr>
<tr>
<td>arpm</td>
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<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
<td>0</td>
<td>0</td>
<td>7127040</td>
</tr>
</tbody>
</table>

--More--

**Dell#**

### Example (Stack-unit)

**Dell#show process 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>
<th>CurrentHolding</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0</td>
<td>0</td>
<td>192512</td>
</tr>
<tr>
<td>fcocntl</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>
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<td>0</td>
<td>7380992</td>
</tr>
<tr>
<td>dhclient</td>
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<td>0</td>
<td>0</td>
<td>1626112</td>
</tr>
<tr>
<td>f10appioserv</td>
<td>225280</td>
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<td>0</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>9445376</td>
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<td>0</td>
<td>192512</td>
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<td>225280</td>
<td>0</td>
<td>0</td>
<td>7127040</td>
</tr>
</tbody>
</table>

--More--

**Dell#**
show processes ipc flow-control

Displays the single window protocol queue (SWPG) statistics.

Syntax

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

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cp</td>
<td>(OPTIONAL) Enter the keyword cp to view the control processor’s SWPG statistics.</td>
</tr>
</tbody>
</table>

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
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<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

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

TxProcess RxProcess   Cur    High  Time  Retr  Msg  Ack  Aval  Max
Len  Mark  Out  ies  Sent  Rcvd  Retra  Retra  ACL0  RTM0
0    0      0     0      0    0    10    10
DIFFSERV0 0    0    0     0      0    0    10    10
ACL0   IGMP0          0    0    0     0      0    10    10
ACL0   PIM0           0    0    0     0      0    10    10
LACP0  IFMGR0         0    24   0     0      34    34    25    25
STP0   L2PM0          0    0    0     0      0    25    25
L2PM0  STP0           0    1    0     0      2    2    25    25
FRRP0  L2PM0          0    0    0     0      0    25    25
DHCP0  ACL0           0    0    0     0      0    25    25
DHCP0  IPMGR0         0    0    0     0      0    25    25
DHCP0  IFMGR0         0    0    0     0      0    25    25
SMUX0  IFMGR0         0    38   0     0      47    47    60    60
SMUX0  LACP0          0    1    0     0      3    3    60    60

--More--

Dell#
```

**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.
show processes memory output

Field Description
Total: Total system memory available
MaxUsed: Total maximum memory used ever (history indicated with time stamp)
CurrentUsed: Total memory currently in use
CurrentFree: Total system memory available
SharedUsed: Total used shared memory
SharedFree: Total free shared memory
PID Process ID
Process Process Name
ResSize Actual resident size of the process in memory
Size Process text, stack, and data size
Allocs Total dynamic memory allocated
Frees Total dynamic memory freed
Max Maximum dynamic memory allocated
Current Current dynamic memory in use

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

```
Dell#show processes memory stack-unit 1
Total:2147483648, MaxUsed:499040256, CurrentUsed:499040256, CurrentFree:1648443392
TaskName TotalAllocated TotalFreed MaxHeld CurrentHolding
f10appioserv 225280 0 0 192512
fcoecntrl 270336 0 0 9277440
f10appioserv 225280 0 0 192512
iscsiOpt 114688 0 0 7380992
dhclient 552960 0 0 1626112
```
### Example

Example (management-unit)

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

<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>
</thead>
<tbody>
<tr>
<td>633</td>
<td>fcoecntrl</td>
<td>9277440</td>
<td>270336</td>
<td>1380528</td>
<td>132512</td>
<td>1281144</td>
<td>1248016</td>
</tr>
<tr>
<td>289</td>
<td>iscsiOpt</td>
<td>7380992</td>
<td>114688</td>
<td>23262</td>
<td>16564</td>
<td>23262</td>
<td>6698</td>
</tr>
<tr>
<td>476</td>
<td>dhclient</td>
<td>1626112</td>
<td>552960</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>521</td>
<td>ndpm</td>
<td>7389184</td>
<td>618496</td>
<td>4848</td>
<td>0</td>
<td>4848</td>
<td>4848</td>
</tr>
<tr>
<td>160</td>
<td>vrrp</td>
<td>712768</td>
<td>335872</td>
<td>880</td>
<td>0</td>
<td>880</td>
<td>880</td>
</tr>
<tr>
<td>318</td>
<td>frrp</td>
<td>7192576</td>
<td>180224</td>
<td>71086</td>
<td>66256</td>
<td>21394</td>
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<tr>
<td>218</td>
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<td>2740224</td>
<td>21858</td>
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</tr>
<tr>
<td>277</td>
<td>pim</td>
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<td>1007616</td>
<td>62168</td>
<td>0</td>
<td>62168</td>
<td>62168</td>
</tr>
</tbody>
</table>

### show reset-reason

Display the reason for the last system reboot.

**Syntax**

```
show reset-reason [stack-unit {stack-unit-number | all}]
```

**Parameters**

- **stack-unit unit-number** (OPTIONAL) Enter the keyword stack-unit and the stack unit number to view the reason for the last system reboot for that stack unit.
- **all** (OPTIONAL) Enter the keyword stack-unit and the keyword all to view the reason for the last system reboot of all stack units in the stack.

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

**Version**

| 9.13(0.0) | Introduced on the S3048–ON, S3100 series, S4048–ON, S4048T–ON, S5000, S6000, S6000–ON, S6010–ON, S6100–ON, Z9100–ON, C9010, MXL, M-IOA, and FN-IOM.
Usage Information

You can use the `show reset-reason` without the `stack-unit` option to view the reason for the last system reboot of the local system.

Example — User-initiated reboot with the `reload` command

```
DellEMC# show reset-reason
Cause : Reset by User through CLI command
Reset Time: 11/05/2017-08:36
```

Example — System reboot due to the `upgrade` command

```
DellEMC# show reset-reason
Cause: Reboot by Software upgrade Module.
Reset Time: 8/9/2017 1:39 PM.
```

Example — System reboot for unknown reasons

```
DellEMC# show reset-reason
Cause: N/A
Reload Time: N/A
```

Example — System reboot due to power loss or pressing the power button off and on.

```
The example shows the reason for the last reboot as N/A for warm reset.
DellEMC# show reset-reason
Cause : N/A
Reset Time : N/A.
```

Example — System reboot due to watchdog timeout

```
DellEMC# show reset-reason
Cause: N/A.
Reset Time: N/A
```

Example — System reboot due to thermal shutdown

```
The example shows the reason for the last reboot as N/A for thermal shutdown.
DellEMC# show reset-reason
Cause: N/A
Reload Time: N/A
```

Example — System reboot due to BIOS boot fail

```
The example shows the reason for the last reboot as N/A for BIOS boot fail.
DellEMC# show reset-reason
Cause: NA
Reset Time: N/A.
```

Example — Unknown reason

```
If the reason for the last system reboot is not available, the system displays the reason as N/A.
DellEMC# show reload-reason
Cause: N/A
Time: N/A
```

Example — Reset reason of a single stack unit

```
DellEMC# show reset-reason stack-unit 1
Cause : Reset by User through CLI command
Reset Time: 11/05/2017-08:36
```

Example — Reset reason of all stack units

```
DellEMC# show reset-reason stack-unit all

<table>
<thead>
<tr>
<th>Type</th>
<th>Cause</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>stack-unit 1</td>
<td>Reboot by Software</td>
<td>11/05/2017-09:04</td>
</tr>
<tr>
<td>stack-unit 2</td>
<td>Reboot by Software</td>
<td>11/05/2017-09:04</td>
</tr>
<tr>
<td>stack-unit 3</td>
<td>Cold Reset</td>
<td>N/A</td>
</tr>
<tr>
<td>stack-unit 4</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>stack-unit 5</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>stack-unit 6</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**show revision**

Displays the revision numbers of all stack-units.

**Syntax**

```
show revision
```

**Command Modes**

- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example (Command)**

```
Dell#show revision
-- Stack unit 1 --
IOM SYSTEM CPLD : 1
Dell#
```

**show server-interfaces**

Displays server port information.

**Syntax**

```
show server-interfaces{brief|detail}
```

**Command Modes**

- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

Supported Modes

  All Modes

Command History

  Version  Description
  9.11(0.0)  Included the support for Stomp B1 chipset on FN IOM.
  9.9(0.0)  Introduced on the FN IOM.
  9.4(0.0)  Supported on the FN I/O Aggregator.
  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  9.11(0.0)  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 Aggregators.

**Syntax**

```plaintext
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

**Supported Modes**

All Modes

**Command History**

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</tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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#
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 7689 Feb 21 2012 04:45:40 +01:00 stbkup
flash: 2143281152 bytes total (2131476480 bytes free)
Dell
```

**Example (support)**

```
Dell#show tech-support stack-unit 1
----------------------------------- show version
-------------------------------
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
----------------------------------- show uplink brief
----------------------------------- show uplink brief

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.

Command Modes
• EXEC Privilege

Supported Modes
All Modes

Command History

Example (brief)
Dell#show uplink brief
---------------------------------------------------------------
Interface OK Status Protocol Description
TenGigabitEthernet 0/41 NO up down
TenGigabitEthernet 0/43 NO up down
TenGigabitEthernet 0/44 NO up down
TenGigabitEthernet 0/45 NO up down
TenGigabitEthernet 0/46 NO up down
TenGigabitEthernet 0/47 NO up down
TenGigabitEthernet 0/48 NO up down
TenGigabitEthernet 0/49 NO up down
TenGigabitEthernet 0/50 NO up down
TenGigabitEthernet 0/51 NO up down
TenGigabitEthernet 0/52 NO up down
TenGigabitEthernet 0/53 NO up down
TenGigabitEthernet 0/54 NO up down
TenGigabitEthernet 0/55 NO up down
TenGigabitEthernet 0/56 NO up down
TenGigabitEthernet 1/41 NO up down
TenGigabitEthernet 1/42 NO up down
TenGigabitEthernet 1/43 NO up down
--More--
4 www.force10networks.com (10.11.84.18) 000.000 ms 000.000 ms 000.000 ms
Dell#

Example (detail)
Dell#show uplink detail
---------------- show uplink detail ---------------------
TenGigabitEthernet 0/41 is up, line protocol is down
Hardware is DellForce10Eth, address is 00:1e:c9:f1:00:99
Current address is 00:1e:c9:f1:00:99
Port is not present
Pluggable media not present
Interface index is 44634881
Internet address is not set
Mode of IP Address Assignment : NONE
DHCP Client-ID : tenG170001ec9f10099
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed auto
Flowcontrol rx on tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 2d19h53m
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
--More--

show util-threshold cpu

Displays the set CPU utilization threshold values.

Syntax
show util-threshold cpu

Command Modes
  • EXEC Privilege

Supported Modes
  All Modes

Command History

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</tbody>
</table>
### show util-threshold memory

Displays the set memory utilization threshold values.

**Syntax**
```
show util-threshold memory
```

**Command Modes**
- EXEC Privilege

**Supported Modes**
All Modes

**Command History**

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**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

**Supported Modes**
All Modes

**Command History**

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</table>
telnet

Connect through Telnet to a server. The Telnet client and server in Dell Networking OS support IPv4 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 of the server.
- **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.

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

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</table>

**Usage Information**

Telnet to link-local addresses is not supported.

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

**Supported Modes**

All Modes

**Command History**

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### 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.

**Defaults**
24 lines

**Command Modes**
- EXEC
- EXEC Privilege

**Supported Modes**
All Modes

**Command History**

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</table>

### 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

**Supported Modes**
All Modes

**Command History**

<table>
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</table>
Version Description
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

**Supported Modes**

All Modes

**Command History**

<table>
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</table>

**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

**Supported Modes**

All Modes

**Command History**

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</table>
**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)**

```plaintext
Dell#traceroute wwwFORCE10networks.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 (18.11.127.254) 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

**Supported Modes**

All Modes

**Command History**

<table>
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---

### 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

Supported Modes

All Modes

Command History

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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.
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.

Topics:

- boot change
- boot selection
- boot show net config retries
- boot write net config retries
- boot zero
- default gateway
- enable
- help
- ignore enable password
- ignore startup-config
- interface management ethernet ip address
- no default gateway
- no interface management ethernet ip address
- reload
- show boot blk
- show boot selection
- show bootflash
- show bootvar
- show default gateway
- show interface management ethernet
- show interface management port config
- syntax help

### boot change

Change the operating system boot parameters.

**Syntax**

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

**Command Modes**

uBoot
**boot selection**

Change the ROM bootstrap bootflash partition.

**Syntax**

```plaintext
boot selection [a | b]
```

**Command Modes**

- uBoot

**Command History**

<table>
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</table>

**Example**

```plaintext
BOOT_USER# boot selection [a | b]
```

**boot show net config retries**

Show the number of retries for network boot configuration failure.

**Syntax**

```plaintext
boot show net config retries
```

**Command Modes**

- uBoot

**Supported Modes**

- All Modes

**Command History**

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**Example**

```plaintext
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**

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

**Command Modes**

- uBoot

**Supported Modes**

- All Modes

**Command History**

<table>
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Example

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

title: boot zero

Cleans the primary, secondary, or deep boot parameters.

**Syntax**

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

**Command Modes**

uBoot

**Supported Modes**

All Modes

**Command History**

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title: default gateway

Set the default gateway IP address.

**Syntax**

```
default-gateway <ip-address>
```

**Command Modes**

uBoot

**Supported Modes**

All Modes

**Command History**

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title: enable

Change the access privilege level.

**Syntax**

```
enable [user| admin]
```

**Command Modes**

uBoot

**Supported Modes**

All Modes
help

Displays the help menu.

Syntax

help

Command Modes

uBoot

Supported Modes

All Modes

Command History

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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>
    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

Supported Modes

All Modes
Command History

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ignore startup-config

Ignore the system startup configuration.

Syntax

```
ignore startup-config
```

Command Modes

uBoot

Supported Modes

All Modes

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<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

interface management ethernet ip address

Set the management port IP address and mask.

Syntax

```
interface management ethernet ip address <ip/mask>
```

Command Modes

uBoot

Supported Modes

All Modes

Command History

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

no default gateway

Clear the default gateway IP address.

Syntax

```
no default-gateway
```

Command Modes

uBoot

Supported Modes

All Modes
no interface management ethernet ip address

Clear the management port IP address and mask.

Syntax: no interface management ethernet ip address

Command Modes: uBoot

Supported Modes: All Modes

Command History:

<table>
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</table>

reload

Reload the switch.

Syntax: reload

Command Modes: uBoot

Supported Modes: All Modes

Command History:

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<thead>
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</tbody>
</table>

show boot blc

Show the boot loop counter value.

Syntax: show boot blc

Command Modes: uBoot

Supported Modes: All Modes
### show boot blc

Displays the boot loop counter value.

**Syntax**

```
show boot blc
```

**Command Modes**

uBoot

**Supported Modes**

All Modes

**Command History**

<table>
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<td>Supported on the M I/O Aggregator.</td>
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</table>

**Example**

```
BOOT_USER # show boot blc ?
Total 1 possible command found.
Possible command list:
  show boot blc
  show the boot loop counter value
BOOT_USER # show boot blc
Boot Loop Counter : 10
BOOT_USER #
```

### show boot selection

Displays the ROM bootstrap bootflash partition.

**Syntax**

```
show boot selection
```

**Command Modes**

uBoot

**Supported Modes**

All Modes

**Command History**

<table>
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**Example**

```
BOOT_USER # show boot blc ?
Total 1 possible command found.
Possible command list:
  show boot blc
  show the boot loop counter value
BOOT_USER # show boot blc
Boot Loop Counter : 10
BOOT_USER #
```

### show bootflash

Show the summary of boot flash information.

**Syntax**

```
show bootflash
```

**Command Modes**

uBoot

**Supported Modes**

All Modes
show bootvar

Show the summary of operating system boot parameters.

Syntax

    show bootvar

Command Modes

    uBoot

Supported Modes

    All Modes

Command History

<table>
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Example

    BOOT_USER # show bootvar

    PRIMARY OPERATING SYSTEM BOOT PARAMETERS:
    ================================
    boot device : tftp
    file name : premnath
    Management Etherenet IP address : 10.16.130.134/16
    Server IP address : 10.16.127.35
    Default Gateway IP address : 15.0.0.1
    Management Etherenet MAC address : 00:01:E8:43:DE:DF

    SECONDARY OPERATING SYSTEM BOOT PARAMETERS:
    ================================
    No Operating System boot parameters specified!

    DEFAULT OPERATING SYSTEM BOOT PARAMETERS:
show default gateway

Displays the default gateway IP address.

Syntax
show default-gateway

Command Modes
uBoot

Supported Modes
All Modes

Command History

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</tr>
</tbody>
</table>

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

Supported Modes
All Modes

Command History

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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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

Supported Modes

All Modes

Command History

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</tbody>
</table>

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 #

syntax help

Show the syntax information.

Syntax

help

Command Modes

uBoot

Supported Modes

All Modes

Command History

<table>
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</table>
Configuration Cloning

Configuration Cloning enables you to clone the configuration from one aggregator to the other. It identifies a source aggregator where running configuration is check-pointed, extracted and downloaded to the target aggregator for further use. The target aggregator checks the compatibility of the cloning file regarding the mode, port types and optional modules. The target aggregator further takes care of the conflicting configurations and appropriately proceeds with the application of the cloning configuration.

**clone-config apply**

Apply the cloning configuration file on the target aggregator.

**Syntax**

```plaintext
clone-config apply [file-name filename][output xml]
```

**Parameters**

- `apply`
  - Enter the keyword `apply` to apply the cloning configuration.
- `file-name filename`
  - Enter the keywords `file-name` to specify the user-defined cloning configuration file name in flash. By default, the file name is `cloning-config`.
- `output xml`
  - Enter the keywords `output xml` to enable the command output status to be displayed in the XML format.

**Defaults**

- `cloning-config`

**Command Modes**

- EXEC

**Command History**

- **Version 9.10(0.0)**
  - Introduced on the FN IOM and M I/O Aggregator.

**clone-config check**

Check the cloning configuration file compatibility with the current configurations on the target aggregator.

**Syntax**

```plaintext
clone-config check [file-name filename][output xml]
```

**Parameters**

- `check`
  - Enter the keyword `check` to check the cloning configuration compatibility.
- `file-name filename`
  - Enter the keywords `file-name` to specify the user-defined cloning configuration file name in flash. By default, the file name is `cloning-config`.
- `output xml`
  - Enter the keywords `output xml` to enable the command output status to be displayed in the XML format.

**Defaults**

- `cloning-config`

**Command Modes**

- EXEC
clone-config create

Create the cloning configuration.

Syntax

```
clone-config create [file-name filename][output xml]
```

Parameters

- `create` Enter the keyword create to create the cloning configuration file.
- `file-name filename` Enter the keywords file-name to save the cloning configuration in user-defined filename. By default, it gets stored in flash under the filename cloning-config.
- `output xml` Enter the keywords output xml to enable the command output status to be displayed in the XML format.

Defaults

cloning-config

Command Modes

EXEC

Command History

- **Version 9.10(0.0)**
  - Introduced on the FN IOM and M I/O Aggregator.
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.

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 command**
- `dcb enable auto-detect on-next-reload`
- `show qos dcb-map`

**PFC Commands**
- `clear pfc counters`
- `show interface pfc`
- `show interface pfc statistics`

**ETS Commands**
- `clear ets counters`
- `show interface ets`

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

Topics:
- Fibre Channel over Ethernet for FC Flex IO Modules
- `advertise dcbx-appln-tlv`
- `advertise dcbx-tlv`
- `bandwidth-percentage`
- `clear dcbx counters`
- `clear ets counters`
- `clear pfc counters`
- `dcb-enable`
- `dcb enable pfc-queues`
- `dcb enable auto-detect on-next-reload`
- `dcb-map stack-unit all stack-ports all`
- `dcb pfc-shared-buffer-size`
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 Aggregator, 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 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 I/O Aggregator are valid for the FC Flex IO modules.
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
autocomplete: 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

Supported Modes
Programmable-Mux (PMUX)

Command History
Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.2(0.0) Introduced on the M I/O Aggregator.
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
autocomplete: 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

Supported Modes
Programmable-Mux (PMUX)
### Command History

<table>
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### 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

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**

- `percentage`
  
  Enter the percentage assignment of weight to the class/queue. The range is from 1 to 100% (granularity 1%).

**Defaults**

None

**Command Modes**

- CONFIGURATION (conf-qos-policy-out)

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
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<td>8.3.16.1</td>
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**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.
clear dcbx counters

Clear all DCBx TLV counters on an interface.

Syntax: `clear dcbx counters tengigabitethernet slot/port`

Defaults: none

Command Modes: EXEC Privilege

Supported Modes: All Modes

Command History:

<table>
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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

Supported Modes: All Modes

Command History:

<table>
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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.
Enter the keyword **statistics** to clear only the hardware PFC counters.

**Defaults**
None

**Command Modes**
- EXEC Privilege

**Supported Modes**
All Modes

**Command History**

<table>
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**Usage Information**
If you do not use the **statistics** parameter, both hardware and DCBx counters clear.

---

**dcb-enable**

Enable data center bridging.

**Syntax**
```
dcb enable
```
To disable DCB, use the `no dcb enable` command.

**Defaults**
none

**Command Modes**
CONFIGURATION

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
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**Usage Information**
DCB is not supported if you enable link-level flow control on one or more interfaces.

---

**dcb enable pfc-queues**

Configure the number of PFC queues.

**Syntax**
```
dcb enable pfc-queues value
```

**Parameters**
- **value**
  Enter the number of PFC queues. The range is from 1 to 4. The number of ports supported based on lossless queues configured will depend on the buffer.

**Default**
2

**Command Modes**
CONFIGURATION mode

**Supported Modes**
Programmable-Mux (PMUX)
### Command History

<table>
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<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN 2210S Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the MXL 10/40GbE Switch IO Module platform.</td>
</tr>
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</table>

### Usage Information

You can configure up to a maximum of four lossless (PFC) queues. By configuring four lossless queues, you can configure four different priorities and assign a particular priority to each application that your network is used to process. For example, you can assign a higher priority for time-sensitive applications and a lower priority for other services, such as file transfers. You can configure the amount of buffer space to be allocated for each priority and the pause or resume thresholds for the buffer. This method of configuration enables you to effectively manage and administer the behavior of lossless queues.

### Example

```
Dell(config)#dcb pfc-queues 4
```

### dcb enable auto-detect on-next-reload

Enables or disables global DCB on a subsequent reload. Also internally configures PFC buffers based on DCB enable or disable. You must save and reload for the configurations to take effect. You can use the auto-detect keyword to re-enable IOA with the port-wise DCB auto detect feature.

**Syntax**
```
dcb enable [auto-detect | on-next-reload]
```

**Parameters**
- `auto-detect`: Enter the keywords `auto-detect` to re-enable the Aggregator with port wise DCB auto detect feature.
- `on-next-reload`: Enter the keywords `on-next-reload` to apply DCB configurations on subsequent reload.

**Defaults**
DCB is globally enabled with auto-detect feature.

**Command Modes**
- CONFIGURATION

**Supported Modes**
All Modes

**Command History**

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</tr>
<tr>
<td>8.3.17.3</td>
<td>Added auto-detect parameter on the M I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
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**Example (Disable)**
```
Dell#show dcb stack-unit 0 port-set 0
DCB Status: Enabled, PFC Queue Count: 4
stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Available Buffer
PP (KB) (KB) (KB) (KB)
-------------------------------------------------------------------
0     3822             1912          832               450
Dell(config)#
Dell#
```
Example (Enable)

```
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status: Enabled, PFC Queue Count: 4
stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Available Buffer
F (KB) (KB) (KB) (KB)
---------------------------------------------------------------------
0 0 3822 1912 832 450
```

Example (Enable DCB with Auto-Detect)

```
Dell#show dcb
DCB Status                               : Disabled
PFC Queue Count                          : 2
Total Buffer [lossy + lossless] (in KB)  : 3822
PFC Total Buffer (in KB)                 : 1912
PFC Shared Buffer (in KB)                : 832
PFC Available Buffer (in KB)             : 1080
```

Example (Enable)

```
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status: Enabled, PFC Queue Count: 4
stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Available Buffer
F (KB) (KB) (KB) (KB)
---------------------------------------------------------------------
0 0 3822 1912 832 450
```

Example (Enable DCB with Auto-Detect)

```
Dell#show dcb
DCB Status                               : Disabled
PFC Queue Count                          : 2
Total Buffer [lossy + lossless] (in KB)  : 3822
PFC Total Buffer (in KB)                 : 1912
PFC Shared Buffer (in KB)                : 832
PFC Available Buffer (in KB)             : 1080
```

Example (Enable)

```
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status: Enabled, PFC Queue Count: 4
stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Available Buffer
F (KB) (KB) (KB) (KB)
---------------------------------------------------------------------
0 0 3822 1912 832 450
```

Example (Enable DCB with Auto-Detect)

```
Dell#show dcb
DCB Status                               : Disabled
PFC Queue Count                          : 2
Total Buffer [lossy + lossless] (in KB)  : 3822
PFC Total Buffer (in KB)                 : 1912
PFC Shared Buffer (in KB)                : 832
PFC Available Buffer (in KB)             : 1080
```

Example (Enable)

```
Dell#show dcb stack-unit 0 port-set 0
stack-unit 0 port-set 0
DCB Status: Enabled, PFC Queue Count: 4
stack-unit Total Buffer PFC Total Buffer PFC Shared Buffer PFC Available Buffer
F (KB) (KB) (KB) (KB)
---------------------------------------------------------------------
0 0 3822 1912 832 450
```
dcb-map stack-unit all stack-ports all

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

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

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO Modules with I/O Aggregator.</td>
</tr>
</tbody>
</table>

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

dcb pfc-shared-buffer-size

Configure the maximum amount of shared buffer size for PFC packets in kilobytes.

Syntax
dcb pfc-shared-buffer-size KB

Parameters

- **KB** Enter a number in the range of 0 to 7787.

Default
None

Command Modes
CONFIGURATION mode

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator and the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information
Configure the maximum shared buffer available for PFC traffic. You can choose to increase or decrease the shared buffer that is allocated in the system by default. Configure the shared buffer size less than the total PFC buffer.
size. If the buffer size and DCB buffer threshold settings are applied on one or more ports, a validation is performed to determine whether following condition is satisfied: If the shared buffer size is more than the total PFC buffer size value, the configuration is not saved and a system logging message is generated as follows:

Shared-pfc-buffer-size <= (Total-pfc-buffer-size — Σpfc priority <> buffer-size on each port, priority).

Dell(conf)#dcb pfc-shared-buffer-size 2000
%ERROR: pfc shared buffer size configured cannot accommodate existing buffer requirement in the system.

Enter a smaller value for the shared buffer size or increase the total buffer size appropriately by using the dcb pfc-total- buffer-size command.

Example

Dell(conf)#dcb pfc-shared-buffer-size 5000

**dcb pfc-total-buffer-size**

Configure the total buffer size for PFC in kilobytes.

**Syntax**

```
dcb pfc-total-buffer-size KB
```

**Parameters**

- **KB**
  
Enter a number in the range of 0 to 7787.

**Default**

The default is 6592KB.

**Command Modes**

CONFIGURATION mode

**Command History**

Version 9.9(0.0)
Introduced on the M I/O Aggregator and the FN I/O Aggregator.

**Usage Information**

Configure the maximum buffer available for PFC traffic. You can choose to increase or decrease the buffer size that is allocated in the system by default. However, if you modify the PFC buffer size lower than the previously configured size, the system determines whether this reduction in size is valid without disrupting the existing configuration. In such a scenario, disable and re-enable DCB. For example, if you modify the total buffer size as 4000 KB from the previous size of 5000 KB, an error message is displayed that this reduction cannot be performed owing to existing system configuration because of queues that are being currently in process.

The lossless queue limit per port is validated based on the dcb pfc-queues command. PFC queue configuration identifies the maximum number of queues a port can support. Although the queue limit per port is a baseline when dynamic buffering is enabled, the limit per port for queues depends on the availability of the buffer.

**Example**

```
Dell(conf)#dcb pfc-total-buffer-size 5000
Dell(conf)#dcb pfc-total-buffer-size 4000
%ERROR: Total pfc buffer size configured cannot accommodate existing buffer requirement in the system.
```

**dcb-buffer-threshold**

Configure the profile name for the DCB buffer threshold.

**Syntax**

```
dcb buffer-threshold profile-name
```

**Example**

Dell(conf)#dcb buffer-threshold profile-name
Parameters

- **profile-name**
  - Enter the name of the profile, which can be a string of up to 32 characters in length.

Default

- None

Command Modes

- CONFIGURATION mode

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator and the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

When you enter the profile name, you enter the DCB buffer threshold configuration mode. You can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets.

Example

```plaintext
Dell(conf)#dcb buffer-threshold test
```

Example of commands in dcb buffer-threshold mode

```plaintext
dell(conf)# qos-policy-buffer test
dell(conf-qos-policy-buffer)#queue 0 pause no-drop buffer-size 128000 pause-threshold 103360 resume-offset 83520
dell(conf-qos-policy-buffer)# queue 4 pause no-drop buffer-size 128000 pause-threshold 103360 resume-offset 83520
```

```plaintext
priority value buffer-size size pause-threshold threshold-value resume-offset threshold-value shared-threshold-weight size
```

```plaintext
Dell(conf-dcb-buffer-thr)#priority 0 buffer-size 52 pause-threshold 16 resume-offset 10 shared-threshold-weight 7
```

**dcb-policy buffer-threshold (Global Configuration)**

Assign the dcb buffer threshold policy on the stack ports. To apply the dcb buffer threshold policy on the stack-units, use the configuration mode. To apply on front-end ports, use the interface mode.

**Syntax**

```plaintext
dcb-policy buffer-threshold stack-unit all stack-ports all profile-name
```

**Parameters**

- **dcb-buffer-threshold**
  - Configure the profile name for the DCB buffer threshold.

- **profile-name**
  - Enter the name of the profile, which can be a string of up to 32 characters in length.

- **stack-unit all**
  - Enter the stack unit identification. Indicates the specific the stack unit or units. Entering all shows the status for all stacks.

- **stack-port all**
  - Enter the port number of a port in a switch stack.

**Default**

- None

**Command Modes**

- CONFIGURATION mode

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator and the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>
Usage Information

You can configure up to a maximum of four lossless (PFC) queues. By configuring four lossless queues, you can configure four different priorities and assign a particular priority to each application that your network is used to process. For example, you can assign a higher priority for time-sensitive applications and a lower priority for other services, such as file transfers. You can configure the amount of buffer space for each priority and the pause or resume thresholds for the buffer. This method of configuration enables you to manage and administer the behavior of lossless queues.

Example for Configuration Mode

Dell(conf)# dcb-policy buffer-threshold stack-unit all stack-ports all test

Example for Interface Mode

Dell(conf-if-te-1/1)# dcb-policy buffer-threshold test

**service-class buffer shared-threshold-weight**

Create a service class and associate the threshold weight of the shared buffer with each of the queues per port in the egress direction.

**Syntax**

```
[no] Service-class buffer shared-threshold-weight [[queue0 number] | [queue1 number] | [queue2 number] | [queue3 number] | [queue4 number] | [queue5 number] | [queue6 number] | [queue7 number]]
```

**Parameters**

- **buffer**
  - Define the shared buffer settings
- **shared-threshold-weight**
  - Specify the weight of a queue for the shared buffer space
- **queue 0 to queue 7**
  - To apply the shared-threshold weight, specify the queue number
- **number**
  - Enter a weight for the queue on the shared buffer as a number in the range of 1 to 11.

**Default**

The default threshold weight on the shared buffer for each queue is 9. Therefore, each queue can consume up to 66.67 percent of available shared buffer by default.

**Command Modes**

INTERFACE mode

**Command History**

- **Version**
  - 9.9(0.0)Introduced on the M I/O Aggregator and the FN I/O Aggregator.

**Usage Information**

You can configure all the data queues. You can configure queues 0-7.

The following table describes the mapping between the threshold weight of the shared buffer on the queue. It also shows the percentage of the available shared buffer used by the queues for each of the corresponding threshold weights of the shared buffer:

<table>
<thead>
<tr>
<th>shared-threshold-weight on the queue</th>
<th>Description heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No dynamic sharing; shared buffer = 0.</td>
</tr>
<tr>
<td>1</td>
<td>0.77%</td>
</tr>
<tr>
<td>2</td>
<td>1.54%</td>
</tr>
<tr>
<td>3</td>
<td>3.03%</td>
</tr>
<tr>
<td>4</td>
<td>5.88%</td>
</tr>
</tbody>
</table>
shared-threshold-weight on the queue

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>11.11%</td>
</tr>
<tr>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td>7</td>
<td>33.33%</td>
</tr>
<tr>
<td>8</td>
<td>50%</td>
</tr>
<tr>
<td>9</td>
<td>66.67%</td>
</tr>
<tr>
<td>10</td>
<td>80%</td>
</tr>
<tr>
<td>11</td>
<td>88.89%</td>
</tr>
</tbody>
</table>

**Example**

```
Dell(conf-if-te-1/8)#Service-class buffer shared-threshold-weight queue5 4
queue7 6
```

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}
```

To remove DCBX port role, use the no dcbx port-role {config-source | auto-downstream | auto-upstream | manual} command.

**Parameters**

- **config-source**: configures the port to serve as the configuration source on the switch.
- **auto-downstream**: configures the port to receive a peer configuration. The configuration source is elected from auto-upstream ports.
- **auto-upstream**: 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

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator.</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.

**dcinx 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**: 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**

INTERFACE PROTOCOL LLDP

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator.</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.

**debug dcbx**

Enable DCBX debugging.

**Syntax**

debad 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.
exchng | fail | mgmt
(resource | sem | tlv)

- 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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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.

**Syntax**

`fc-map fc-map-value`

**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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN 2210S Aggregator.</td>
</tr>
<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 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.

---

**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.

**Syntax**

```
fcoe-map map-name
```

**Parameters**

- `map-name`  
  Maximum: 32 alphanumeric characters.

**Defaults**

On the FN2210S Aggregator with PMUX modules, the following parameters are applied on all the PMUX 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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

- **Version**
  - 9.9(0.0) Introduced on the FN IOM.
  - 9.6(0.0) Supported on the FN2210S Aggregator.
  - 9.3(0.0) Introduced on the M I/O Aggregator.

**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 FN2210S Aggregator with the PMUX 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 FN2210S Aggregator with the PMUX module NPIV proxy gateway, you cannot apply an FCoE map 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.

**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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>priority-bitmap</code></td>
<td>Enter the priority-bitmap range. The range is from 1 to FF.</td>
</tr>
</tbody>
</table>

**Defaults**

0x8

**Command Modes**

- PROTOCOL LLDP

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>priority-bitmap</code></td>
<td>Enter the priority-bitmap range. The range is from 1 to FF.</td>
</tr>
</tbody>
</table>

**Defaults**

0x10

**Command Modes**

- PROTOCOL LLDP

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>
**keepalive**

Send keepalive packets periodically to keep an interface alive when it is not transmitting data.

**Syntax**

```text
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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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.

**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 Aggregator with the PMUX module of NPIV proxy gateway.

**Syntax**

```text
interface vlan vlan-id
```

**Parameters**

- `vlan-id` Enter a number as the VLAN Identifier. The range is 1 to 4094.

**Defaults**

Not configured.

**Command Modes**

- CONFIGURATION

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>

---

**Usage Information**

This command is available at the global level only.
<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Introduced on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

FCoE storage traffic received from servers on an M I/O Aggregator with the PMUX 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.

**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.

## 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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Introduced on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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` 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.

## 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

### Supported Modes

Programmable-Mux (PMUX)

### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</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

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

Interface

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</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

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.

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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>
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.

**priority-group bandwidth pfc**

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

**Syntax**

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

**Parameters**

- **priority-group**
  - **group-num**
  - **bandwidth**
  - **percentage**
  - **strict-priority**
  - **pfc (on | off)**

**Defaults**

None

**Command Modes**

DCB MAP

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the FC Flex IO module installed in the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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**

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

### priority-pgid

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

**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.
- `dot1p1_group-num`
- `dot1p2_group-num`
- `dot1p3_group-num`
- `dot1p4_group-num`
- `dot1p5_group-num`
- `dot1p6_group-num`
- `dot1p7_group-num`

**Defaults**

- None

**Command Modes**

- DCB MAP

**Supported Modes**

- Programmable-Mux (PMUX)
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**

`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.

---

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</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

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.

Command Modes

POLICY-MAP-OUT-ETS

Supported Modes

Programmable-Mux (PMUX)

Command History

Version  Description

9.9(0.0)    Introduced on the FN IOM.
9.4(0.0)    Supported on the FN I/O Aggregator.
9.2(0.0)    Introduced on the M I/O Aggregator.
8.3.16.1    Introduced on the M4010, 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

- bandwidth-percentage — bandwidth percentage allocated to priority traffic in port queues.
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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**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 Queue Count : 2
Total Buffer[lossy + lossless] (in KB) : 3822
PFC Total Buffer (in KB) : 1912
PFC Shared Buffer (in KB) : 832
PFC Available Buffer (in KB) : 1080
```

---

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.

**NOTE:** This command also enables you to view information corresponding to a range of ports.

- You can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.

**Command Modes**

CONFIGURATION

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.</td>
</tr>
<tr>
<td>Version</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</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**

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>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: 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>
</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
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.

**NOTE:** This command also enables you to view information corresponding to a range of ports.

- You can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.

Command Modes

- **CONFIGURATION**

Supported Modes

- All Modes

Command History

- **Version**
  - **9.9(0.0)** Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.
  - **9.4(0.0)** Supported on the FN I/O Aggregator.
  - **9.2(0.0)** Introduced on the M I/O Aggregator.
  - **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 TC</td>
<td>Maximum number of priority groups supported.</td>
</tr>
<tr>
<td>Group</td>
<td></td>
</tr>
<tr>
<td>Number of Traffic</td>
<td>Number of 802.1p priorities currently configured.</td>
</tr>
<tr>
<td>Classes</td>
<td></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.</td>
</tr>
</tbody>
</table>
### Field Description

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.

### Local Parameters

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.

### 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.

### Reason

Reason displayed when the DCBx operational status for ETS on a port is down.

### 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.

### ETS TLV Statistic:

- **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.

---

**Example (Summary)**

Dell(conf)# show interfaces te 0/1 ets summary

Interface TenGigabitEthernet 0/1
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on

**Admin Parameters:**

Admin is enabled

<table>
<thead>
<tr>
<th>TC-grp Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0,1,2,3,4,5,6,7</td>
<td>100%</td>
<td>ETS</td>
</tr>
<tr>
<td>1 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>2 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>3 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>4 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>5 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>6 0%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>7 0%</td>
<td>ETS</td>
<td></td>
</tr>
</tbody>
</table>

**Priority#**

<table>
<thead>
<tr>
<th>Priority#</th>
<th>Bandwidth</th>
<th>TSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 13%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>1 13%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>2 13%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>3 13%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>4 12%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>5 12%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>6 12%</td>
<td>ETS</td>
<td></td>
</tr>
<tr>
<td>7 12%</td>
<td>ETS</td>
<td></td>
</tr>
</tbody>
</table>

**Remote Parameters:**

Remote is disabled

**Local Parameters:**
### Example (Detail)

Dell(conf)# show interfaces tengigabitethernet 0/1 ets detail
Interface TenGigabitEthernet 0/1
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters:

<table>
<thead>
<tr>
<th>TC-grp 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>
</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>

Remote Parameters:

<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>

Remote Parameters:

<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>

Remote is disabled

Local Parameters:

<table>
<thead>
<tr>
<th>TC-grp 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>
</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>
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.

<table>
<thead>
<tr>
<th>NOTE: This command also enables you to view information corresponding to a range of ports.</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can specify multiple ports as <code>slot/port-range</code>. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as <code>show interfaces interface-type 1/1 - 4</code>.</td>
</tr>
</tbody>
</table>

Command Modes

- INTERFACE

Supported Modes

- All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</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

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>• Init: Local PFC configuration parameters were exchanged with the peer.</td>
</tr>
<tr>
<td></td>
<td>• Recommend: Remote PFC configuration parameters were received from the peer.</td>
</tr>
<tr>
<td></td>
<td>• Internally propagated: 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>Reason</td>
<td>Reason displayed when the DCBX operational status for PFC on a port is 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>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>
</tbody>
</table>
### Field Description

**PFC TLV Statistics:** Number of PFC TLVs transmitted.
- **Output TLV pkts**
- **Error pkts**
- **Pause Tx pkts**
- **Pause Rx pkts**

**Error pkts** Number of PFC error packets received.

**Pause Tx pkts** Number of PFC pause frames transmitted.

**Pause Rx pkts** Number of PFC pause frames received.

### Example (Summary)

```
Dell# show interfaces tengigabitethernet 0/4 pfc summary
Interface TenGigabitEthernet 0/4
  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 45566 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

Dell# show interfaces tengigabitethernet 0/4 pfc detail
Interface TenGigabitEthernet 0/4
  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
```
show interfaces te 0/3 pfc statistics

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.

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

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
9.2(0.0) Introduced on the M I/O Aggregator.
8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
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.

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

**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.

```
show stack-unit {all | stack-unit} stack-ports {all | port-number} ets details
```

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>
Version | Description
--- | ---
9.4(0.0) | Supported on the FN I/O Aggregator.
9.2(0.0) | Introduced on the M I/O Aggregator.
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

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
```

**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

**Supported Modes**

- All Modes
## Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
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<td>9.4(0.0)</td>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the MI/O Aggregator.</td>
</tr>
<tr>
<td>8.3(16.1)</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

## 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
```
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**

- clear ip dhcp client statistics
- 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

Topics:

- clear ip dhcp client statistics
- debug ip dhcp client events
- debug ip dhcp client packets
- ip address dhcp
- release dhcp interface
- renew dhcp interface
- show ip dhcp client statistics
- show ip dhcp lease

**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 interface type slot/port
```

**Parameters**

```
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

**Supported Modes**
- All Modes

**Default**
- None

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

---

**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**

d-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

**Supported Modes**
- All Modes

**Default**
- None

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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]

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

Supported Modes

- All Modes

Default

- None

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

ip address dhcp

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

Syntax

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

Command Modes

- INTERFACE

Supported Modes

- All Modes

Default

- Enabled

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

In the 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.
release dhcp interface

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

Syntax

```
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

Supported Modes

- All Modes

Default

- None

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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

```
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

Supported Modes

- All Modes

Default

- None.
Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage information

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 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 `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

**Supported Modes**

All Modes

**Default**

None.

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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 `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.
Display DHCP lease information on all DHCP client-enabled interfaces on the switch.

Command Modes
- EXEC Privilege

Supported Modes
- All Modes

Default
- Display DHCP lease information on all DHCP client-enabled interfaces on the switch.

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</thead>
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<tr>
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</tr>
</tbody>
</table>
This chapter provides a generic, broad-level description of the operations, capabilities, and configuration commands of the Fiber Channel (FC) Flex IO module.

Topics:
- Fibre Channel over Ethernet for FC Flex IO Modules
- NPIV Proxy Gateway for FC Flex IO Modules
- description (for FCoE maps)
- fabric
- fabric-id vlan
- fcf-priority
- fc-map
- fcoe-map
- fka-adv-period
- interface vlan (NPIV proxy gateway)
- keepalive
- show fc switch
- show fcoe-map
- show npiv devices
- show running-config fcoe-map

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 Aggregator, 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 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 I/O Aggregator are valid for the FC Flex IO modules.
**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 with the FC Flex IO module switch, allowing server CNAs to communicate with SAN fabrics over the M I/O Aggregator with the FC Flex IO module.

To configure the M I/O Aggregator with the FC Flex IO module to operate as an NPIV proxy gateway, use the following commands:

### 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 with the FC Flex IO module NPIV proxy gateway in a converged fabric.

#### M I/O Aggregator with the FC Flex IO module

**Syntax**

```
description text
```

**Parameters**

- **text**
  
Enter a maximum of 32 characters.

**Defaults**

None

**Command Modes**

FCOE MAP

**Supported Modes**

Programmable-Mux (PMUX)

**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 with the FC Flex IO module

**Syntax**

```
fabric map-name
```

**Parameters**

- **map-name**
  
  Maximum: 32 alphanumeric characters.
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 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 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 with the FC Flex IO module**

**Syntax**

```
fabric-id fabric-num vlan vlan-id
```

**Parameters**

- `fabric-id fabric-num` 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.
- `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
Supported Modes  Programmable-Mux (PMUX)

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

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 with the FC Flex IO module**

**Syntax**

```
fcf-priority priority
```

**Parameters**

- `priority`  
  Enter the priority assigned to the M I/O Aggregator 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

**Supported Modes**

Programmable-Mux (PMUX)

**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 FCF priority you assign to an M I/O Aggregator 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.
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.

Syntax

```
fc-map fc-map-value
```

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

Supported Modes

- Programmable-Mux (PMUX)

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.
**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 with the FC Flex IO module

**Syntax**

```
fcoe-map map-name
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>map-name</code></td>
<td>Maximum: 32 alphanumeric characters.</td>
</tr>
</tbody>
</table>

**Defaults**

On the I/O Aggregator with PMUX modules, the following parameters are applied on all the PMUX 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

**Supported Modes**

Programmable-Mux (PMUX)

**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 with the PMUX 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 with the PMUX 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**

```plaintext
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

**Supported Modes**

- Programmable-Mux (PMUX)

**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-erpiod command.

**Related Commands**

- **fcoe-map** — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.

### 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 with the PMUX module NPIV proxy gateway.

**Syntax**

```plaintext
interface vlan vlan-id
```

**Parameters**

- **vlan-id**
  
  Enter a number as the VLAN Identifier. The range is 1 to 4094.
Defaults
Not configured.

Command Modes
CONFIGURATION

Supported Modes
Programmable-Mux (PMUX)

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 configured as an NPIV proxy gateway.</td>
</tr>
</tbody>
</table>

Usage Information

FCoE storage traffic received from servers on an M I/O Aggregator with the PMUX 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.

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.

**keepalive**

In an FCoE map, enable the monitoring of FIP keepalive messages (if it is disabled).

**M I/O Aggregator 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

**Supported Modes**

Programmable-Mux (PMUX)

**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

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 fc switch

Display the switch configuration for Fibre Channel capability.

M I/O Aggregator with the FC Flex IO module

Syntax

show fc switch

Parameters

None

Command Modes

• EXEC
• EXEC Privilege

Supported Modes

All Modes

Command History

Version Description

9.7(0.0) Introduced on the M I/O Aggregator.

Usage Information

The following table describes the show fc switch output shown in the following example.

<table>
<thead>
<tr>
<th>Switch Mode</th>
<th>Fibre Channel mode of operation of an Aggregator.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch WWN</td>
<td>Factory-assigned worldwide node (WWN) name of the Aggregator. The M I/O Aggregator WWN name is not user-configurable.</td>
</tr>
</tbody>
</table>

Example

Dell(conf)#do show fc switch
Switch Mode : NPG
Switch WWN  : 10:00:aa:00:00:00:00:ac
Dell(conf)#

show fcoe-map

Display the Fibre Channel and FCoE configuration parameters in FCoE maps.

M I/O Aggregator with the FC Flex IO module

Syntax

show fcoe-map [brief | map-name]
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>brief</td>
<td>Displays an overview of currently configured FCoE maps.</td>
</tr>
<tr>
<td>map-name</td>
<td>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.</td>
</tr>
</tbody>
</table>

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</table>

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 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 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>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>
<tr>
<td>Members</td>
<td>M I/O Aggregator 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.</td>
</tr>
</tbody>
</table>

**Example**

Dell#show fcoe-map brief

<table>
<thead>
<tr>
<th>Fabric-Name</th>
<th>Fabric-Id</th>
<th>Vlan-Id</th>
<th>FC-MAP</th>
<th>FCF-Priority</th>
<th>Config-State</th>
<th>Oper-State</th>
</tr>
</thead>
<tbody>
<tr>
<td>test</td>
<td>16</td>
<td>16</td>
<td>0efc02</td>
<td>128</td>
<td>ACTIVE</td>
<td>UP</td>
</tr>
<tr>
<td>cnatest</td>
<td>1003</td>
<td>1003</td>
<td>0efc03</td>
<td>128</td>
<td>ACTIVE</td>
<td>UP</td>
</tr>
<tr>
<td>sitest</td>
<td>1004</td>
<td>1004</td>
<td>0efc04</td>
<td>128</td>
<td>ACTIVE</td>
<td>DOWN</td>
</tr>
</tbody>
</table>

Dell#show fcoe-map si

<table>
<thead>
<tr>
<th>Fabric Name</th>
<th>Fabric Id</th>
<th>Vlan priority</th>
<th>FC-MAP</th>
<th>FKA-ADV-Period</th>
<th>FCF Priority</th>
<th>Config-State</th>
<th>Oper-State</th>
</tr>
</thead>
<tbody>
<tr>
<td>si</td>
<td>1004</td>
<td>3</td>
<td>0efc04</td>
<td>8</td>
<td>128</td>
<td>ACTIVE</td>
<td>DOWN</td>
</tr>
</tbody>
</table>

**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 into an M I/O Aggregator with the FC Flex IO module NPIV proxy gateway.

M I/O Aggregator with the FC Flex IO module

Syntax

```
show npiv devices [brief]
```

Parameters

- `brief` Displays an overview of current server CNA-fabric connections over an M I/O Aggregator with the FC Flex IO module NPIV proxy gateway.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

```
Version Description
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 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 with the FC Flex IO module that operates as an 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 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
```

```
FC Flex IO Modules
```

153
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>

Usage Information
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 M I/O Aggregator 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 M I/O Aggregator 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 M I/O Aggregator 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
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:03:03:01:02:01
FC-ID : 01:02:01
LoginMethod : FLOGI
Secs : 5593
Status : LOGGED_IN

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
Related Commands

fcoe-map — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.

**show running-config fcoe-map**

Displays the current fcoe-map configurations.

**M I/O Aggregator with the FC Flex IO module**

**Syntax**

```
show running-config fcoe-map
```

**Command Modes**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN2210S Aggregator.</td>
</tr>
<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>

**Example**

```
Dell(conf)#do show running-config fcoe-map
!
fcoe-map map
    fc-map 0efc00
    fabric-id 100 vlan 100
```
The switch is a blade switch which is plugged into the Dell M1000 Blade server chassis. The blade module contains two slots for pluggable flexible module. With single FC Flex IO module, 4 ports are supported, whereas 8 ports are supported with both FC Flex IO modules. Each port can operate in 2G, 4G or 8G Fiber Channel speed. The topology-wise, FC Flex IOM is directly connected to a FC Storage. In the following topology, the FC flex IOM model offers local connectivity without a SAN switch or fabric.

Topics:
- active-zoneset
- fabric
- fc alias
- fc zone
active-zoneset

Activate the zoneset.

Syntax
active-zoneset zoneset_name

To change to the default zone behavior, use the no active-zoneset zoneset_name command.

Parameters
zoneset_name
Enter the zoneset name.

Command Modes
FC FABRIC CONFIGURATION

Supported Modes
All Modes

Command History
Version Description
9.9(0.0) Supported on the FN I/O Aggregator.
9.7(0.0) Introduced on the M I/O Aggregator.

Example
Dell(conf)# fcoe-map default_full_fabric
Dell(conf-fcoe-default_full_fabric)# fc-fabric
Dell(conf-fmap-default_full_fabric-fcfabric)# active-zoneset zs1

Related Commands
show fc zoneset — displays the configured and active zoneset.

fabric

Apply an FCoE map on a fabric-facing Fibre Channel (FC) port.

Syntax
fabric map-name

Parameters
map-name
Maximum: 32 alphanumeric characters.

Defaults
None

Command Modes
INTERFACE FIBRE_CHANNEL

Supported Modes
All Modes
An FCoE map is a template used to map FCoE and FC parameters in a converged fabric. An FCoE map virtualizes the upstream FC ports on the switch NPIV proxy gateway to 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. It provides necessary parameters to FCoE-enabled servers and switches to log in to a SAN fabric. Use the fcoe-map command to create an FCoE map.

On the switch NPIV proxy gateway, an FCoE map is applied on fabric-facing FC ports and server-facing Ethernet ports. Use the fabric command to apply an FCoE map on an FC port. Use the fcoe-map command to apply an FCoE map on an Ethernet port.

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 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.

Usage Information

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 alias

Create a zone alias name.

**Syntax**

```
fabric alias ZoneAliasName member name
```

To delete a zone alias name, use the no fabric zone ZoneAliasName command.

**Parameters**

- **ZoneAliasName**
  - Enter the zone alias name.
- **member name**
  - Enter the WWPN, port ID, or domain/port.

**Command Modes**

- CONFIGURATION

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell(conf)#fc alias test12
Dell(conf-fc-alias-test12)#?
```
end                     Exit from configuration mode
exit                    Exit from Alias config mode
member                  Add Alias member
no                      Negate a command or set its defaults
show                    Show alias profile configuration
show fc alias           — displays the configured alias.
Dell(conf-fc-alias-test12)#member ?
WORD                    WWN(00:00:00:00:00:00:00:00), or portID(123000)

Dell(conf)# fc zone z1
Dell(conf-fc-zone-z1)#

Dell(conf)#fc zone test
Dell(conf-fc-zone-test)#member ?
WORD                    WWN(00:00:00:00:00:00:00:00), portID(000000), or Alias name(word)
Dell(conf-fc-zone-test)#member

Dell(conf)# fc zoneset z1
Dell(conf-fc-zoneset-z1)#

fc zoneset zonename member
To delete a zoneset, use the no fc zoneset zonename [member] command.
zoneset_name           Enter the zoneset name.
member                 Enter the WWPN, port ID, or domain/port.

Example without member
Dell(conf)# fc zoneset z1
Dell(conf-fc-zoneset-z1)#

Example with member
Dell(conf)#fc zoneset test
Dell(conf-fc-zoneset-test)#member ?
WORD                    WWN(00:00:00:00:00:00:00:00), portID(000000), or Alias name(word)
Dell(conf-fc-zoneset-test)#member

show fc zone           — displays the configured zone.
show fcoe-map          — displays the fabric parameters.

Related Commands
Enter the WWPN, FC-ID, or Alias name.

Command Modes

- **CONFIGURATION**
- **All Modes**

Command History

**Version**
- **9.9(0.0)** Supported on the FN I/O Aggregator.
- **9.7(0.0)** Introduced on the M I/O Aggregator.

Example

```
Dell(conf)#fc zoneset test1
Dell(conf-fc-zoneset-test1)#member ?
WORD                    Zone Name
Dell(conf-fc-zoneset-test1)#member
```

Related Commands

- **show fc zoneset** — displays the configured and active zoneset.
- **show fcoe-map** — displays the fabric parameters.

### 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.

**Syntax**

```
fcoe-map map-name
```

**Parameters**

- **map-name**
  - Maximum: 32 alphanumeric characters.

**Defaults**

None

**Command Modes**

- **CONFIGURATION**
- **INTERFACE**

**Supported Modes**

All Modes

**Command History**

**Version**

- **9.9(0.0)** Supported on the FN I/O Aggregator.
- **9.3(0.0)** Introduced on the M I/O Aggregator.

**Usage Information**

An FCoE map is a template to map FCoE and FC parameters in a converged fabric. An FCoE map virtualizes upstream FC ports on the switch NPIV proxy gateway to 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. It provides necessary parameters to FCoE-enabled servers and switches to log in to a SAN fabric.

On the switch NPIV proxy gateway, an FCoE map is applied on fabric-facing FC ports and server-facing Ethernet ports. Use the `fcoe-map` command to apply an FCoE map on an Ethernet port. Use the `fabric` command to apply an FCoE map on an FC port.
An FCoE map consists of the following parameters: the dedicated FCoE VLAN for storage traffic, the destination SAN fabric (FC-MAP value), FCF priority, and the FIP keepalive (FKA) advertisement timeout.

To remove an FCoE map from an Ethernet interface, enter the `no fcoe-map map-name` command in Interface configuration mode.

**NOTE:** You cannot create `fcoe-map` in IOA mode. It can only be created in PMUX mode.

**NOTE:** In FCF F mode, you can create only one FCoE map. It doesn't get created automatically. If you try to create more than one map, an error message is displayed.

**Related Commands**
- `show fcoe-map` — displays the Fibre Channel and FCoE configuration parameters in FCoE maps.

**feature fc**

Enable feature fc with FPort functionality.

**Syntax**

```
feature fc fport domain-id range
```

**Parameters**

- `Range` — Enter the range from 1 to 239.

**Command Modes**

- CONFIGURATION

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Enable `remote-fault-signaling rx off` command in FCF FPort mode on interfaces connected to the Compellent and MDF storage devices.

**Example**

```
Dell(conf)#feature fc fport domain-id
```

**show fc alias**

Display the configured alias.

**Syntax**

```
show fc alias [ZoneAliasName ]
```

**Parameters**

- `ZoneAliasName` — Enter the zone alias name to display the details.

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>
show fc ns

Display the devices in the name server database.

Syntax

show fc ns \{ switch \} \{ brief \}

Parameters

switch

Enter the keyword switch to display all the devices in the name server database of the switch.

brief

Enter the keyword brief to display in brief devices in the name server database.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

Version Description

9.9(0.0) Supported on the FN I/O Aggregator.

9.7(0.0) Introduced on the M I/O Aggregator.

Example

Dell#show fc ns switch
Total number of devices = 1
Switch Name 10:00:5c:f9:dd:ef:0a:00
Domain Id 1
Switch Port 53
Port Id 01:35:00
Port Name 10:00:8c:7c:ff:17:f8:01
Node Name 20:00:8c:7c:ff:17:f8:01
Class of Service 8
IP Address
Symbolic Port Name Brocade-1860 | 3.0.3.0 | DV-SP-SERVER2 | |
Symbolic Node Name (NULL)
Port Type Node port
Registered with NameServer Yes
Registered for SCN Yes
Display of local name server entries - brief version
Dell#

Dell#show fc ns switch brief
Total number of devices = 1
Intf# Domain FC-ID Enode-WWPN Enode-WWNN
53 1 01:35:00 10:00:8c:7c:ff:17:f8:01 20:00:8c:7c:ff:17:f8:01
Dell#
show fc ns fabric
Total number of devices = 3
Switch Name                     10:00:5c:f9:dd:ef:0a:80
Domain Id                       2
Switch Port                     9
Port Id                         02:09:00
Port Name                       32:11:0e:fc:00:00:00:88
Node Name                       22:11:0e:fc:00:00:00:88
Class of Service                8
IP Address
Symbolic Port Name              (NULL)
Symbolic Node Name              (NULL)
Port Type                       Node port
Registered with NameServer      No
Registered for SCN              No
Switch Name                     10:00:5c:f9:dd:ef:0a:80
Domain Id                       2
Switch Port                     11
Port Id                         02:0b:00
Port Name                       31:11:0e:fc:00:00:00:77
Node Name                       21:11:0e:fc:00:00:00:77
Class of Service                8
IP Address
Symbolic Port Name              (NULL)
Symbolic Node Name              (NULL)
Port Type                       Node port
Registered with NameServer      No
Registered for SCN              No
Switch Name                     10:00:5c:f9:dd:ef:0a:00
Domain Id                       1
Switch Port                     53
Port Id                         01:35:00
Port Name                       10:00:8c:7c:ff:17:f8:01
Node Name                       20:00:8c:7c:ff:17:f8:01
Class of Service                8
IP Address
Symbolic Port Name              Brocade-1860 | 3.0.3.0 | DV-SP-SERVER2 |
Symbolic Node Name              (NULL)
Port Type                       Node port
Registered with NameServer      Yes
Registered for SCN              Yes
Dell#

show fc ns fabric brief
Total number of devices = 2
Intf#   Domain  FC-ID           Enode-WWPN                      Enode-WWNN
9       2       02:09:00        32:11:0e:fc:00:00:00:88 22:11:0e:fc:00:00:00:88
11      2       02:0b:00        31:11:0e:fc:00:00:00:77 21:11:0e:fc:00:00:00:77
Dell#

show fc switch

Display the switch configuration for Fibre Channel capability.

Syntax show fc switch

Parameters None

Command Modes
- EXEC
- EXEC Privilege
show fc switch

Display the configured switch.

Syntax

show fc switch

Parameters

zonename

Enter the zone name to display the details.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Supported on the FN I/O Aggregator.
9.7(0.0) Introduced on the M I/O Aggregator.

Example

Dell#show fc switch
ZoneName ZoneMember
---------------------------------------------
brcd_sanb brcd_cna1_wwpn1

sanb_p2tgt1_wwpn
Dell#
### Syntax

```
show fc zoneset [ zoneset_name | active ]
```

### Parameters

- `zoneset_name` Enter the zoneset name to display the zoneset name.
- `active` Enter the keyword `active` to display the active zonesets.
- `merged` Enter the keyword `merged` to display the merge active zones.

### Command Modes

- EXEC
- EXEC Privilege

### Supported Modes

All Modes

### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### Example

```
Dell#show fc zoneset
ZoneSetName     ZoneName               ZoneMember
============================================
fcoe_srv_fc_tgt brcd_sanb
                  brcd_cna1_wwpn1
                  sanb_p2tgt1_wwpn
Active Zoneset: fcoe_srv_fc_tgt

ZoneName               ZoneMember
================================
brcd_sanb
                  10:00:8c:7c:ff:21:5f:8d
                  20:02:00:11:0d:03:00:00
Dell#

Dell#show fc zoneset active

Active Zoneset: fcoe_srv_fc_tgt

ZoneName               ZoneMember
================================
brcd_sanb
                  10:00:8c:7c:ff:21:5f:8d
                  20:02:00:11:0d:03:00:00
Dell#
```

### Related Commands

- `fc zone` — creates a zone.
fc zoneset — creates a zoneset.

active-zoneset — activates the zoneset.

**show fcoe-map**

Display the Fibre Channel and FCoE configuration parameters in FCoE maps.

**Syntax**

```
show fcoe-map
```

**Parameters**

None

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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 Switch.

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. It also virtualizes the 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.

**Example**

```
Dell(conf)#do show fcoe-map
Fabric Name        SAN_FABRIC
Fabric Type        npiv
Fabric Id          1002
Vlan Id            1002
Vlan priority      3
FC-MAP             0efc00
FKA-ADV-Period     8
Fcf Priority       128
Config-State       ACTIVE
Oper-State         UP

Members
Fc 0/41 Fc 0/42 Fc 0/43 Fc 0/44 Fc 0/49 Fc 0/50 Fc 0/51 Fc 0/52
Te 0/4 Te 0/9 Te 0/16

Dell(conf)#
```

**Related Commands**

- `fcoe-map` — creates an FCoE map which contains the parameters used in the communication between servers and a SAN fabric.
In a converged Ethernet network, an Aggregator 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.

This chapter describes the FIP snooping commands.

Topics:
- clear fip-snooping database interface vlan
- show fip-snooping statistics
- debug fip-snooping
- show fip-snooping config
- show fip-snooping enode
- show fip-snooping fcf
- show fip-snooping sessions
- show fip-snooping statistics
- show fip-snooping system
- show fip-snooping vlan

### 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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
clear fip-snooping statistics

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

Syntax

```plaintext
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.

Command Modes

- EXEC Privilege

Supported Modes

All Modes

Command History

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<tr>
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</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
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</tbody>
</table>

168 | FIP Snooping | DELL EMC
fip-snooping enable

Enable FIP snooping on all VLANs or on a specified VLAN.

Syntax

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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

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 FM-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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
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<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
**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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

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<tr>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Usage Information**

The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
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</tr>
<tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
The following table describes the `show fip-snooping statistics` command.

<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>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 Advertisements</td>
<td>Number of FIP-snooped multicast discovery advertisements received on the interface.</td>
</tr>
<tr>
<td>Number of Unicast Discovery 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>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</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 due to Hardware Config</td>
<td>Number of session failures due to hardware configuration that occurred on the interface</td>
</tr>
</tbody>
</table>

**Example**

```markdown
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

Dell(conf)#

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
```

**Example (port channel)**

```markdown
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: 0
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

debug fip-snooping

Enable the debug FIP protocol specific messages.

Syntax
dependent fip-snooping [all|acl|error|ifm|info|ipc|rx]

Parameters
  all: Enable all the debug options.
  acl: Enable for ACL specific debugs
  error: Enable for Error specific debugs
  ifm: Enable for IFM specific debugs
  info: Enable for Information specific debugs
  ipc: Enable for IPC specific debugs
  rx: Enable for packet receive specific debugs

Command Modes
  EXEC Privilege

Supported Modes
  All Modes

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

show fip-snooping config

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

Syntax
  show fip-snooping config

Command Modes
  EXEC
  EXEC Privilege

Supported Modes
  All Modes

Command History
  Version Description
  9.9(0.0) Introduced on the FN IOM.
  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

Supported Modes
All Modes

Command History
Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
8.3.17.0 Supported on the M I/O Aggregator.

Usage Information
The following table describes the show fip-snooping enode command.

<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
------- --------------- -------
------ ------- ------
54:7f:ee:37:34:40 100 62:00:11

Dell
**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

**Supported Modes**

All Modes

**Command History**

<table>
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</tr>
<tr>
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</tr>
</tbody>
</table>

**Usage Information**

The following table describes the `show fip-snooping fcf` command.

<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_PERIOD</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 Enodes            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

Supported Modes

All Modes

Command History

Version  Description
9.9(0.0)  Introduced on the FN IOM.
9.4(0.0)  Supported on the FN I/O Aggregator.
8.3.17.0  Supported on the M I/O Aggregator.

Usage Information

The following table describes the show fip-snooping sessions command.

<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 0/14 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 0/16 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

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the MI/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

The following table describes the show fip-snooping statistics command.

<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>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 Advertisements</td>
<td>Number of FIP-snooped multicast discovery advertisements received on the interface</td>
</tr>
<tr>
<td>Number of Unicast Discovery 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>Field</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</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 due to Hardware Config</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
```
### 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

**Supported Modes**

All Modes

**Command History**

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

**Example**

```
Dell# show fip-snooping system
Global Mode : Enabled
FCOE VLAN List (Operational) : 1, 100
FCFs : 1
```
show fip-snooping vlan

Display information on the FIP snooping operational VLANs.

**Syntax**

```
show fip-snooping vlan
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
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<th>Description</th>
</tr>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell# show fip-snooping vlan
* = Default VLAN

<table>
<thead>
<tr>
<th>VLAN</th>
<th>FC-MAP</th>
<th>FCFs</th>
<th>Enodes</th>
<th>Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>*1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1002</td>
<td>0X0EFC00</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
```
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 group-join-limit
- ip igmp querier-timeout
- ip igmp query-interval
- ip igmp query-max-resp-time
- ip igmp snooping enable
- ip igmp snooping fast-leave
- ip igmp snooping flood
- ip igmp snooping last-member-query-interval
- ip igmp snooping mrouter
- ip igmp snooping querier
- ip igmp version
- 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.
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).

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

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
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

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### 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)

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### 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
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

Supported Modes

- Programmable-Mux (PMUX)

Command History

- **9.9(0.0)** Introduced on the FN IOM.
- **9.4(0.0)** Supported on the FN I/O Aggregator.
- **9.2(0.0)** Introduced on the M I/O Aggregator.

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

Supported Modes

- Programmable-Mux (PMUX)
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

Supported Modes
Programmable-Mux (PMUX)

Command History
- Introduced on the FN IOM.
- Supported on the FN I/O Aggregator.
- Introduced on the M I/O Aggregator.

Usage Information
To enable IGMP snooping, enter this command. When you enable this command from CONFIGURATION mode, IGMP snooping enables on all VLAN interfaces (except the default VLAN).

NOTE: Execute the no shutdown command on the VLAN interface for IGMP Snooping to function.

ip igmp snooping fast-leave

Enable IGMP snooping fast-leave for this VLAN.

Syntax
ip igmp snooping fast-leave
To disable IGMP snooping fast leave, use the no igmp snooping fast-leave command.

Defaults
Not configured.

Command Modes
INTERFACE VLAN — (conf-if-vl-n)

Supported Modes
Programmable-Mux (PMUX)

Command History
- Introduced on the FN IOM.
- Supported on the FN I/O Aggregator.
<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.</td>
</tr>
</tbody>
</table>

Usage Information
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 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
```

To disable the flooding, use the `no ip igmp snooping flood` command.

**Parameters**

- **Enabled**

**Command Modes**

- CONFIGURATION

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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**

**Defaults**

- 1000 milliseconds

**Command Modes**

- INTERFACE VLAN

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tbody>
</table>
Version Description
9.4(0.0) Supported on the FN I/O Aggregator.
9.2(0.0) Introduced on the M I/O Aggregator.

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 interface
to delete a specific multicast router interface, use the no igmp snooping mrouter interface interface command.

Parameters
interface 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.

Defaults
Not configured.

Command Modes INTERFACE VLAN — (conf-if-vl-n)

Supported Modes Programmable-Mux (PMUX)

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 Description
9.2(0.0) Introduced on the M I/O Aggregator.

Usage Information
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-n)

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</tbody>
</table>

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.

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

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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

Supported Modes

All Modes

Command History

Version Description

9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
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

Field | Description
--- | ---
Group Address | Lists the multicast address for the IGMP group.
Interface | Lists the interface type, slot and port number.
Mode | Displays the IGMP version used.
Uptime | Displays the amount of time the group has been operational.
Expires | Displays the amount of time until the entry expires.
Last Reporter | Displays the IP address of the last host to be a member of the IGMP group.
### Field Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member Ports</td>
<td>Indicates the member ports of the port channel. If the port channel is VLT, an asterisk (*) after the port channel number indicates the port channel is locally down and that a remote VLT port is up.</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

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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
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

**Supported Modes**

All Modes

**Command History**

<table>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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.
This chapter defines the interface commands on the Aggregator switch.

**Port Interface Commands**

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

- clear counters
- clear mac-address-table dynamic
- interface range
- 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 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
- 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. FTP, TFTP, ACLs, and SNMP are not supported on a VLAN.

Occasionally, while sending broadcast traffic over multiple 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

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

Supported Modes
Standalone Mode

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

Command History

Version Description
9.4(0.0) Supported on the FN I/O Aggregator.
8.3.17.0 Supported on the M I/O Aggregator.

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

Supported Modes
Programmable-Mux (PMUX)

Command History

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

interface port-channel — creates a Port Channel interface.

clear counters

Clear the counters used in the show interfaces commands for 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 managementethernet 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

NOTE: This command also enables you to clear the port configurations corresponding to a range of ports.

- You can specify multiple ports as slot/port-range. For example, if you want to clear the port configurations corresponding to all ports between 1 and 4, specify the port range as show interfaces interface-type 1/1 - 4.

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM and added support to clear the interface configurations corresponding to a range of ports.
9.4(0.0) Supported on the FN 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

Supported Modes

- All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

default vlan-id

Set the default VLAN ID.

Syntax

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

To reset the default VLAN ID, use the `no default vlan-id` command.

Defaults

- `none`

Command Modes

- CONFIGURATION

Supported Modes

- All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
</tbody>
</table>

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.

feature fc

Enables the Fibre channel communication via the NPG functionality.

Syntax

feature fc

Command Modes
CONFIGURATION

Default
Enabled

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN 2210S Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>
flowcontrol

Controls 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} pause-threshold value

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.
- **pause-threshold**: Enter the buffer threshold limit for generating PAUSE frames.

Defaults

- `rx off`
- `tx off`

Command Modes

- INTERFACE

Supported Modes

- Programmable-Mux (PMUX)

Command History

- **Version**: 9.9(0.0) Introduced on the FN IOM.
- **Version**: 9.4(0.0) Supported on the FN I/O Aggregator.
- **Version**: 9.2(0.0) Introduced on the M I/O Aggregator.
- **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 hold at least three packets.

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 monitor session 5 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>
<th>LocNegRx</th>
<th>LocNegTx</th>
<th>RemNegRx</th>
<th>RemNegTx</th>
</tr>
</thead>
<tbody>
<tr>
<td>off</td>
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</tbody>
</table>
**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.

**Defaults**

Not configured.

**Command Modes**

- CONFIGURATION

**Supported Modes**

All Modes

**Command History**

<table>
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<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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. By default, in PMUX mode, the interface is shut down when the `portmode hybrid` and `switchport` are enabled.

The tunnel interface operates as an ECMP (equal cost multipath) 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 0/1
Dell(conf-if-te-0/1)#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) and port number zero (0).

**Defaults**

Not configured.

**Command Modes**

- CONFIGURATION

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
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</tr>
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<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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**

```
Dell(conf)#interface managementethernet 0/0
Dell(conf-if-ma-0/0)#
```

---

**interface port-channel**

Create a Port Channel interface, which is a link aggregation group (LAG) containing physical interfaces on the Aggregator.

**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

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
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<th>Version</th>
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</tr>
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<tbody>
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<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
Version Description
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.

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.

### 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.

**Defaults** none

**Command Modes** CONFIGURATION
Supported Modes

All Modes

Command History

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

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 - 23, 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#)

Dell(conf)#interface range tengig 2/1 - 11, tengig 2/1 - 23
Dell(conf-if-range-tengig-2/1-23#)

Only VLAN and port-channel interfaces created using the interface vlan and vlan tagged 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, 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 vlan

Configure a VLAN. Configure the default VLAN to enable Static or DCHP IP configuration. You can configure up to 4094 VLANs.

### Syntax

```
interface vlan vlan-id
```

To delete a VLAN, use the `no interface vlan vlan-id` command.

### Parameters

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

### Supported Modes

All Modes

### Command History

<table>
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</tr>
</tbody>
</table>

### Usage Information

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

FTP, TFTP, and SNMP operations are not supported on a VLAN. MAC/IP ACLs are not supported.

### Examples

```
Dell(conf)#int vlan 1
Dell(conf-if-vi-1)#
Dell(conf)#int vlan 3
Dell(conf-if-vi-3)#
```

### 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

Supported Modes

    All Modes

Command History

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</tr>
</tbody>
</table>

Usage Information

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

Related Commands

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

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

Supported Modes

    All Modes

Command History

<table>
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</tr>
</tbody>
</table>
Version | Description
--- | ---
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.

### 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

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
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<td>8.3.16.1</td>
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</table>

**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.

### 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]
```

**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.

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

**Supported Modes**
All Modes

**Command History**

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

**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 <code>monitor interface</code> 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>
<tr>
<td>q</td>
<td>Return to the CLI prompt.</td>
</tr>
</tbody>
</table>

**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
```
### 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. The default is **1554**.

**Defaults**

**1554**

**Command Modes**

- INTERFACE

**Supported Modes**

- Programmable-Mux (PMUX)
Command History

<table>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

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>
<tr>
<td>Tagged Packet with VLAN-Stack Header</td>
<td>26 bytes</td>
</tr>
</tbody>
</table>
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

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
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</tr>
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</tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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
INTERFACE

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
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</tbody>
</table>

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
  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
• 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.

remote-fault-signaling rx
Brings the interface up or down when a Remote Fault Indication (RFI) error is detected.

Syntax  remote-fault-signaling rx {on | off}

Parameters
on  Brings the interface up when an RFI error is detected.
off  Brings the interface down when an RFI error is detected.

Defaults  ON.

Command Modes  INTERFACE CONFIGURATION

Command History  Version 9.7(0.0)  Introduced on the M I/O Aggregator.

Usage Information  By default, the M I/O Aggregator processes RFI errors transmitted by remote peers and brings down the interface when an RFI error is detected.

Example  Dell(conf-if-te-1/3)#remote-fault-signaling rx ?
on Enable
off Disable

show config (INTERFACE mode)
Displays the interface configuration.

Syntax  show config

Command Modes  INTERFACE
show config (from INTERFACE RANGE mode)

Display the bulk configured interfaces (group).

Syntax

```
show config
```

Command Modes

CONFIGURATION INTERFACE (conf-if-range)

Supported Modes

All Modes

Command History

<table>
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</table>

Example

```
Dell(conf-if)#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

```
show config
```

Command Modes

INTERFACE VLAN

Supported Modes

All Modes
show config (from PROTOCOL LLDP mode)

Displays the LLDP configuration.

Syntax
show config

Command Modes
PROTOCOL LLDP

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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.
**NOTE:** This command also enables you to view information corresponding to a range of ports.

- You can specify multiple ports as `slot/port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.

---

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Added support to display the interface configurations corresponding to a range of ports.</td>
</tr>
<tr>
<td>9.6(0.0)</td>
<td>Added support for Auto-LAG on the M I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator</td>
</tr>
</tbody>
</table>

**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.

**User Information**

The following describes the `show interfaces` command shown in the 10G example below.

<table>
<thead>
<tr>
<th>Line</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>
Line 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
  - 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-IOA-A1(conf-if-te-0/1)#do show int te 0/1
TenGigabitEthernet 0/1 is up, line protocol is down(error-disabled[UFD])
Hardware is DellEth, address is f8:b1:56:07:1d:8e
  Current address is f8:b1:56:07:1d:8e
Server Port AdminState is Up
Pluggable media not present
Example
(ManagementEthernet)

Dell#show interface managementethernet ?
0/0 Management Ethernet interface number
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
Virtual-IP IPv6 address 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 ip interface— Displays Layer 3 information about the interfaces.
show memory— Displays the stack unit(s) status.
show interfaces status — Displays all interfaces configured using the interface range command.

**show interfaces configured**

Displays any interface with a non-default configuration.

**Syntax**

```
show interfaces configured
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example (ManagementEthernet)**

```
Dell#show interfaces configured
TenGigabitEthernet 1/1 is up, line protocol is down(error-disabled[UFD])
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 : tenG25800001e800ab01
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
TenGigabitEthernet 1/2 is up, line protocol is down(error-disabled[UFD])
Dell#
```
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.

NOTE: This command also enables you to view information corresponding to a range of ports.
- You can specify multiple ports as slot/port-range. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as show interfaces interface-type 1/1 - 4.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.
9.4(0.0) Supported on the FN I/O Aggregator.
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.

Field Description
Interface Displays the type of interface and associated slot and port number.
OK? Indicates if the hardware is functioning properly.
Status States whether the interface is enabled (up) or disabled (administratively down).
Protocol States whether IP is enabled (up) or disabled (down) on the interface.
Description Displays the description (if any) manually configured for the interface.

Example

Dell#show interface description
Interface OK Status Protocol Description
TenGigabitEthernet 0/1 NO admin down down
TenGigabitEthernet 0/2 NO admin up down
TenGigabitEthernet 0/3 NO admin up down
TenGigabitEthernet 0/4 NO admin up down
TenGigabitEthernet 0/5 NO admin up 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.

NOTE: This command also enables you to view information corresponding to a range of ports.

- For port-channel interfaces, you can specify multiple ports as port-range. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as show interfaces port-channel 1 - 4.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.
9.7(0.0) Introduced on the M I/O Aggregator.
9.4(0.0) Supported on the FN I/O Aggregator.

Usage Information

The following describes the show interfaces port-channel command shown in the following example.

Field Description
Port-Channel 1... Displays the status of LAG. In the Example, the status of the LAG, LAG fate-sharing group (“Failover-group”) is listed.
Hardware is... Displays the interface’s hardware information and its assigned MAC address.
Port-channel is part... Indicates whether the LAG is part of a LAG fate-sharing group (“Failover-group”).
Internet address... States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
MTU 1554... Displays link and IP MTU.
LineSpeed Displays the interface’s line speed. For a port channel interface, it is the line speed of the interfaces in the port channel.
Field | Description
--- | ---
Members in this... | Displays the interfaces belonging to this port channel.
ARP type:... | Displays the ARP type and the ARP timeout value for the interface.
Last clearing... | Displays the time when the `show interfaces` counters were cleared.
Queueing strategy. | States the packet queuing strategy. FIFO means first in first out.
packets input... | Displays the number of packets and bytes into the interface.
Input 0 IP packets... | 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.
0 64-byte... | Displays the size of packets and the number of those packets entering that interface. This information is displayed over two lines.
Received 0... | Displays the type and number of errors or other specific packets received. This information is displayed over three lines.
Output 0... | Displays the type and number of packets sent out the interface. This information is displayed over three lines.
Rate information... | Displays the traffic rate information into and out of the interface. Traffic rate is displayed in bits and packets per second.
Time since... | Displays the time since the last change in the configuration of this interface.

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 :lag1001ec9f10005
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.

Field | Description
--- | ---
LAG | Lists the port channel number.
Mode | Lists the mode:
### show interfaces stack-unit

Display information on all interfaces on a specific 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

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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
Time since last interface status change: 5d5h23m

Related Commands
show diag — Displays data plane and management plane input/output statistics.

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.

  unit-number Enter the stack unit’s ID number. The range is from 0 to 5.

NOTE: This command also enables you to view information corresponding to a range of ports.

  - You can specify multiple ports as slot/port-range. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as show interfaces interface-type 1/1 - 4.

Defaults

  none

Command Modes

  - EXEC
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.

  1. **NOTE:** This command also enables you to view information corresponding to a range of ports.

     - For physical interfaces, you can specify multiple ports as slot/port-range. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces interface-type 1/1 - 4`.
     - For port-channel interfaces, you can specify multiple ports as port-range. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces port-channel 1 - 4`.

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 1   10000 Mbit Full --
```

Supported Modes

- All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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

Supported Modes

All Modes

Command History

- Version 9.9(0.0) Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.
- Version 9.4(0.0) Supported on the FN I/O Aggregator.
- 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 the VLAN tagged (&quot;True&quot;), untagged (&quot;False&quot;), or hybrid (&quot;Hybrid&quot;), 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
10-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 tdr**

Displays the TDR test results.

**Syntax**

```plaintext
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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
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</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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: Short</td>
</tr>
<tr>
<td>Shorted</td>
<td></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>Impedance</td>
<td>There is an impedance mismatch in the cables.</td>
</tr>
<tr>
<td>Mismatch</td>
<td></td>
</tr>
</tbody>
</table>

**Example**

```plaintext
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**

- `tdr-cable-test` — 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

Supported Modes

All Modes

Command History

- **Version**
  - **9.4(0.0)** Supported on the FN I/O Aggregator.
  - **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>

<table>
<thead>
<tr>
<th>Column 1 — no heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>= Default VLAN</td>
</tr>
<tr>
<td>G</td>
<td>= GVRP VLAN</td>
</tr>
<tr>
<td>P</td>
<td>= primary VLAN</td>
</tr>
<tr>
<td>C</td>
<td>= community VLAN</td>
</tr>
<tr>
<td>I</td>
<td>= isolated VLAN</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        unassigned
2                                       0      0        unassigned
20                                      0      0        unassigned
1002                                    0      0        unassigned
Dell#

Example (Using a VLAN Name)
---
Dell(conf)#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)#
Dell#

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

Supported Modes
---
All Modes

Command History
---

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information
---
The shutdown 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 `shutdown` 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 shutdown` on the port channel interface and at least one interface within that port channel.

The `shutdown` and `description` commands are the only commands that you can configure on an interface that is a member of a port channel.

**Related Commands**

- `vlan tagged` — Test the condition of copper cables on 100/1000/10G Base-T modules.
- `interface vlan` — Creates a VLAN.
- `show ip interface` — Displays the interface routing status. Add the keyword `brief` to display a table of interfaces and their status.

### 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)`

**Supported Modes**

- All Modes

**Command History**

- **Version**
  - 9.3(0.0)
    - Added support for the `fortyGigE` keyword on M I/O Aggregator.
  - 8.3.17.0
    - Supported on M I/O Aggregator.
speed (for 1000/10000 interfaces)

Set the speed for 1000/10000 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

```
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.
- **auto**: Enter the keyword auto to set the interface to auto-negotiate its speed. Auto-negotiation is enabled. For more information, refer to `name`.

Defaults

`auto`

Command Modes

- **INTERFACE**

Supported Modes

- **All Modes**

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Added support for fanned-out 1 Gigabit SFP port.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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.

If you use an active optical cable (AOC), you can convert the QSFP+ port to a 10 Gigabit SFP+ port or 1 Gigabit SFP port. You can use the `speed` command to enable the required speed.

Related Commands

- `negotiation auto` — enables or disables auto-negotiation on an interface.
stack-unit portmode

Split a single 40G port into 4x10G ports on the MXL switch.

Syntax

```
stack-unit stack-unit port number portmode quad
```

Parameters

- `stack-unit` (Required) 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` (Required) 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**

Supported Modes

- Programmable-Mux (PMUX)

Command History

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

wavelength

Set the wavelength for tunable 10–Gigabit SFP+ optics.

Syntax

```
wavelength
```

To retain the existing wavelength, use the `no wavelength` command.

Defaults

none

Command Modes

- **INTERFACE**

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell Networking OS Command Line Reference Guide.
**Version**

9.10(0.0)  
Introduced on the S6000, S6000-ON, S5000, S4810, S4820T, S3048-ON, S4048-ON, M I/O Aggregator, FN I/O Module, MXL, C9010, S3100 series, and Z9100-ON.

**Usage Information**

The wavelength can be configured only on a tunable 10-Gigabit SFP+ optic. The wavelength range is from 1528.3 nm to 1568.77nm.

If you configure the wavelength on a non-tunable optic, there is no change to the existing wavelength. The configured wavelength is saved in the running configuration and is applicable, when a tunable optic is used.

If you do not configure the wavelength on an inserted tunable optic, the existing wavelength is used.

**Example**

The following example shows the wavelength set for a tunable 10-Gigabit SFP+ optic:

**Related Commands**

- `show config` — displays the interface configuration.

---

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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**

```
vlan tagged [vlan-id]
```

To remove a tagged interface from a VLAN, use the `no vlan tagged vlan-id` command.

**Parameters**

- `vlan-id` Enter the VLAN ID. The range is from 1 to 4094.

**Defaults**

All interfaces in Layer 2 mode are untagged.

**Command Modes**

- INTERFACE

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

- 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 VLAN3.

**Example**

```
Dell(conf-if-te-0/2)#vlan tagged 2-4
```

**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

```
vlan untagged [vlan-id]
```

To remove an untagged interface from a VLAN, use the `no vlan untagged [vlan-id]` command.

### Parameters

- **vlan-id**
  
  Enter the VLAN ID. The range is from 1 to 4094.

### Defaults

All interfaces in Layer 2 mode are untagged.

### Command Modes

**INTERFACE**

### Supported Modes

All Modes

### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### 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 taggedcommand`.

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)#

234 | Interfaces
Related Commands

interface vlan — Configures a VLAN.

vlan tagged — Specifies which interfaces in a VLAN are tagged.
IPv4 Routing

The aggregator supports both IPv4 and IPv6 routing and these are used only for the management purpose.

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 tcp statistics

Topics:

- clear tcp statistics
- debug ip dhcp
- debug ip icmp
- ip route
- management route
- show arp
- show ip interface
- show ip management-route
- show ip multicast-cam stack-unit
- show ip route
- show tcp statistics

### clear tcp statistics

Clear the TCP counters.

**Syntax**

```
clear tcp statistics
```

**Command Modes**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
</tbody>
</table>
**debug ip dhcp**

Enable debug information for DHCP relay transactions and display the information on the console.

**Syntax**

```
debug ip dhcp
```

**Parameters**

- `debug ip dhcp` To disable debug, use the no debug ip dhcp command.

**Defaults**

Debug disabled

**Command Mode**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example**

```
FTOS#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
```
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:
  - For the management interface, enter the keyword ManagementEthernet then 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 then the slot/port information.
  - For VLAN, enter the keyword vlan then by a number from 1 to 4094.
- **count value** (OPTIONAL) Enter the keywords count then the count value. The ranges from 1 to 65534. The default is infinity.

**Command Modes**
- EXEC Privilege

**Supported Modes**
- All Modes

**Command History**

<table>
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</tr>
</tbody>
</table>

**Usage Information**
To stop packets from flooding the user terminal when debugging is turned on, use the count option.

**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:
```

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 {address | interface [ip-address]} 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

**Supported Modes**

- All Modes

**Command History**

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

**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

**Supported Modes**

All Modes

**Command History**

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

**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 | inspection]
```

**Parameters**

- interface 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.

- ip ip-address mask: (OPTIONAL) Enter the keyword ip followed by an IP address in the dotted decimal format. Enter the optional IP address mask in the slash prefix format (/x).


- static: (OPTIONAL) Enter the keyword static to view entries entered manually.

- retries: (OPTIONAL) Enter the keyword retries to view the number of ARP retries before a 20–second back off.

- dynamic: (OPTIONAL) Enter the keyword dynamic to view dynamic entries.

- summary: (OPTIONAL) Enter the keyword summary to view a summary of ARP entries.

- inspection: (OPTIONAL) Enter the keyword inspection to view dynamic ARP Inspection details.
Usage Information

The following describes the show arp command shown in the following example.

Row Heading Description
Protocol Displays the protocol type.
Address Displays the IP address of the ARP entry.
Age(min) Displays the age (in minutes) of the ARP entry.
Hardware Address Displays the MAC address associated with the ARP entry.
Interface Displays the first two letters of the interfaces type and the slot/port associated with the ARP entry.
VLAN Displays the VLAN ID, if any, associated with the ARP entry.
CPU Lists which CPU the entries are stored on.

Example

Dell#show arp

<table>
<thead>
<tr>
<th>Protocol</th>
<th>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</td>
<td>10.11.8.6</td>
<td>167</td>
<td>00:01:e9:45:00:03</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>10.11.68.14</td>
<td>124</td>
<td>00:01:e9:45:00:03</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>10.11.209.254</td>
<td>0</td>
<td>00:01:e9:45:00:03</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
</tbody>
</table>

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</th>
<th>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</td>
<td>5.5.5.1</td>
<td>-</td>
<td>00:01:e8:43:96:1e</td>
<td>-</td>
<td>Vl 10 pv 200</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>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</td>
<td>10.1.2.4</td>
<td>1</td>
<td>00:01:e8:55:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>10.10.10.4</td>
<td>1</td>
<td>00:01:e8:55:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>10.16.127.53</td>
<td>1</td>
<td>00:01:e8:55:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>10.16.134.254</td>
<td>20</td>
<td>00:01:e8:55:9e:e2</td>
<td>Ma 0/0</td>
<td>-</td>
<td>CP</td>
</tr>
<tr>
<td>Internet</td>
<td>133.33.33.4</td>
<td>1</td>
<td>00:01:e8:55:9e: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.

Row Heading Description
Total Entries Lists the total number of ARP entries in the ARP table.
Static Entries Lists the total number of configured or static ARP entries.
Dynamic Entries Lists the total number of learned or dynamic ARP entries.
CPU Lists which CPU the entries are stored on.

Example (Summary)

Dell#show arp summary

<table>
<thead>
<tr>
<th>Total Entries</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>

IPv4 Routing | 241
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

Supported Modes

All Modes

Command History

- **Version**
  - 9.11(0.0) Updated the command output to include the unicast reverse path forwarding (uRPF) status.
  - 9.4(0.0) Supported on the FN I/O Aggregator.
  - 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.

- **Lines**
  - **Description**
    - **TenGigabitEthernet 0/0...** Displays the interface’s type, slot/port and physical and line protocol
    - **Internet address...** States whether an IP address is assigned to the interface. If one is, that address is displayed.
    - **IP MTU is...** Displays IP MTU value.
    - **Inbound access...** Displays the name of the any configured incoming access list. If none is configured, the phrase “not set” is displayed.
    - **Proxy ARP...** States whether proxy ARP is enabled on the interface.
    - **Split horizon...** States whether split horizon for RIP is enabled on the interface.
    - **Poison Reverse...** States whether poison for RIP is enabled on the interface.
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.

Example (Brief)

```
Dell#show ip interface brief
Interface     IP-Address  OK? Method Status Protocol
Tengigabitethernet 0/0    unassigned NO None    up    down
Tengigabitethernet 0/1    unassigned NO None    up    up
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
```
summary

(Optional) Enter the keyword summary to view a table listing the number of active and non-active routes and their sources.

static

(Optional) Enter the keyword static to view non-active routes also.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

Dell#show ip management-route
Destination    Gateway                 State
--------------- -------                 -----          
10.1.2.0/24    ManagementEthernet 0/0  Connected
172.16.1.0/24   10.1.2.4               Active
Dell#

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-prefix]

(Optional) Enter the IP address and mask of a route to CAM entries for that route only.

longer-prefixes

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 int he 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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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>
<tr>
<td></td>
<td>- CP = control processor</td>
</tr>
<tr>
<td></td>
<td>- Fo= 40 Gigabit Ethernet interface</td>
</tr>
<tr>
<td></td>
<td>- Te = 10 Gigabit Ethernet interface</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show ip multicast-cam stack-unit 0 port-set 0 10.10.10.10/32 longer-prefixes
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

Supported Modes All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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<tr>
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<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

The following describes the show ip route all command in the following example.

Field (undefined) Description
Identifies the type of route:

- C = connected
- S = static
- R = RIP
- B = BGP
- IN = internal BGP
- EX = external BGP
- LO = Locally Originated
- O = OSPF
- IA = OSPF inter area
- N1 = OSPF NSSA external type 1
- N2 = OSPF NSSA external type 2
- E1 = OSPF external type 1
- E2 = OSPF external type 2
- i = IS-IS
- L1 = IS-IS level-1
- L2 = IS-IS level-2
- IA = IS-IS inter-area
- * = candidate default
- > = non-active route
- + = summary routes
### Field Description

- **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

<table>
<thead>
<tr>
<th>Route Source</th>
<th>Active Routes</th>
<th>Non-active Routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>connected</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>static</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Total 3 active route(s) using 612 bytes

### show tcp statistics

View information on TCP traffic through the switch.

**Syntax**

```
show tcp statistics
```

**Command Modes**

- EXEC Privilege
- All Modes

**Command History**

- Version 9.9(0.0) Introduced on the FN IOM.
- Version 9.4(0.0): Supported on the FN I/O Aggregator.
- Version 8.3.17.0: Supported on the M I/O Aggregator.

### Usage Information

The following describes the `show tcp statistics cp` command shown in the following example.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rcvd:</strong></td>
<td>Displays the number and types of TCP packets received by the switch.</td>
</tr>
<tr>
<td><strong>0 checksum error...</strong></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>
</tbody>
</table>

### show ip route summary

```
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
<table>
<thead>
<tr>
<th>Destination</th>
<th>Gateway</th>
<th>Dist/Metric</th>
<th>Last Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>*S 0.0.0.0/0/0</td>
<td>via 10.10.91.9, Te 1/2</td>
<td>1/0</td>
<td>3d2h</td>
</tr>
</tbody>
</table>

Dell#
```
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>
<tr>
<td>0 window probe...</td>
<td>Displays the number of window probe and update packets delayed.</td>
</tr>
<tr>
<td>7 Connections initiated...</td>
<td>Displays the number of TCP connections initiated, accepted, and established.</td>
</tr>
<tr>
<td>14 Connections closed...</td>
<td>Displays the number of TCP connections closed, dropped.</td>
</tr>
<tr>
<td>20 Total rxmt...</td>
<td>Displays the number of times the switch tried to re-send data and the number of connections dropped during the TCP retransmit timeout period.</td>
</tr>
<tr>
<td>0 Keepalive...</td>
<td>Lists the number of keepalive packets in timeout, the number keepalive probes and the number of TCP connections dropped during keepalive.</td>
</tr>
</tbody>
</table>

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
```
<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>6674 data packets (152822 bytes)</td>
<td></td>
</tr>
<tr>
<td>12 data packets (1222 bytes) retransmitted</td>
<td></td>
</tr>
<tr>
<td>85 ack only packets (5677 delayed)</td>
<td></td>
</tr>
<tr>
<td>0 window probe packets, 0 window update packets</td>
<td></td>
</tr>
<tr>
<td>0 Connections initiated, 7 connections accepted, 7 connections established</td>
<td></td>
</tr>
<tr>
<td>8 Connections closed (including 4 dropped, 0 embryonic dropped)</td>
<td></td>
</tr>
<tr>
<td>12 Total rxmt timeout, 1 connections dropped in rxmt timeout</td>
<td></td>
</tr>
<tr>
<td>26 Keepalive timeout, 25 keepalive probe, 1 Connections dropped in keepalive</td>
<td></td>
</tr>
</tbody>
</table>

Dell#
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.

### Topics:
- advertise dcbx-app-tlv
- iscsi aging time
- iscsi cos
- iscsi enable
- iscsi priority-bits
- iscsi profile-compellent
- iscsi target port
- show iscsi
- show iscsi sessions
- show iscsi sessions detailed

#### 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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
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<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
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<tbody>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

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

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

iscsi enable

Globally enable iSCSI optimization.

Syntax

```
iscsi enable
```

To disable iSCSI optimization, use the `no iscsi enable` command.

Parameters

- **enable**
  
Enter the keyword `enable` to enable the iSCSI optimization feature.

Defaults

Disabled.

Command Modes

CONFIGURATION

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
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</tr>
</tbody>
</table>

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 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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>priority-bitmap</code></td>
<td>Enter the priority-bitmap range. The range is from 1 to FF.</td>
</tr>
</tbody>
</table>

**Defaults**

0x10

**Command Modes**

PROTOCOL LLDP

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
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<tr>
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</tr>
</tbody>
</table>

**Usage Information**

This command is available at the global level only.

### iscsi profile-compellent

Configure the auto-detection of Dell Compellent arrays on a port.

**Syntax**

```plaintext
iscsi profile-compellent
```

**Defaults**

Dell Compellent disk arrays are not detected.

**Command Modes**

INTERFACE

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
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</table>

### iscsi target port

Configure the iSCSI target ports and optionally, the IP addresses on which iSCSI communication is monitored.

**Syntax**

```plaintext
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**

### Supported Modes

- **Programmable-Mux (PMUX)**

### Command History

<table>
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</table>

### 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.

### show iscsi

**Display the currently configured iSCSI settings.**

#### Syntax

```
show iscsi
```

#### Command Modes

- EXEC
- EXEC Privilege

#### Supported Modes

- All Modes

#### Command History

<table>
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</tbody>
</table>

#### Example

```
Dell#show iscsi
iSCSI is enabled
iSCSI session monitoring is enabled
iSCSI COS : dot1p is 4 no-remark
Session aging time: 10
Maximum number of connections is 256
-------------------------------------
iSCSI Targets and TCP Ports:
-------------------------------------
```
show iscsi sessions

Display information on active iSCSI sessions on the switch that have been established since the last reload.

**Syntax**

```
show iscsi sessions
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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
Initiator Initiator Target Target Connection
IP Address TCP Port IP Address TCP Port ID
10.10.0.44 33345 .10.0.101 3260 0

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
Initiator Initiator Target Target Connection
IP Address TCP Port IP Address TCP Port ID
10.10.0.53 33432 .10.0.101 3260 0

**Related Commands**

- `show iscsi` — displays the currently configured iSCSI settings.
- `show iscsi sessions` — displays information on active iSCSI sessions on the switch that have been established since the last reload.
Isolated Networks

This chapter describes the isolated networks commands in the Dell Networking OS.

io-aggregator isolated-network vlan

Enable the isolated-network functionality for a particular VLAN or a set of VLANs.

Syntax

[no] io-aggregator isolated-network vlan vlan-range

Parameters

- isolated-network
  - Specify an isolated network to be configured
- vlan vlan-range
  - Enter the keyword vlan followed by the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination. For example: VLAN IDs (comma-separated): 3, 4, 6. Range (hyphen-separated): 5-10. Combination: 3, 4, 5-10, 8.

Defaults

Not configured.

Command Modes

CONFIGURATION

Usage Information

To add more VLANs into an isolated network, you can enter this same command at any later point. The VLANs specified are appended to the existing set of VLANs. To remove a VLAN or a set of VLANs from an isolated network, use the no form of command.

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.5(0.0) Supported on the FN I/O Aggregator.
9.5(0.0) Supported on the MI/O Aggregator.

Example

Dell(conf)#io-aggregator isolated-network vlan 5-10

show io-aggregator isolated-networks

Display the VLANs that are configured to be part of an isolated network on an Aggregator.

Syntax

show io-aggregator isolated-networks

Parameters

- isolated-networks
  - Specify an isolated network to be configured
- vlan vlan-range
  - Enter the keyword vlan followed by the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination.

Defaults
None

Command Modes
EXEC Privilege

Usage Information
This command is used to show the isolated-network feature status and the VLANs configured for this feature. Show running-config will save this command under io-aggregator.

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
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<tr>
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</tr>
<tr>
<td>9.5(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

Dell#show io-aggregator isolated-networks
Isolated Network Enabled VLANs : 5-10
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).

Topics:
- auto-lag enable
- clear lacp counters
- debug lacp
- delay-restore abort-threshold
- io-aggregator auto-lag enable
- lacp link-fallback
- lacp long-timeout
- lacp port-priority
- port-channel mode
- port-channel-protocol lacp
- show interfaces port-channel
- show io-aggregator auto-lag status
- show lacp
- show link-bundle-distribution port-channel
- show port-channel-flow

**auto-lag enable**

Enable auto-lag on a server facing port.

**Syntax**

```
auto-lag enable
```

To disable the auto-lag use the `no auto-lag enable` command.

When disabled, the server port associated in a LAG is removed and the LAG itself gets removed. Any LACPDUs received on the server port are discarded.

**Defaults**

Enabled

**Command Modes**

INTERFACE

**Supported Modes**

Standalone, Stacking, VLT

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN I/O Aggregator</td>
</tr>
</tbody>
</table>
clear lacp counters

Clear Port Channel counters.

Syntax

```plaintext
clear lacp port-channel-number counters
```

Parameters

- `port-channel-number`: Enter a port-channel number.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</tbody>
</table>

Related Commands

- `show lacp` — displays the LACP configuration.

debug lacp

Debug LACP (events).

Syntax

```plaintext
d 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

**Supported Modes**

All Modes

**Command History**

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

**delay-restore abort-threshold**

Increase the Boot Up timer to some value (>60 seconds).

**Syntax**

```
delay-restore abort-threshold <interval>
```

To remove use the `no delay-restore abort-threshold` command.

**Defaults**

60 seconds

**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.

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</thead>
<tbody>
<tr>
<td>9.8(0.0)</td>
<td>Introduced on the S3048-ON and S4048-ON.</td>
</tr>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the S4820T, S4810, S6000, S5000, Z9000, S6000-ON and Z9500.</td>
</tr>
</tbody>
</table>

**Parameter**

Enter the value (in seconds) to specify the time interval for delay restore timer to abort. This timer is applicable only during reload/boot-up and not in other scenarios (example, ICL flap).

The range is from 1 to 1800 seconds.

**Usage Information**

To abort VLT delay restore timer as the maximum threshold, the maximum time interval is applied to hold down ICL peer-up in the start-up configurations during the reload.

**io-aggregator auto-lag enable**

Enable auto-lag globally on the server facing ports

**Syntax**

```
io-aggregator auto-lag enable
```

To disable the auto-lag, use the `no io-aggregator auto-lag enable` command.

When disabled, all the server ports associated in a LAG are removed and the LAG itself gets removed. Any LACPDUs received on the server ports are discarded.
lacrp link-fallback

Enable the LACP link-fallback feature.

Syntax

```
lacp link-fallback member-independent port-channel 128
```

To disable the LACP link-fallback, use the `no lacp link-fallback member-independent port-channel 128` command.

Command Modes

- INTERFACE
- CONFIGURATION

Supported Modes

Standalone, Stacking, and VLT

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Reference Guide.

The following is a list of the Dell Networking OS version history for this command.

<table>
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<tr>
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<tbody>
<tr>
<td>9.11(0.0)</td>
<td>Introduced the support on VLT mode.</td>
</tr>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator and FN I/O Aggregator.</td>
</tr>
</tbody>
</table>

lacrp 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)

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
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</table>

**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

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

### port-channel mode

Configure the LACP port channel mode.

**Syntax**
```
port-channel number [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

Supported Modes

Programmable-Mux (PMUX)

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.2(0.0) Introduced on the M I/O Aggregator.
8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.

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

Supported Modes

Programmable-Mux (PMUX)
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.

**NOTE:** This command also enables you to view information corresponding to a range of ports.

- For port-channel interfaces, you can specify multiple ports as `port-range`. For example, if you want to display information corresponding to all ports between 1 and 4, specify the port range as `show interfaces port-channel 1 - 4`.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

All Modes

Command History

- **Version**  
  - 9.9(0.0) Introduced on the FN IOM and added support to display the interface configurations corresponding to a range of ports.
  - 9.7(0.0) Introduced on the M I/O Aggregator.
  - 9.4(0.0) Supported on the FN 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 status of LAG. In the Example, the status of the LAG, 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 \texttt{show interfaces} counters 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**

```
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
DHCP Client-ID :lag1001ec9f10005
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
```

(etherScale)
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 (<code>shutdown</code>)</td>
</tr>
<tr>
<td></td>
<td>• up — if the port channel is enabled (<code>no shutdown</code>)</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 bri
Codes: L - LACP Port-channel
       O - OpenFlow Controller Port-channel
       A - Auto Port-channel
       I - Internally Lagged
LAG Mode Status Uptime Ports
L  128 L3 down 00:00:00
Dell#
```

To indicate the LACP fallback, Internally lagged is added to the list. When the LAG auto-configures itself, the LAG status describes as 'I'.

Related Commands

- `show lacp` — displays the LACP matrix.

**show io-aggregator auto-lag status**

Displays global information on the auto-lag status.

**Syntax**

```
show io-aggregator auto-lag status
```

**Command Modes**

- EXEC

**Supported Modes**

- Standalone, Stacking, VLT
### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### Example

```
Dell-ct-mxl-1-b1(conf)#do show io-aggregator auto-lag status
Auto LAG creation on server port(s) is disabled
```

### 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

#### Supported Modes

All Modes

#### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

#### 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
Dell#

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
Dell#

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
Dell#

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

Supported Modes  All Modes

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</td>
</tr>
</tbody>
</table>

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 marked as being overutilized and alarm is generated</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>
</tbody>
</table>
### show port-channel-flow

Display an egress port in a given port-channel flow.

**Syntax**

```
show port-channel-flow port-channel number incoming-interface interface { src-mac address dest-mac address {vlan vlanid | ether-type }} [ src-ip address dest-ip address ] [ src-port number dest-port number ]
```

**Parameters**

- **port-channel number**
  - Enter the keywords `port-channel` then the number of the port channel to display flow information. The range is from 1 to 128.

- **incoming-interface interface**
  - Enter the keywords `incoming-interface` then the interface type and slot/port or number information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- **src-mac address**
  - Enter the keywords `src-mac` then the MAC source address in the nn:nn:nn:nn:nn:nn format.

- **dest-mac address**
  - Enter the keywords `dest-mac` then the MAC destination address in the nn:nn:nn:nn:nn:nn format.

- **vlan vlan-id**
  - Enter the keyword `vlan` then the VLAN ID. The range is from 1 to 4094.

- **ether-type**
  - Enter the keywords `ether-type` then the ether-value in the XX:XX format.

- **src-ip address**
  - Enter the keywords `src-ip` then the IP source address in IP address format.

- **dest-ip address**
  - Enter the keywords `dest-ip` then the IP destination address in IP address format.

- **src-port number**
  - Enter the keywords `src-port` then the source port number. The range is from 1 to 65536. The default is **None**.

- **dest-port number**
  - Enter the keywords `dest-port` then the destination port number. The range is from 1 to 65536. The default is **None**.

**Command Modes**

- EXEC

**Supported Modes**

- All Modes

---

### Field Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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

<table>
<thead>
<tr>
<th>Interface</th>
<th>Line Protocol</th>
<th>Utilization[In Percent]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te 0/5</td>
<td>Up</td>
<td>0</td>
</tr>
<tr>
<td>Te 0/13</td>
<td>Up</td>
<td>0</td>
</tr>
</tbody>
</table>

Dell#show port-channel-flow
show port-channel-flow port-channel number incoming-interface interface { src-mac address dest-mac address {vlan vlanid | ether-type }} [ src-ip address dest-ip address ] [ src-port number dest-port number ]

**Example**

Dell#show link-bundle-distribution port-channel
Link-bundle trigger threshold - 60
LAG bundle - 1      Utilization[In Percent] - 0      Alarm State - Inactive

<table>
<thead>
<tr>
<th>Interface</th>
<th>Line Protocol</th>
<th>Utilization[In Percent]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te 0/5</td>
<td>Up</td>
<td>0</td>
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<tr>
<td>Te 0/13</td>
<td>Up</td>
<td>0</td>
</tr>
</tbody>
</table>

show

port-channel-flow

Display an egress port in a given port-channel flow.

**Syntax**

```
show port-channel-flow port-channel number incoming-interface interface { src-mac address dest-mac address {vlan vlanid | ether-type }} [ src-ip address dest-ip address ] [ src-port number dest-port number ]
```

**Parameters**

- **port-channel number**
  - Enter the keywords `port-channel` then the number of the port channel to display flow information. The range is from 1 to 128.

- **incoming-interface interface**
  - Enter the keywords `incoming-interface` then the interface type and slot/port or number information:
    - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- **src-mac address**
  - Enter the keywords `src-mac` then the MAC source address in the nn:nn:nn:nn:nn:nn format.

- **dest-mac address**
  - Enter the keywords `dest-mac` then the MAC destination address in the nn:nn:nn:nn:nn:nn format.

- **vlan vlan-id**
  - Enter the keyword `vlan` then the VLAN ID. The range is from 1 to 4094.

- **ether-type**
  - Enter the keywords `ether-type` then the ether-value in the XX:XX format.

- **src-ip address**
  - Enter the keywords `src-ip` then the IP source address in IP address format.

- **dest-ip address**
  - Enter the keywords `dest-ip` then the IP destination address in IP address format.

- **src-port number**
  - Enter the keywords `src-port` then the source port number. The range is from 1 to 65536. The default is **None**.

- **dest-port number**
  - Enter the keywords `dest-port` then the destination port number. The range is from 1 to 65536. The default is **None**.

**Command Modes**

- EXEC

**Supported Modes**

- All Modes
Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

Because this command calculates based on a Layer 2 hash algorithm, use this command to display flows for switched Layer 2 packets, not for routed packets (use the `show ip flow` command to display routed packets).

The `show port-channel-flow` command returns the egress port identification in a given port-channel if a valid flow is entered. A mismatched flow error occurs if MAC-based hashing is configured for a Layer 2 interface and you are trying to display a Layer 3 flow.

The output displays three entries:

- Egress port for unfragmented packets.
- In the event of fragmented packets, the egress port of the first fragment.
- In the event of fragmented packets, the egress port of the subsequent fragments.

> **NOTE:** In the `show port-channel-flow` command output, the egress port for an unknown unicast, multicast, or broadcast traffic is not displayed.
This chapter describes commands to configure Layer 2 features.

This chapter contains the following sections:

- MAC Addressing Commands
- Virtual LAN (VLAN) Commands

Topics:

- MAC Addressing Commands
- Virtual LAN (VLAN) Commands
- clear mac-address-table dynamic
- description
- mac-address-table aging-time
- mac-address-table static
- mac-address-table station-move refresh-arp
- show cam mac stack-unit
- show mac-address-table

**MAC Addressing Commands**

The following commands are related to configuring, managing, and viewing MAC addresses:

- clear mac-address-table dynamic
- mac-address-table aging-time
- mac-address-table static
- mac-address-table station-move refresh-arp
- show cam mac stack-unit
- show mac-address-table

**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.
clear mac-address-table dynamic

Clear the MAC address table of all MAC addresses 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 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

Supported Modes

- All Modes

Command History

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

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

Supported Modes

- All Modes

Command History

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

Supported Modes

Programmable-Mux (PMUX)

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.2(0.0) Introduced on the M I/O Aggregator.

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.
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

```
[no] mac-address-table station-move refresh-arp
```

Defaults

Enabled

Command Modes

CONFIGURATION

Supported Modes

Programmable-Mux (PMUX)

Command History

Version Description
9.9(0.0) Modified the default option from none to Enabled. Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.2(0.0) Introduced on the M I/O Aggregator.
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.

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

- **stack-unit**: (REQUIRED) Enter the keyword stack-unit followed by a stack member number to select the stack unit for which to gather information. The range is 0 to 5.
- **unit_number**: (REQUIRED) Enter the keyword unit_number followed by a Port-Pipe number to select the Port-Pipe for which to gather information. The range is 0.
- **port-set**: (REQUIRED) Enter the keywords port-set followed by a Port-Pipe number to select the Port-Pipe for which to gather information. The range is 0.
- **port-pipe**: (REQUIRED) Enter the keywords port-pipe followed by a Port-Pipe number to select the Port-Pipe for which to gather information. The range is 0.
- **address mac-addr**: (OPTIONAL) Enter the keyword address followed by a MAC address in the nnn:nnn:nnn:nnn:nnn:nn format to display information on that MAC address.
- **dynamic**: (OPTIONAL) Enter the keyword dynamic to display only those MAC addresses learned dynamically by the switch.
- **static**: (OPTIONAL) Enter the keyword static to display only those MAC address specifically configured on the switch.
interface interface  (OPTIONAL) Enter the keyword interface followed by the interface type, slot and port information:

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

vlan vlan-id  (OPTIONAL) Enter the keyword vlan followed by the VLAN ID to display the MAC address assigned to the VLAN. The range is from 1 to 4094.

Command Modes

•  EXEC
•  EXEC Privilege

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

show mac-address-table

Display the MAC address table.

Syntax

show mac-address-table [dynamic | static] [address mac-address | interface interface | vlan vlan-id] [count [vlan vlan-id] [interface interface-type [slot [/port]]]]

Parameters

dynamic  (OPTIONAL) Enter the keyword dynamic to display only those MAC addresses the switch dynamically learns. Optionally, you can also add one of these combinations: address/mac-address, interface/interface, or vlan vlan-id.

static  (OPTIONAL) Enter the keyword static to display only those MAC addresses specifically configured on the switch. Optionally, you can also add one of these combinations: address/mac-address, interface/interface, or vlan vlan-id.

address mac-address  (OPTIONAL) Enter the keyword address then a MAC address in the nn:nn:nn:nn:nn:nn format to display information on that MAC address.

interface interface  (OPTIONAL) Enter the keyword interface then the interface type, slot and port information:

  •  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.

interface interface-type  (OPTIONAL) Instead of entering the keyword interface then the interface type, slot and port information, as above, you can enter the interface type, then just a slot number.

vlans vlan-id  (OPTIONAL) Enter the keyword vlan then the VLAN ID to display the MAC address assigned to the VLAN. The range is 1 to 4094.
count  (OPTIONAL) Enter the keyword count, then optionally, by an interface or VLAN ID, to
display total or interface-specific static addresses, dynamic addresses, and MAC
addresses in use.

Command Modes

- EXEC
- EXEC Privilege

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

The following describes the `show mac-address-table` command shown in the following example.

<table>
<thead>
<tr>
<th>Column Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VlanId</td>
<td>Displays the VLAN ID number.</td>
</tr>
<tr>
<td>Type</td>
<td>Lists whether the MAC address was manually configured (Static), learned dynamically (Dynamic), or associated with a specific port (Sticky). An (N) indicates that the specified MAC address has been learnt by a neighbor and is synced to the node.</td>
</tr>
</tbody>
</table>
| Interface      | Displays the interface type and slot/port information. The following abbreviations describe the interface types:  
|                | • gi — Gigabit Ethernet then a slot/port.       |
|                | • po — Port Channel then a number. The range is from 1 to 255 for TeraScale. |
|                | • so — SONET then a slot/port.                   |
|                | • te — 10 Gigabit Ethernet then a slot/port.     |
| State          | Lists if the MAC address is in use (Active) or not in use (Inactive). |

Example

```
Dell#show mac-address-table
VlanId Mac Address     Type     Interface  State
20     00:00:c9:ad:f6:12 Dynamic Te 0/3     Active
Dell#  
```

Usage Information

The following describes the `show mac-address-table` command shown in the following example.

<table>
<thead>
<tr>
<th>Column Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VlanId</td>
<td>Displays the VLAN ID number.</td>
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<td>Type</td>
<td>Lists whether the MAC address was manually configured (Static), learned (Dynamic), or associated with a specific port (Sticky).</td>
</tr>
</tbody>
</table>
| Interface      | Displays the interface type and slot/port information. The following abbreviations describe the interface types:  
|                | • gi — Gigabit Ethernet then a slot/port.       |
|                | • po — Port Channel then a number. The range is from 1 to 255 for TeraScale. |
|                | • so — SONET then a slot/port.                   |
|                | • te — 10 Gigabit Ethernet then a slot/port.     |
### Column Heading  Description
- gi — Gigabit Ethernet then a slot/port
- po — Port Channel then a number. The range is from 1 to 255. \n- so — SONET then a slot/port.
- te — 10-Gigabit Ethernet then a slot/port.

### State
Lists if the MAC address is in use (Active) or not in use (Inactive).

The following describes the `show mac-address-table count` command shown in the following example.

<table>
<thead>
<tr>
<th>Line Beginning With</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC Entries...</td>
<td>Displays the number of MAC entries learned per VLAN.</td>
</tr>
<tr>
<td>Dynamic Address...</td>
<td>Lists the number of dynamically learned MAC addresses.</td>
</tr>
<tr>
<td>Static Address...</td>
<td>Lists the number of user-defined MAC addresses.</td>
</tr>
<tr>
<td>Total MAC...</td>
<td>Lists the total number of MAC addresses the switch uses.</td>
</tr>
</tbody>
</table>

#### Example (Count)
```
Dell#show mac-address-table count
MAC Entries for all vlans :
Dynamic Address Count : 5
Static Address (User-defined) Count : 0
Total MAC Addresses in Use: 5
Dell#
```
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 describes the LLDP commands.

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 FN I/O Aggregator Configuration Guide.

Topics:
- `advertise dot3-tlv`
- `advertise management-tlv`
- `advertise interface-port-desc`
- `clear lldp counters`
- `clear lldp neighbors`
- `debug lldp interface`
- `disable`
- `hello`
- `multiplier`
- `protocol lldp (Configuration)`
- `protocol lldp (Interface)`
- `show lldp neighbors`
- `show lldp statistics`

`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)
Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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<tbody>
<tr>
<td>9.9(0.0)</td>
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<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

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)

Supported Modes

Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

Usage Information

The command options system-capabilities, system-description, and system-name can be invoked individually or together, in any sequence.
advertise interface-port-desc

Advertise port descriptor.

Syntax
advertise interface-port-desc {description | port-id}
To remove the advertised port descriptor, use the no advertise interface-port-desc {description | port-id} command.

Parameters
description Enter the keyword description then the interface description.
port-id Enter the keyword port-id then the port-id. The range is from 0 to 7.

Defaults None

Command Modes CONFIGURATION (conf-lldp)
INTERFACE (conf-if-interface-lldp)

Command History This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version Description
9.11(2.0P1) Introduced the description and port-id options.

Usage Information If you do not specify the option, by default the port-id takes higher precedence and sends the port-id in the LLDP packets.

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

Supported Modes All Modes

Command History

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

Supported Modes

```
Programmable-Mux (PMUX)
```

Command History

```
Version Description
9.2(0.0) Introduced on the M I/O Aggregator.
8.3.16.1 Introduced on the MXL 10/40GbE Switch IO Module.
```

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

Supported Modes All Modes

Command History

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

**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)

Supported Modes Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</tbody>
</table>

Related Commands debug lldp interface — debugs LLDP.

**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)
**Supported Modes**

| Programmed-Mux (PMUX) |

**Command History**

<table>
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</tr>
</tbody>
</table>

**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)
- INTERFACE (conf-if-interface-lldp)

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
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</tr>
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</table>

**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)

**Supported Modes**

All Modes
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)

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

This command is available only in PMUX mode.

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

Supported Modes
All Modes

Command History

Version  Description
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

Supported Modes
All Modes

Command History

Version  Description
9.9(0.0)  Introduced on the FN IOM.
9.4(0.0)  Supported on the FN I/O Aggregator.
8.3.17.0  Supported on the M I/O Aggregator.

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#
Object Tracking supports IPv4 and IPv6, and is available on the Dell Networking platforms.

Object tracking allows you to define objects of interest, monitor their state, and report to a client when a change in an object’s state occurs. The following tracked objects are supported:

- Link status of Layer 2 interfaces
- Routing status of Layer 3 interfaces (IPv4 and IPv6)
- Reachability of IPv4 and IPv6 routes
- Metric thresholds of IPv4 and IPv6 routes

You can configure client applications, such as virtual router redundancy protocol (VRRP), to receive a notification when the state of a tracked object changes.

Topics:
- IPv4 Object Tracking Commands
- IPv6 Object Tracking Commands

### IPv4 Object Tracking Commands

The following section describes the IPv4 VRRP commands.

#### debug track

Enables debugging for tracked objects.

**Syntax**

```
debug track [all | notifications | object-id]
```

**Parameters**

- **all**
  - Enables debugging on the state and notifications of all tracked objects.

- **notifications**
  - Enables debugging on the notifications of all tracked objects.

- **object-id**
  - Enables debugging on the state and notifications of the specified tracked object. The range is 1 to 500.

**Defaults**

Enable debugging on the state and notifications of all tracked objects (`debug track all`).

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
Example

```
Dell#debug track all

04:35:04: %RPM0-P:RP2 %OTM-5-STATE: track 6 - Interface TenGigabitEthernet 1/2 line-protocol DOWN

04:35:04: %RPM0-P:RP2 %OTM-5-NOTIF: VRRP notification: resource ID 6 DOWN
```

delay

Configure the time delay used before communicating a change in the status of a tracked object to clients.

**Syntax**

```
delay { [up seconds] [down seconds] }
```

To return to the default setting, use the `no delay` command.

**Parameters**

- `seconds` Enter the number of seconds the object tracker waits before sending a notification about the change in the UP and/or DOWN state of a tracked object to clients. The range is 0 to 180. The default is **0 seconds**.

**Defaults**

**0 seconds**

**Command Modes**

OBJECT TRACKING (conf_track_object-id)

**Command History**

- **Version 9.7(0.0)**
  - Introduced on the M I/O Aggregator.

**Usage Information**

You can configure an UP and/or DOWN timer for each tracked object to set the time delay before a change in the state of a tracked object is communicated to clients. The configured time delay starts when the state changes from UP to DOWN or vice-versa.

If the state of an object changes back to its former UP/DOWN state before the timer expires, the timer is cancelled and the client is not notified. For example, if the DOWN timer is running when an interface goes down and comes back up, the DOWN timer is cancelled and the client is not notified of the event.

If the timer expires and an object’s state has changed, a notification is sent to the client. If no delay is configured, a notification is sent immediately after a change in the state of a tracked object is detected. The time delay in communicating a state change is specified in seconds.

description

Enter a description of a tracked object.

**Syntax**

```
description { text }
```

To remove the description, use the `no description { text }` command.

**Parameters**

- `text` Enter a description to identify a tracked object (80 characters maximum).

**Defaults**

**none**

**Command Modes**

OBJECT TRACKING (conf_track_object-id)
show running-config track

Display the current configuration of tracked objects.

Syntax

```
show running-config track [object-id]
```

Parameters

- **object-id**
  
  (OPTIONAL) Display information on the specified tracked object. The range is 1 to 500.

Command Modes

- EXEC Privilege

Command History

- Version 9.7(0.0) Introduced on the M I/O Aggregator.

Example

```
Dell#show running-config track

track 1 ip route 23.0.0.0/8 reachability
track 2 ipv6 route 2040::/64 metric threshold
delay down 3
delay up 5
threshold metric up 200
track 3 ipv6 route 2050::/64 reachability
track 4 interface TenGigabitEthernet 1/2 ip routing
track 5 ip route 192.168.0.0/24 reachability vrf red
track resolution ip route isis 20
track resolution ip route ospf 10
```

Example (Object-id)

```
Dell#show running-config track 300

track 300 ip route 10.0.0.0/8 metric threshold
delay down 3
delay up 5
threshold metric up 100
```

Related Commands

- **track ip route metric threshold** – configures object tracking on the threshold of an IPv4 route metric.
- **track ip route reachability** – configures object tracking on the reachability of an IPv4 route.
**show track**

Display information about tracked objects, including configuration, current tracked state (UP or DOWN), and the clients which are tracking an object.

**Syntax**

```
```

**Parameters**

- **object-id** (OPTIONAL) Display information on the specified tracked object. The range is 1 to 500.
- **interface** (OPTIONAL) Display information on all tracked interfaces (Layer 2 and IPv4 Layer 3).
- **ip route** (OPTIONAL) Display information on all tracked IPv4 routes.
- **resolution** (OPTIONAL) Display information on the configured resolution values used to scale protocol-specific route metrics. The range is 0 to 255.
- **brief** (OPTIONAL) Display a single line summary of the tracking information for a specified object, object type, or all tracked objects.

**Command Modes**

EXEC Privilege

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

The following describes the `show track` command shown in the Example below.

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track object-id</td>
<td>Displays the number of the tracked object.</td>
</tr>
<tr>
<td>Interface type slot/port, IP route ip-address, IPv6 route ipv6-address</td>
<td>Displays the interface type and slot/port number or address of the IPv4/IPv6 route that is being tracked.</td>
</tr>
<tr>
<td>object is Up/Down</td>
<td>Up/Down state of tracked object; for example, IPv4 interface, reachability or metric threshold of an IP route.</td>
</tr>
<tr>
<td>number changes, last change time</td>
<td>Number of times that the state of the tracked object has changed and the time since the last change in hours:minutes:seconds.</td>
</tr>
<tr>
<td>First hop interface</td>
<td>Displays the type and slot/port number of the first-hop interface of the tracked route.</td>
</tr>
<tr>
<td>Tracked by</td>
<td>Client that is tracking an object's state; for example, VRRP.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show track

Track 1
    IP route 23.0.0.0/8 reachability
    Reachability is Down (route not in route table)
    2 changes, last change 00:16:08
    Tracked by:

Track 2
    IPv6 route 2040::/64 metric threshold
    Metric threshold is Up (STATIC/0/0)
    5 changes, last change 00:02:16
    Metric threshold down 255 up 254
```
First-hop interface is TenGigabitEthernet 1/2
Tracked by:
    VRRP TenGigabitEthernet 2/3 IPv6 VRID 1

Track 3
    IPv6 route 2050::/64 reachability
    Reachability is Up (STATIC)
    5 changes, last change 00:02:16
    First-hop interface is TenGigabitEthernet 1/2
    Tracked by:
        VRRP TenGigabitEthernet 2/3 IPv6 VRID 1

Usage Information
The following describes the show track brief command shown in the Example below.

Output       Description
ResID        Number of the tracked object.
Resource     Type of tracked object.
Parameter    Detailed description of the tracked object.
State        Up or Down state of the tracked object.
Last Change  Time since the last change in the state of the tracked object.

Example (Brief)
Dell>show track brief
ResId Resource               Parameter   State LastChange
1     IP route reachability   10.16.0.0/16 Up   00:01:08
2     Interface line-protocol Ethernet0/2 Down 00:05:00
3     Interface ip routing    VLAN100      Up   01:10:05

threshold metric

Configure the metric threshold used to determine the UP and/or DOWN state of a tracked IPv4 or IPv6 route.

Syntax
threshold metric {up number | down number}

To return to the default setting, use the no threshold metric {up number | down number} command.

Parameters
up number Enter a number for the UP threshold to be applied to the scaled metric of an IPv4 or IPv6 route. The default UP threshold is 254. The routing state is UP if the scaled route metric is less than or equal to the UP threshold.

down number Enter a number for the DOWN threshold to be applied to the scaled metric of an IPv4 or IPv6 route. The default DOWN threshold is 255. The routing state is DOWN if the scaled route metric is greater than or equal to the DOWN threshold.

Defaults
none

Command Modes
OBJECT TRACKING (conf_track_object-id)

Command History
Version Description
9.7(0.0) Introduced on the M I/O Aggregator.
Usage Information

Use this command to configure the UP and/or DOWN threshold for the scaled metric of a tracked IPv4 or IPv6 route.

Determine the UP/DOWN state of a tracked route by the threshold for the current value of the route metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client always considers a lower value to have priority over a higher value.

The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

Configure the UP and DOWN thresholds for each tracked route with the threshold metric command. The default UP threshold is 254; the default DOWN threshold is 255. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

The tracking process uses a protocol-specific resolution value to convert the actual metric in the routing table to a scaled metric in the range 0 to 255. You can configure the resolution value used to scale route metrics for supported protocols with the track resolution ip route and track resolution ipv6 route commands.

track interface ip routing

Configure object tracking on the routing status of an IPv4 Layer 3 interface.

Syntax

track object-id interface interface ip routing

To return to the default setting, use the no track object-id command.

Parameters

- object-id
  - Enter the ID number of the tracked object. The range is 1 to 500.
- interface
  - Enter one of the following values:
    - 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 Loopback interface, enter the keyword loopback then a number from 0 to 16383.
    - For a port channel interface, enter the keywords port-channel then a number.
    - For a tunnel interface, enter the keyword tunnel.
    - For a VLAN interface, enter the keyword vlan then a number from 1 to 4094.

Defaults

- none

Command Modes

- CONFIGURATION
track interface line-protocol

Configure object tracking on the line-protocol state of a Layer 2 interface.

Syntax
track object-id interface interface line-protocol
To return to the default setting, use the no track object-id command.

Parameters
object-id
Enter the ID number of the tracked object. The range is 1 to 500.

interface
Enter one of the following values:
- 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 Loopback interface, enter the keyword loopback then a number from 0 to 16383.
- For a port channel interface, enter the keywords port-channel then a number.
- For a tunnel interface, enter the keyword tunnel.
- For a VLAN interface, enter the keyword vlan then a number from 1 to 4094.

Defaults
none

Command Modes
CONFIGURATION

Command History
Version
9.7(0.0)
Introduced on the M I/O Aggregator.

Usage Information
Use this command to create an object that tracks the line-protocol state of a Layer 2 interface by monitoring its operational status (UP or DOWN).

When the link-level status goes down, the tracked object status is considered to be DOWN; if the link-level status is up, the tracked object status is considered to be UP.

Related Commands
- show track – displays information about tracked objects, including configuration, current state, and clients which track the object.
- track interface ip routing – configures object tracking on the routing status of an IPv4 Layer 3 interface.
**track ip route metric threshold**

Configure object tracking on the threshold of an IPv4 route metric.

**Syntax**

```
track object-id ip route ip-address/prefix-len metric threshold
```

To return to the default setting, use the `no track object-id` command.

**Parameters**

- `object-id` : Enter the ID number of the tracked object. The range is 1 to 500.
- `ip-address/prefix-len` : Enter an IPv4 address in dotted decimal format. The valid IPv4 prefix lengths are from `/0` to `/32`.

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Use this command to create an object that tracks the UP and/or DOWN threshold of an IPv4 route metric. In order for a route's metric to be tracked, the route must appear as an entry in the routing table.

A tracked IPv4 route is considered to match an entry in the routing table only if the exact IPv4 address and prefix length match a table entry. For example, when configured as a tracked route, 10.0.0.0/24 does not match the routing table entry 10.0.0.0/8. If no route-table entry has the exact IPv4 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure the threshold of an IPv4 route metric as a tracked object, the UP/DOWN state of the tracked route is also determined by the current metric for the route in the routing table.

To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client always considers a lower value to have priority over a higher value. The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

You configure the UP and DOWN thresholds for each tracked route by using the `threshold metric` command. The default UP threshold is 254; the default DOWN threshold is 255. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

**Related Commands**

- `show track` – displays information about tracked objects, including configuration, current state, and clients which track the object.
- `threshold metric` – configures the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- `track resolution ip route` – configures the protocol-specific resolution value used to scale an IPv4 route metric.
track ip route reachability

Configure object tracking on the reachability of an IPv4 route.

Syntax

```
track object-id ip route ip-address/prefix-len reachability [vrf vrf-name]
```

To return to the default setting, use the `no track object-id` command.

Parameters

- **object-id**: Enter the ID number of the tracked object. The range is 1 to 500.
- **ip-address/prefix-len**: Enter an IPv4 address in dotted decimal format. The valid IPv4 prefix lengths are from /0 to /32.
- **vrf vrf-name**: (Optional) E-Series only: You can configure a VPN routing and forwarding (VRF) instance to specify the virtual routing table to which the tracked route belongs.

Defaults

```
none
```

Command Modes

```
CONFIGURATION
```

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

Use this command to create an object that tracks the reachability of an IPv4 route. In order for a route’s reachability to be tracked, the route must appear as an entry in the routing table.

A tracked IPv4 route is considered to match an entry in the routing table only if the exact IPv4 address and prefix length match a table entry. For example, when configured as a tracked route, 10.0.0.0/24 does not match the routing table entry 10.0.0.0/8. If no route-table entry has the exact IPv4 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure IPv4 route reachability as a tracked object, the UP/DOWN state of the tracked route is also determined by the entry of the next-hop address in the ARP cache. A tracked route is considered to be reachable if there is an ARP cache entry for the route's next-hop address.

If the next-hop address in the ARP cache ages out for a route tracked for its reachability, an attempt is made to regenerate the ARP cache entry to if the next-hop address appears before considering the route DOWN.

Related Commands

- `show track` – displays information about tracked objects, including configuration, current state, and clients which track the object.
- `track ip route metric threshold` – configures object tracking on the threshold of an IPv4 route metric.

track resolution ip route

Configure the protocol-specific resolution value used to scale an IPv4 route metric.

Syntax

```
track resolution ip route {isis resolution-value | ospf resolution-value}
```

To return to the default setting, use the `no track object-id` command.
Parameters

- **object-id**: Enter the ID number of the tracked object. The range is 1 to 500.
- **isis resolution-value**: Enter the resolution used to convert the metric in the routing table for ISIS routes to a scaled metric.
- **ospf resolution-value**: Enter the resolution used to convert the metric in the routing table for OSPF routes to a scaled metric.

Defaults

- none

Command Modes

- CONFIGURATION

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

Use this command to configure the protocol-specific resolution value that converts the actual metric of an IPv4 route in the routing table to a scaled metric in the range 0 to 255.

The UP/DOWN state of a tracked IPv4 route is determined by a user-configurable threshold (the `threshold metric` command) for the route’s metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible.

The protocol-specific resolution value calculates the scaled metric by dividing a route's cost by the resolution value set for the route protocol:

- For ISIS, you can set the resolution in the range 1 to 1000, where the default is 10.
- For OSPF, you can set the resolution in the range 1 to 1592, where the default is 1.
- The resolution value used to map static routes is not configurable. By default, Dell Networking OS assigns a metric of 0 to static routes.
- The resolution value used to map RIP routes is not configurable. The RIP hop-count is automatically multiplied by 16 to scale it. For example, a RIP metric of 16 (unreachable) scales to 256, which considers the route to be DOWN.

Related Commands

- `threshold metric` — configures the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- `track ip route metric threshold` — configures object tracking on the threshold of an IPv4 route metric.

### IPv6 Object Tracking Commands

The following object tracking commands apply to IPv4 and IPv6:

- `debug track`  
- `delay`  
- `description`  
- `show running-config track`  
- `threshold metric`  
- `track interface line-protocol`
**show track ipv6 route**

Display information about all tracked IPv6 routes, including configuration, current tracked state (UP or DOWN), and the clients which are tracking an object.

**Syntax**

```
show track ipv6 route [brief]
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>brief</td>
<td>(OPTIONAL) Display a single line summary of information for tracked IPv6 routes.</td>
</tr>
</tbody>
</table>

**Command Modes**

- EXEC
- EXEC Privilege

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

The following describes the `show track ipv6 route` command shown in the Example below.

**Output**

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track object-id</td>
<td>Displays the number of the tracked object.</td>
</tr>
<tr>
<td>Interface type slot/port, IP route ip-address, IPv6 route ipv6-address</td>
<td>Displays the interface type and slot/port number or address of the IPv4/IPv6 route that is being tracked.</td>
</tr>
<tr>
<td><code>object is Up/Down</code></td>
<td>Up/Down state of tracked object; for example, IPv4 interface, reachability or metric threshold of an IP route.</td>
</tr>
<tr>
<td><code>number changes, last change</code></td>
<td>Number of times that the state of the tracked object has changed and the time since the last change in <code>hours:minutes:seconds</code>.</td>
</tr>
<tr>
<td><code>First hop interface</code></td>
<td>Displays the type and slot/port number of the first-hop interface of the tracked route.</td>
</tr>
<tr>
<td>Tracked by</td>
<td>Client that is tracking an object’s state; for example, VRRP.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show track ipv6 route

Track 2
  IPv6 route 2040::/64 metric threshold
  Metric threshold is Up (STATIC/0/0)
    5 changes, last change 00:02:30
  Metric threshold down 255 up 254
  First-hop interface is TenGigabitEthernet 1/2
  Tracked by:
    VRRP TenGigabitEthernet 2/4 IPv6 VRID 1

Track 3
  IPv6 route 2050::/64 reachability
  Reachability is Up (STATIC)
    5 changes, last change 00:02:30
  First-hop interface is TenGigabitEthernet 1/2
  Tracked by:
    VRRP TenGigabitEthernet 2/4 IPv6 VRID 1
```

**Usage Command**

The following describes the `show track ipv6 route brief` command shown in the Example below.
**Input**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ResID</td>
</tr>
<tr>
<td>Number of the tracked object.</td>
</tr>
<tr>
<td>Resource</td>
</tr>
<tr>
<td>Type of tracked object.</td>
</tr>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Detailed description of the tracked object.</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Up or Down state of the tracked object.</td>
</tr>
<tr>
<td>Last Change</td>
</tr>
<tr>
<td>Time since the last change in the state of the tracked object.</td>
</tr>
</tbody>
</table>

**Example (Brief)**

```
Dell#show track ipv6 route brief
```

<table>
<thead>
<tr>
<th>ResId</th>
<th>Resource</th>
<th>Parameter</th>
<th>State</th>
<th>LastChange</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>IPv6 route metric threshold</td>
<td>2040::/64</td>
<td>Up</td>
<td>00:02:36</td>
</tr>
<tr>
<td>3</td>
<td>IPv6 route reachability</td>
<td>2050::/64</td>
<td>Up</td>
<td>00:02:36</td>
</tr>
</tbody>
</table>

**track interface ipv6 routing**

Configure object tracking on the routing status of an IPv6 Layer 3 interface.

**Syntax**

```
track object-id interface interface ipv6 routing
```

To return to the default setting, use the `no track object-id` command.

**Parameters**

- **object-id**
  - Enter the ID number of the tracked object. The range is 1 to 500.
- **interface**
  - Enter one of the following values:
    - 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 Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
    - For a port channel interface, enter the keywords `port-channel` then a number.
    - For a tunnel interface, enter the keyword `tunnel`.
    - For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

**Defaults**

```
none
```

**Command Modes**

```
CONFIGURATION
```

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Use this command to create an object that tracks the routing state of an IPv6 Layer 3 interface:

- The status of the IPv6 interface is UP only if the Layer 2 status of the interface is UP and the interface has a valid IP address.
- The Layer 3 status of an IPv6 interface goes DOWN when its Layer 2 status goes down (for a Layer 3 VLAN, all VLAN ports must be down) or the IP address is removed from the routing table.
Related Commands

- show track ipv6 route — displays information about tracked IPv6 routes, including configuration, current state, and clients which track the route.
- track interface ip routing — configures object tracking on the routing status of an IPv4 Layer 3 interface.

**track ipv6 route metric threshold**

Configure object tracking on the threshold of an IPv4 route metric.

**Syntax**

```
track object-id ipv6 route ipv6-address/prefix-len metric threshold
```

To return to the default setting, use the `no track object-id` command.

**Parameters**

- `object-id` Enter the ID number of the tracked object. The range is 1 to 500.
- `ipv6-address/prefix-len` Enter an IPv6 address in X:XX::X format. The valid IPv6 prefix lengths are from /0 to /128.

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

- **Version**
  - 9.7(0.0) Introduced on the M I/O Aggregator.

**Usage Information**

Use this command to create an object that tracks the UP and/or DOWN threshold of an IPv6 route metric. In order for a route's metric to be tracked, the route must appear as an entry in the routing table.

A tracked IPv6 route is considered to match an entry in the routing table only if the exact IPv6 address and prefix length match a table entry. For example, when configured as a tracked route, 3333:100:200:300:400::/80 does not match routing table entry 3333:100:200:300::/64. If no route-table entry has the exact IPv6 address and prefix length, the status of the tracked route is considered to be DOWN.

When you configure the threshold of an IPv6 route metric as a tracked object, the UP/DOWN state of the tracked route is also determined by the current metric for the route in the routing table.

To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible. The scaled metric value communicated to a client always considers a lower value to have priority over a higher value. The resulting scaled value is compared against the configured threshold values to determine the state of a tracked route as follows:

- If the scaled metric for a route entry is less than or equal to the UP threshold, the state of a route is UP.
- If the scaled metric for a route is greater than or equal to the DOWN threshold or the route is not entered in the routing table, the state of a route is DOWN.

You configure the UP and DOWN thresholds for each tracked IPv6 route by using the `threshold metric` command. The default UP threshold is 254; the default DOWN threshold is 255. The notification of a change in the state of a tracked object is sent when a metric value crosses a configured threshold.

**Related Commands**

- `show track ipv6 route` — displays information about tracked IPv6 routes, including configuration, current state, and clients which track the route.
• **threshold metric** – configures the metric threshold used to determine the UP and/or DOWN state of a tracked route.

• **track resolution ipv6 route** – configures the protocol-specific resolution value used to scale an IPv6 route metric.

## track ipv6 route reachability

Configure object tracking on the reachability of an IPv6 route.

**Syntax**

```
track object-id ipv6 route ip-address/prefix-len reachability
```

To return to the default setting, use the `no track object-id` command.

**Parameters**

- **object-id**
  - Enter the ID number of the tracked object. The range is 1 to 500.

- **ipv6-address/prefix-len**
  - Enter an IPv6 address in X:XX::X format. The valid IPv6 prefix lengths are from /0 to /128.

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Use this command to create an object that tracks the reachability of an IPv6 route. In order for a route’s reachability to be tracked, the route must appear as an entry in the routing table.

A tracked route is considered to match an entry in the routing table only if the exact IPv6 address and prefix length match a table entry. For example, when configured as a tracked route, 3333:100:200:300:400::/80 does not match routing table entry 3333:100:200:300::/64. If no route-table entry has the exact IPv6 address and prefix length, the tracked route is considered to be DOWN.

When you configure IPv6 route reachability as a tracked object, the UP/DOWN state of the tracked route is also determined by the entry of the next-hop address in the ARP cache. A tracked route is considered to be reachable if there is an ARP cache entry for the route’s next-hop address.

If the next-hop address in the ARP cache ages out for a route tracked for its reachability, an attempt is made to regenerate the ARP cache entry to if the next-hop address appears before considering the route DOWN.

**Related Commands**

- **show track ipv6 route** – displays information about tracked IPv6 routes, including configuration, current state, and clients which track the route.

## track resolution ipv6 route

Configure the protocol-specific resolution value used to scale an IPv6 route metric.

**Syntax**

```
track resolution ipv6 route {isis resolution-value | ospf resolution-value}
```

To return to the default setting, use the `no track object-id` command.
**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>object-id</td>
<td>Enter the ID number of the tracked object. Use the range to 1 to 500.</td>
</tr>
<tr>
<td>isis resolution-value</td>
<td>Enter the resolution used to convert the metric in the routing table for ISIS routes to a scaled metric.</td>
</tr>
<tr>
<td>ospf resolution-value</td>
<td>Enter the resolution used to convert the metric in the routing table for OSPF routes to a scaled metric.</td>
</tr>
</tbody>
</table>

**Defaults**

none

**Command Modes**

CONFIGURATION

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Use this command to configure the protocol-specific resolution value that converts the actual metric of an IPv6 route in the routing table to a scaled metric in the range 0 to 255.

The UP/DOWN state of a tracked IPv6 route is determined by the user-configurable threshold (the `threshold metric` command) for a route's metric in the routing table. To provide a common tracking interface for different clients, route metrics are scaled in the range 0 to 255, where 0 is connected and 255 is inaccessible.

The protocol-specific resolution value calculates the scaled metric by dividing a route's cost by the resolution value set for the route protocol:

- For ISIS, you can set the resolution in the range 1 to 1000, where the default is 10.
- For OSPF, you can set the resolution in the range 1 to 1592, where the default is 1.
- The resolution value used to map static routes is not configurable. By default, Dell Networking OS assigns a metric of 0 to static routes.
- The resolution value used to map RIP routes is not configurable. The RIP hop-count is automatically multiplied by 16 to scale it. For example, a RIP metric of 16 (unreachable) scales to 256, which considers the route to be DOWN.

**Related Commands**

- `threshold metric` — configures the metric threshold used to determine the UP and/or DOWN state of a tracked route.
- `track ipv6 route metric threshold` — configures object tracking on the threshold of an IPv6 route metric.
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.

Topics:

- description
- monitor session
- show config
- show monitor session
- show running-config monitor session
- source (port monitoring)
**description**

Enter a description of this monitoring session.

**Syntax**

description {description}

To remove the description, use the 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)

**Supported Modes**
All Modes

**Command History**

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

**monitor session**

Create a session for monitoring traffic with port monitoring.

**Syntax**

monitor session session-ID

To delete a session, use the no monitor session session-ID command.

To delete all monitor sessions, use the 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

**Supported Modes**
All Modes

**Command History**

<table>
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<tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information** The 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)
show config

Display the current monitor session configuration.

**Syntax**
show config

**Defaults**
none

**Command Modes**
MONITOR SESSION (conf-mon-sess-session-ID)

**Supported Modes**
All Modes

**Command History**

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

**Example**

Dell(conf-mon-sess-1)#show config

```plaintext
monitor session 1
source TenGigabitEthernet 0/1 destination Port-channel 1 direction rx
```

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

**Supported Modes**
All Modes

**Command History**

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

**Example**

Dell#show monitor session

<table>
<thead>
<tr>
<th>SessID</th>
<th>Source</th>
<th>Destination</th>
<th>Dir</th>
<th>Mode</th>
<th>Source IP</th>
<th>Dest IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vl 10</td>
<td>Te 0/8</td>
<td>rx</td>
<td>Flow</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**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

Supported Modes

All Modes

Command History

Version Description
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 running-config monitor session
!
monitor session 1
source TenGigabitEthernet 0/1 destination TenGigabitEthernet 0/2 direction rx

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.
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)

**Supported Modes**
All Modes

**Command History**

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

**Example**

```bash
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 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.

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

- **percentage**: Enter the percentage assignment of weight to the class/queue. The range is from 1 to 100% (granularity 1%).

Defaults

none

Command Modes

CONFIGURATION (conf-qos-policy-out)

Supported Modes

Programmable-Mux (PMUX)

Command History

- **Version**
  - 9.9(0.0): Introduced on the FN IOM.
  - 9.4(0.0): Supported on the FN I/O Aggregator.
  - 9.2(0.0): Introduced on the M I/O Aggregator.
  - 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)

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
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</tr>
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</tr>
<tr>
<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Related Commands**

- `policy-map-output` — creates an output policy map.
- `qos-policy-output` — creates an output QoS-policy on the router.

---

**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>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</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.

### 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` (Required) 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)

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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<td>8.3.16.1</td>
<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Usage Information**

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.
If only aggregate input QoS policy exists, input traffic conditioning configurations (rate-police) apply. Any marking configurations in aggregate input QoS policy are ignored.

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**

```text
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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

- **Version** 9.9(0.0) 
  Introduced on the FN IOM.
- **Version** 9.4(0.0) 
  Supported on the FN I/O Aggregator.
- **Version** 9.2(0.0) 
  Introduced on the M I/O Aggregator.
- **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**

```text
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

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
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</table>

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.

**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

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
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</table>

**Usage Information**
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-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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
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</table>

**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.

---

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
  - 10-7
Command Modes

Supported Modes

Supported Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
8.3.17.0 Supported on the M I/O Aggregator.

Usage Information

To apply dot1p-queue-mapping, use the service-class dynamic dot1p command.

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>
<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>

Command Modes

• INTERFACE
• CONFIGURATION
Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the MI/O Aggregator.</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

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 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-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

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
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<td>Introduced on the MXL 10/40GbE Switch IO Module.</td>
</tr>
</tbody>
</table>

**Usage Information**

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 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 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)

Supported Modes

Programmable-Mux (PMUX)

Command History

Version Description

9.9(0.0) Introduced on the FN IOM.

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

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

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

Usage Information

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 dcb-map

Display the DCB parameters configured in a specified DCB map.

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
show qos dcb-map
dcb-map2

show qos dcb-map dcbmap2

Example

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 Description

9.9(0.0) Introduced on the FN IOM.
**Version** | **Description**
---|---
9.4(0.0) | Supported on the FN I/O Aggregator.
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#
```

**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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tbody>
</table>

**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
    Wred green wg
Dell#
```
This chapter describes various types of security commands in the Dell Networking OS, in the following sections:

The commands are listed in the following sections:

- AAA Accounting Commands
- Authentication and Password Commands
- RADIUS Commands
- TACACS+ Commands
- SSH Server and SCP Commands

**NOTE:** Starting with the Dell Networking OS version 7.2.1.0, LEAP with MSCHAP v2 supplicant is implemented.

**Topics:**

- AAA Accounting Commands
- Authentication and Password Commands
- RADIUS Commands
- Suppressing AAA Accounting for Null Username Sessions
- TACACS+ Commands
- SSH Server and SCP Commands
- ICMP Commands

### 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**

```plaintext
aaa accounting {system | exec | commands level} {name | default}{start-stop | wait-start | stop-only} {tacacs+}
```

**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

Supported Modes All Modes

Command History

<table>
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<tr>
<th>Version</th>
<th>Description</th>
</tr>
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<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
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</tbody>
</table>

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

Dell(conf)# aaa accounting exec default start-stop tacacs+
Dell(conf)# aaa accounting command 15 default start-stop tacacs+
Dell(config)#

Related Commands enable password — changes the password for the enable command.

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.

aaa accounting suppress null-username
Accounting records are recorded for all users.

**Command Modes**
CONFIGURATION

**Supported Modes**
All Modes

**Command History**

<table>
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<th>Version</th>
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<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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.

### aaa authorization commands

Set parameters that restrict (or permit) a user’s access to EXEC and CONFIGURATION level commands.

**Syntax**

```
aaa authorization commands {level | role role-name}{name|default} {local | tacacs+ | none}
```

 Undo a configuration with the `no aaa authorization commands {level | role role-name}{name|default} {local | tacacs+ | none} command.

**Parameters**

- **commands level**
  - Enter the keyword `commands` then the command privilege level for command level authorization.
- **role role-name**
  - Enter the keyword `role` then the role name.
- **name**
  - Define a name for the list of authorization methods.
- **default**
  - Define the default list of authorization methods.
- **local**
  - Use the authorization parameters on the system to perform authorization.
- **tacacs+**
  - Use the TACACS+ protocol to perform authorization.
- **none**
  - Enter the keyword `none` to apply no authorization.

**Defaults**

- none

**Command Modes**
CONFIGURATION

**Supported Modes**
All Modes

**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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the M I/O Aggregator</td>
</tr>
</tbody>
</table>
aaa authorization config-commands

Set parameters that restrict (or permit) a user’s access to EXEC level commands.

Syntax

```plaintext
aaa authorization config-commands

Disable authorization checking for CONFIGURATION level commands using the no aaa authorization config-commands command.
```

Defaults

Enabled when you configure aaa authorization commands command.

Command Modes

CONFIGURATION

Supported Modes

All Modes

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 table lists the Dell Networking OS version history for this command.

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<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.6.(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

By default, the `aaa authorization commands` command configures the system to check both EXEC level and CONFIGURATION level commands. Use the command `no aaa authorization config-commands` to enable only EXEC-level command checking.

aaa authorization exec

Set parameters that restrict (or permit) a user’s access to EXEC-level commands.

Syntax

```plaintext
aaa authorization exec {name | default} {local || tacacs+ || if-authenticated || none}

To disable authorization checking for EXEC level commands, use the no aaa authorization exec command.
```

Parameters

- `name`: Define a name for the list of authorization methods.
- `default`: Define the default list of authorization methods.
- `local`: Use the authorization parameters on the system to perform authorization.
- `tacacs+`: Use the TACACS+ protocol to perform authorization.
- `none`: Enter the keyword none to apply no authorization.

Defaults

None

Command Modes

CONFIGURATION

Supported Modes

All Modes
This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

The following table lists the Dell Networking OS version history for this command.

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<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>

```
accounting
```

Apply an accounting method list to terminal lines.

**Syntax**

```
accounting {exec | commands {level | role role-name} method-list}
```

**Parameters**

- `exec`
  - Enter the keyword `exec` to apply an EXEC level accounting method list.
- `commands {level | role role-name}`
  - Enter the keywords `commands level` to apply an EXEC and CONFIGURATION level accounting method list or enter the keywords `commands role` and then the role name for accounting of commands run by a user with that role.
- `method-list`
  - Enter a method list that you defined using the `aaa accounting exec` or `aaa accounting commands`.

**Defaults**

none

**Command Modes**

- LINE

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
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</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Related Commands**

- `aaa accounting` — enables AAA Accounting and creates a record for monitoring the accounting function.

**Example**

The following example configures accounting for the role `secadmin` using default method:

```
Dell(conf-vty-0)# accounting commands role secadmin default
```

```
show accounting
```

Display the active accounting sessions for each online user.

**Syntax**

```
show accounting
```

**Defaults**

none

**Command Modes**

- EXEC
Supported Modes

All Modes

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 table lists the Dell Networking OS version history for this command.

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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 Role <none>
    Task ID 2, EXEC Accounting record, 00:02:03 Elapsed, service=shell
Active accounted actions on tty3, User ad Priv 15 Role <none>
    Task ID 7, EXEC Accounting record, 00:01:22 Elapsed, service=shell
Active accounted actions on tty4, User ad Priv 15 Role <none>
    Task ID 11, EXEC Accounting record, 00:00:35 Elapsed, service=shell
Active accounted actions on tty5, User ad1 Priv1 Role sysadmin
    Task ID 16, EXEC Accounting record, 00:00:04 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 commands that control the management access to the system.

aaa authentication enable

Configure AAA Authentication method lists for user access to EXEC privilege mode (the “Enable” access).

Syntax

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.
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).

Defaults
Not configured (that is, no authentication is performed).

Command Modes
CONFIGURATION

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.11(0.0)</td>
<td>Included a prompt to force the users to re-authenticate, when re-authentication is enabled.</td>
</tr>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

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.
aaa reauthenticate enable

Enable re-authentication of user whenever there is a change in the authenticators.

Syntax
aaa reauthenticate enable

To disable the re-authentication option, use the no aaa reauthenticate enable command.

Defaults
Disabled

Command Modes
CONFIGURATION

Command History
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version Description
9.11(0.0) Introduced this command.

Usage Information
When an operating system enables to change the user authenticators, the users might access resources and perform tasks that they do not have authorization.

Once re-authentication is enabled, Dell EMC Networking OS prompts the users to re-authenticate whenever there is a change in authenticators.

The change in authentication happens when:

- Add or remove an authentication server (RADIUS/TACACS+)
- Modify an AAA authentication/authorization list
- Change to role-only (RBAC) mode

The re-authentication is also applicable for authenticated 802.1x devices. When there is a change in the authentication servers, the supplicants connected to all the ports are forced to re-authenticate.

Example

DellEMC(config)#aaa reauthenticate enable
DellEMC(config)#aaa authentication login vty_auth_list radius
Force all logged-in users to re-authenticate (y/n)?
DellEMC(config)#radius-server host 192.100.0.12
Force all logged-in users to re-authenticate (y/n)?

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.

Parameters
- c: 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".

**Defaults**
No banner is displayed.

**Command Modes**
CONFIGURATION

**Supported Modes**
All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tbody>
</table>

**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 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.
- **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.
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

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
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<tbody>
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<td>9.9(0.0)</td>
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<td>Supported on the FN I/O Aggregator.</td>
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<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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

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

**Supported Modes**
All Modes

**Command History**

<table>
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</tbody>
</table>

**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.

**Command Modes**

EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
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</tbody>
</table>
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

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
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</tbody>
</table>

exec-banner

Enable the display of a text string when the user enters EXEC mode.

Syntax
eexec-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

Supported Modes
All Modes

Command History

<table>
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<tr>
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</table>

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

Supported Modes

All Modes

Command History

<table>
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<td>9.3.(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
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</table>

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 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

**Supported Modes**

All Modes

**Command History**

<table>
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<td>9.3.(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
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</table>

### 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

**Supported Modes**

All Modes

**Command History**

<table>
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</table>

**Usage Information**

If you configure the `aaa authentication login default` command, the `login authentication default` command automatically is applied to all terminal lines.

**Related Commands**

- `aaa authentication login` — selects the login authentication methods.
**secure-cli enable**

Enable the secured CLI mode.

**Syntax**

secure-cli enable

**Command Modes**

CONFIGURATION

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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<tbody>
<tr>
<td>9.11(0.0)</td>
<td>Introduced this command.</td>
</tr>
</tbody>
</table>

**Usage Information**

The secured CLI mode prevents the users from enhancing the permissions or promoting the privilege levels. After entering the command, save the running-configuration.

Once you save the running-configuration, the secured CLI mode is enabled. If you do not want to enter the secured mode, do not save the running-configuration.

Once saved, to disable the secured CLI mode, you need to manually edit the startup-configuration file and reboot the system.

### 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

**Supported Modes**

All Modes

**Command History**

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</table>
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

hostname

Enter the name of the RADIUS server host.

ipv4-address | ipv6-address

Enter the IPv4 address (A.B.C.D) or IPv6 address (X::X::X) of the RADIUS server host.

auth-port port-number

(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 1812.

retransmit retries

(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 3 attempts.

timeout seconds

(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 5 seconds.

key [encryption-type] 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

Supported Modes

All Modes

Command History

Version Description

9.9(0.0) Introduced on the FN IOM.

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

9.3(0.0) Supported 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 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**

- `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 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`

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
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</tr>
</tbody>
</table>

**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.

**Related Commands**

- `radius-server host` — configures a RADIUS host.
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` Enter a number of attempts that Dell Networking Operating System (OS) tries to locate a RADIUS server. The range is from zero (0) to 100. The default is 3 retries.

Defaults

3 retries

Command Modes

CONFIGURATION

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.3(0.0) Supported 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

Supported Modes

All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
9.3(0.0) Supported on the M I/O Aggregator.
show privilege

View your access level.

**Syntax**

```
show privilege
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

<table>
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<tr>
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</tbody>
</table>

**Example**

```
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.

```
CONFIGURATION mode

aaa accounting suppress null-username
```

TACACS+ Commands

Dell Networking OS supports TACACS+ as an alternate method for login authentication.

**TACACS+ 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 | command 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

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.

Supported Modes

All Modes

Command History

<table>
<thead>
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<tr>
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<tr>
<td>9.5(0.0)</td>
<td>Supported on the FN I/O Aggregator and M I/O Aggregator.</td>
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</tbody>
</table>

Example

```
Dell(config)# aaa accounting exec default start-stop tacacs+
Dell(config)# aaa accounting command 15 default start-stop tacacs+
Dell(config)#
```

Related Commands

- `enable password` changes the password for the enable command.
- `login authentication` enables AAA login authentication on the terminal lines.
- `password` creates a password.
- `tacacs-server host` specifies a TACACS+ server host.
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) 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**

Supported Modes

All Modes

Command History

<table>
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</table>

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

**Supported Modes**
All Modes

**Command History**

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<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

**Supported Modes**
All Modes
### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### 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.

### 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.

- **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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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 v \]e`". When the password is created, you do not use the CNTL + v key combination and enter "`abcd\]e`".

**NOTE:** The question mark (?) is not a supported character.

Related Commands  
show running-config — views the current configuration.

**enable restricted**

Allows Dell Networking technical support to access restricted commands.

**Syntax**

```plaintext
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.

**Command Modes**

Not configured.

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

Only Dell Networking Technical Support staff use this command.

**enable sha256-password**

Configure SHA-256 based password for the `enable` command.

**Syntax**

```plaintext
enable sha256-password [level level] [encryption-type] password
```

To delete a password, use the `no enable sha256-password [encryption-type] password [level level]` command.
Parameters

- **sha256-password**: Enter the keyword `sha256-password` then the encryption-type or the password.
- **level level**: (OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.
- **encryption-type**: (OPTIONAL) Enter the number 8 or 0 as the encryption type.

Enter the `sha256-password` then the encryption-type or the password.

- **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

This guide is platform-specific. For command information about other platforms, see the relevant Dell Networking OS Command Line Reference Guide.

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Introduced on the MXL.</td>
</tr>
</tbody>
</table>

Related Commands

- `show running-config` — views the current configuration.

---

**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**

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Removed the support for hmac-sha2-256-96 algorithm.</td>
</tr>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show ip ssh
SSH server              : enabled.
SSH server version      : v1 and v2.
SSH server vrf          : default.
SSH server macs         : hmac-sha2-256, hmac-sha1, hmac-sha1-96, hmac-md5, hmac-md5-96.
Password Authentication : enabled.
Hostbased Authentication : disabled.
RSA Authentication      : disabled.
Vty          Encryption  HMAC          Remote IP
  2            aes128-cbc   hmac-md5      10.16.127.141
  4            aes128-cbc   hmac-md5      10.16.127.141
  *            aes128-cbc   hmac-md5      10.16.127.141
```

**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

**Supported Modes**

All Modes
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

Supported Modes
All Modes

Command History

Version Description
9.9(0.0) Introduced on the FN IOM.
9.4(0.0) Supported on the FN I/O Aggregator.
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
AAAAB3NzaC1yc2EAAAABIwAAAIEAox/QOp8xYhzOxn07yh4VGPAoUfgKolcTHO9G4snNV+ui+
DWEc3cgYAcUG5Ig1MU20rzhCwyDNp05tKBU3tReGl
08AxLi6+S4hyEMqHzkxBFNVqHzpQc
+Rs4p2urzV0F4pRKnaXdf3lk4D460HzRhhVrxqenPDpEnWIMPJi0
dsn= ashwani@poclab4

Dell#
show users

Allows you to view information on all users logged in to the switch.

Syntax

```
show users [all]
```

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>(OPTIONAL) Enter the keyword all to view all terminal lines in the switch.</td>
</tr>
</tbody>
</table>

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

Version Description
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 users
Authorization Mode: role or privilege

Line        User           Role        Priv Host(s)       Location
*   0  console 0                    unassigned       1  idle
    2  vty 0          admin         unassigned       1  idle       10.16.127.35
    3  vty 1          ad            unassigned       15  idle
    10.16.127.145
    4  vty 2          ad1           sysadmin         1  idle
    10.16.127.141
    5  vty 3          ad1           sysadmin         1  idle
    10.16.127.145
    6  vty 4          admin          unassigned       1  idle
    10.16.127.141
    7  vty 5          ad            unassigned       15  idle
    10.16.127.141
Dell#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssh</td>
<td>enables a user.</td>
</tr>
</tbody>
</table>

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} [-| username | -p port-number| -v {1|2}]```

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>Specifies the host name.</td>
</tr>
<tr>
<td>ipv4 address</td>
<td>Specifies the IPv4 address.</td>
</tr>
<tr>
<td>username</td>
<td>Specifies the username.</td>
</tr>
<tr>
<td>port-number</td>
<td>Specifies the port number.</td>
</tr>
<tr>
<td>version</td>
<td>Specifies the version of the SSH client.</td>
</tr>
</tbody>
</table>

Security

346
### 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.

- **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.

- **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**

### Supported Modes

- **All Modes**

### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Removed the support for hmac-sha2-256-96 algorithm.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

### Example

```
Dell#ssh 10.16.151.48 -l anvltest

Trying 10.16.151.48...
01:18:16: %STKUNIT0-M:CP %SEC-5-SSH_USAGE: Initiated SSH Client v2 (FIPS Disabled) to anvltest@10.16.151.48 by default from console
anvltest@10.16.151.48's password:
Last login: Thu Jan  5 00:17:47 2012 from login-maa-101
[anvltest@dt-maa-linux-1 ~]# exit
logout
Dell#
```

### username

Establish an authentication system based on user names.

#### Syntax

```
username name access-list-name [nopassword | (password | secret | sha256-password) [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.
• 8 to indicate that a password encrypted using a sha256 hashing algorithm follows. This encryption type is available with the `sha256-password` option only, and is the default encryption type for this 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.
`sha256-password` Enter the keyword `sha256-password` then the encryption-type or the password.

Defaults The default encryption type for the `password` option is 0. The default encryption type for the `secret` option is 5. The default encryption type for `sha256-password` option is 8.

Command Modes CONFIGURATION

Supported Modes All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.10(0.0)</td>
<td>Added support for the <code>sha256-password</code> option for S3100, S3048–ON, S4048–ON, S4810, S4820T, S5000, S6000, S6000–ON, Z9100–ON, MXL, and Z9500.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information To view the defined user names, use the `show running-config user` command.

Related Commands
- `enable sha256-password` — configures SHA-256 based password.
- `service password-encryption`— specifies a password for users on terminal lines.
- `show running-config`— views the current configuration.

**ICMP Commands**

The internet control message protocol (ICMP) is a network-layer internet protocol that provides message packets to report errors and other information regarding IP packet processing back to the source. Dell Networking OS mainly addresses the following ICMP vulnerabilities:

- ICMP Mask Reply
- ICMP Timestamp Request
- ICMP Replies
- IP ID Values Randomness

Dell Networking OS can be configured to drop ICMP reply messages in the kernel. When the `drop icmp` feature is configured, the system drops the ICMP reply messages on the front end and management interfaces. By default, the Dell Networking OS responds to all the ICMP messages. The Dell Networking OS suppresses the following ICMPv4 and ICMPv6 message types:
Table 3. Suppressed ICMPv4 message types

<table>
<thead>
<tr>
<th>ICMPv4 Message Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echo reply (0)</td>
</tr>
<tr>
<td>All sub types of destination unreachable (3)</td>
</tr>
<tr>
<td>Source quench (4)</td>
</tr>
<tr>
<td>Redirect (5)</td>
</tr>
<tr>
<td>Router advertisement (9)</td>
</tr>
<tr>
<td>Router solicitation (10)</td>
</tr>
<tr>
<td>Time exceeded (11)</td>
</tr>
<tr>
<td>IP header bad (12)</td>
</tr>
<tr>
<td>Timestamp request (13)</td>
</tr>
<tr>
<td>Timestamp reply (14)</td>
</tr>
<tr>
<td>Information request (15)</td>
</tr>
<tr>
<td>Information reply (16)</td>
</tr>
<tr>
<td>Address mask request (17)</td>
</tr>
<tr>
<td>Address mask reply (18)</td>
</tr>
</tbody>
</table>

**NOTE:** The Dell Networking OS does not suppress the ICMPv4 message type Echo request (8).

Table 4. Suppressed ICMPv6 message types

<table>
<thead>
<tr>
<th>ICMPv6 Message Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination unreachable (1)</td>
</tr>
<tr>
<td>Time exceeded (3)</td>
</tr>
<tr>
<td>IPv6 header bad (4)</td>
</tr>
<tr>
<td>Echo reply (129)</td>
</tr>
<tr>
<td>Who are you request (139)</td>
</tr>
<tr>
<td>Who are you reply (140)</td>
</tr>
<tr>
<td>Mtrace response (200)</td>
</tr>
<tr>
<td>Mtrace messages (201)</td>
</tr>
</tbody>
</table>
The Dell Networking OS does not suppress the following **ICMPv6** message types:

- Packet too big (2)
- Echo request (128)
- Multicast listener query (130)
- Multicast listener report (131)
- Multicast listener done (132)
- Router solicitation (133)
- Router advertisement (134)
- Neighbor solicitation (135)
- Neighbor advertisement (136)
- Redirect (137)
- Router renumbering (138)
- MLD v2 listener report (143)
- Duplicate Address Request (157)
- Duplicate Address Confirmation (158)

---

**drop icmp**

Drops the ICMPv4 and ICMPv6 packets.

**Syntax**

```plaintext
drop {icmp | icmpv6}
```

**Command Modes**

CONFIGURATION

**Command History**

This guide is platform-specific. For command information about other Platforms, see the relevant Dell Networking OS Command Line Reference Guide.

**Version**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.11.0.0</td>
<td>Introduced on the S4810, S4820T, S3048-ON, S3100 Series, S4048-ON, S5000, S6000, S6000-ON, Z9500, Z9100-ON, S6100-ON, S6010-ON, S4048T-ON, C9000, M IOA, FN IOM, and MXL.</td>
</tr>
</tbody>
</table>

**Usage Information**

When the `drop icmp` feature is configured, the system drops the ICMP reply messages on the front end and management interfaces. By default, the Dell Networking OS responds to all the ICMP messages.

**NOTE:** There is no separate CLI to enable IP ID randomness. By default, the IP ID in the kernel is randomized.
This chapter contains commands to configure and monitor the simple network management protocol (SNMP) v1/v2 and Syslog.

**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.

**NOTE:** The system does not support SNMPv3 traps in PMUX mode.

**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).

**show snmp**

Display the status of SNMP network elements.

**Syntax**

```
show snmp
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

Programmable-Mux (PMUX)

**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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

```
45418 SNMP packets input
  0 Bad SNMP version errors
 12 Unknown community name
  0 Illegal operation for community name supplied
  0 Encoding errors
45275 Number of requested variables
  0 Number of altered variables
  76 Get-request PDUs
45265 Get-next PDUs
  0 Set-request PDUs
45406 SNMP packets output
  0 Too big errors (Maximum packet size 1500)
  31 No such name errors
  0 Bad values errors
  0 General errors
45341 Response PDUs
  0 Trap PDUs
Dell#
```

Related Commands

- `snmp-server community` — enables the SNMP and set community string.

**show snmp engineID**

Display the identification of the local SNMP engine and all remote engines that are configured on the router.

**Syntax**

```
show snmp engineID
```

**Command Modes**

- EXEC
- EXEC Privilege

**Supported Modes**

Programmable-Mux (PMUX)

**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.

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</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

```
Dell#show snmp engineID
Local SNMP engineID: 0000178B0200001E80214A8
Remote Engine ID     IP-addr     Port
80001F88043132333435  172.31.1.3   5009
80001F88043938373635  172.31.1.3   5008
Dell#
```

Related Commands

- `snmp-server engineID` — configures local and remote SNMP engines on the router.
show snmp group

Display the group name, security model, status, and storage type of each group.

Syntax

    show snmp group

Command Modes

    •  EXEC
    •  EXEC Privilege

Supported Modes

Programmable-Mux (PMUX)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

The following Example displays a group named ngroup. The ngroup has a security model of version 3 (v3) with authentication (auth), the read and notify name is nview with no write view name specified, and finally the row status is active.

Example

    Dell#show snmp group
    groupname: v1v2creadg                        security model: v1
              readview : v1v2cdefault                     writeview: no write view specified
              notifyview: v1v2cdefault                     context: no context specified
              row status: active                           context: no context specified
    groupname: v1v2creadg                        security model: v2c
              readview : v1v2cdefault                     writeview: no write view specified
              notifyview: v1v2cdefault                     context: no context specified
              row status: active                           context: no context specified
    groupname: v1v2cwriteg                       security model: v1
              readview : v1v2cdefault                     writeview: v1v2cdefault
              notifyview: v1v2cdefault                     context: no context specified
              row status: active                           context: no context specified
    groupname: v1v2cwriteg                       security model: v2c
              readview : v1v2cdefault                     writeview: v1v2cdefault
              notifyview: v1v2cdefault                     context: no context specified
              row status: active                           context: no context specified

Dell#

Related Commands

    snmp-server group — configures an SNMP server group.

show snmp user

Display the information configured on each SNMP user name.

Syntax

    show snmp user
Command Modes

- EXEC
- EXEC Privilege

Supported Modes

Programmable-Mux (PMUX)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

```
Dell#show snmp user
User name: test
Engine ID: 0000178B020000102030407
storage-type: nonvolatile active
Authentication Protocol: None
Privacy Protocol: None
User name: v1v2cwriteu
Engine ID: 0000178B020000102030407
storage-type: nonvolatile active
Authentication Protocol: None
Privacy Protocol: None
Dell#
```

### snmp context

Enables you to map a bgp vrf instance within a SNMP context through community mapping, in SNMPv2c and SNMPv3.

**Syntax**

```
[no] snmp context [context name]
```

**Parameters**

- **context name**
  
Enter a unique name for the context.

**Defaults**

None

**Command Modes**

CONFIGURATION

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.13(0.0)</td>
<td>Introduced on all DNOS platforms.</td>
</tr>
</tbody>
</table>

**Usage Information**

This command is used for mapping SNMP context to a VRF instance within a community, in SNMPv2c and SNMPv3. The no version of this command turns off this feature.
**snmp-server community**

Configure a new community string access for SNMP v3.

**Syntax**
```
snmp-server community community-name {ro | rw} {ipv6 ipv6-access-list-name | ipv6 ipv6-access-list-name | access-list-name | security-name name} | security-name name [ipv6 ipv6-access-list-name | access-list-name | security-name name] | access-list-name [ipv6 ipv6-access-list-name | access-list-name | security-name name]]
```

To remove access to a community, use the no snmp-server community community-string {ro | rw} [security-name name [access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]] command.

**Parameters**
- **community-name**: Enter a text string (up to 20 characters long) to act as a password for SNMP.
- **ro**: Enter the keyword ro to specify read-only permission.
- **rw**: Enter the keyword rw to specify read-write permission.
- **ipv6 access-list-name**: (Optional) Enter the keyword ipv6 then an IPv6 ACL name (a string up to 16 characters long).
- **security-name name**: (Optional) Enter the keywords security-name then the security name as defined by the community MIB.
- **access-list-name**: (Optional) Enter a standard IPv4 access list name (a string up to 16 characters long).

**Defaults**
none

**Command Modes**
CONFIGURATION

**Supported Modes**
Programmable-Mux (PMUX)

**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.

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</tbody>
</table>

**Usage Information**
The following example configures a community named public that is mapped to the security named guestuser with Read Only (ro) permissions.

The security-name parameter maps the community string to an SNMPv3 user/security name as defined by the community MIB.

If a community string is configured without a security-name (for example, `snmp-server community public ro`), the community is mapped to a default security-name/group:

- `v1v2creadu / v1v2creadg` — maps to a community with ro (read-only) permissions.
- `v1v2cwriteu / v1v2cwriteg` — maps to a community with rw (read-write) permissions.

The community-name parameter indexes this command.
If you do not configure the `snmp-server community` command, you cannot query SNMP data. Only Standard IPv4 ACL and IPv6 ACL is supported in the optional `access-list-name`.

The command options `ipv6`, `security-name`, and `access-list-name` are recursive. In other words, each option can, in turn, accept any of the three options as a sub-option, and each of those sub-options can accept any of the three sub-options as a sub-option, and so forth. The second Example shows the creation of a standard IPv4 ACL called `snmp-ro-acl` and then assigning it to the SNMP community `guest`.

**NOTE:** For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP; TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs, port rules are not valid for SNMP.

Example

```bash
Dell#config
Dell(conf)# snmp-server community public ro
Dell(conf)# snmp-server community guest ro security-name guestuser
Dell(conf)#
```

Example

```bash
Dell(conf)# ip access-list standard snmp-ro-acl
Dell(config-std-nacl)#seq 5 permit host 10.10.10.224
Dell(config-std-nacl)#seq 10 deny any count

Dell(conf)#snmp-server community guest ro snmp-ro-acl
Dell(conf)#
```

**Related Commands**

- `snmp-server engineID` - configures local and remote SNMP engines on the router.

**snmp-server context**

Configure a new context to an SNMP server.

**Syntax**

```
snmp-server context {line}
```

To remove a user from the SNMP group, use the `snmp-server context {line}` command.

**Parameters**

- `line`  
Enter the context string (max 32 characters), on the host that connects to the agent.

**Defaults**

As above.

**Command Modes**

- CONFIGURATION

**Supported Modes**

- Programmable-Mux (PMUX)

**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**  
  **9.9(0.0)**  
  Introduced on the M I/O Aggregator.

Example

```bash
Dell(conf)#snmp-server context ?
LINE            Context String (max 32 chars)
Dell(conf)#snmp-server context test1234 ?
```

**Related Commands**

- `show snmp user` — displays the information configured on each SNMP user name.
**snmp-server enable traps**

Enable SNMP traps.

**Syntax**

```
snmp-server enable traps [snmp] [stack]
```

To disable traps, use the `no snmp-server enable traps [snmp] [stack]` command.

**Parameters**

- **stack**: Enable stacking role change traps.
- **snmp**: For the `snmp` notification-type, enter one of the following optional parameters:
  - linkdown
  - linkup

**Defaults**

Not enabled.

**Command Modes**

- CONFIGURATION

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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</table>

**Usage Information**

M I/O Aggregator supports up to 16 SNMP trap receivers.

If this command is not configured, no traps controlled by this command are sent. If you do not specify a notification-type and notification-option, all traps are enabled.

**Related Commands**

- `snmp-server community` - configures a new community string access for SNMP v3.

---

**snmp-server engineID**

Configure the name for both the local and remote SNMP engines on the router.

**Syntax**

```
snmp-server engineID [local engineID] [remote ip-address]
```

To return to the default, use the `no snmp-server engineID [local engineID] [remote ip-address]` command.

**Parameters**

- **local engineID**: Enter the keyword `local` followed by the engine ID number that identifies the copy of the SNMP on the local device.

  Format (as specified in RFC 3411): 12 octets.

  - The first four octets are set to the private enterprise number.
The remaining eight octets are the MAC address of the chassis.

remote ip-address

Enter the keyword remote followed by the IP address that identifies the copy of the SNMP on the remote device.

Defaults

As above.

Command Modes

CONFIGURATION

Supported Modes

Programmable-Mux (PMUX)

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.

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</table>

Usage Information

Changing the value of the SNMP Engine ID has important side effects. A user’s password (entered on the command line) is converted to a message digest algorithm (MD5) or secure hash algorithm (SHA) security digest. This digest is based on both the password and the local Engine ID. The command line password is then destroyed, as required by RFC 2274. Because of this deletion, if the local value of the Engine ID changes, the security digests of SNMPv3 users is invalid and the users will have to be reconfigured.

For the remote Engine ID, the host IP and UDP port are the indexes to the command that are matched to either overwrite or remove the configuration.

Related Commands

show snmp engineID — displays the SNMP engine and all the remote engines that are configured on the router.

**snmp-server group**

Configure a new SNMP group or a table that maps SNMP users to SNMP views.

**Syntax**

```
snmp-server group {group_name {1 | 2c | 3 {auth | noauth | priv}}} [read name] [write name] [notify name] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]
```

To remove a specified group, use the no snmp-server group {group_name {v1 | v2c | v3 {auth | noauth | priv}}} [read name] [write name] [notify name] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name] command.

**Parameters**

- `group_name` Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults):
  - v1v2creadg — maps to a community/security-name with ro permissions.
  - v1v2cwriteg — maps to a community/security-name rw permissions.

- `1 | 2c | 3` (OPTIONAL) Enter the security model version number (1, 2c, or 3):
  - 1 is the least secure version.
- 3 is the most secure of the security modes.
- 2c allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed.

The default is 1.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auth</td>
<td>(OPTIONAL) Enter the keyword auth to specify authentication of a packet without encryption.</td>
</tr>
<tr>
<td>noauth</td>
<td>(OPTIONAL) Enter the keyword noauth to specify no authentication of a packet.</td>
</tr>
<tr>
<td>priv</td>
<td>(OPTIONAL) Enter the keyword priv to specify both authentication and then scrambling of the packet.</td>
</tr>
<tr>
<td>read name</td>
<td>(OPTIONAL) Enter the keyword read then a name (a string of up to 20 characters long) as the read view name. The default is GlobalView and is assumed to be every object belonging to the internet (1.3.6.1) OID space.</td>
</tr>
<tr>
<td>write name</td>
<td>(OPTIONAL) Enter the keyword write then a name (a string of up to 20 characters long) as the write view name.</td>
</tr>
<tr>
<td>notify name</td>
<td>(OPTIONAL) Enter the keyword notify then a name (a string of up to 20 characters long) as the notify view name.</td>
</tr>
<tr>
<td>access access-list-name</td>
<td>(Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).</td>
</tr>
<tr>
<td>ipv6 access-list-name</td>
<td>(Optional) Enter the keyword ipv6 then the IPv6 access list name (a string up to 16 characters long).</td>
</tr>
</tbody>
</table>

**Defaults**
As above.

**Command Modes**
CONFIGURATION

**Supported Modes**
Programmable-Mux (PMUX)

**Command History**
This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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</table>

**Usage Information**
The following Example specifies the group named harig as a version 3 user requiring both authentication and encryption and read access limited to the read named rview.

**NOTE:** The number of configurable groups is limited to 16 groups.

**Example**
```
Dell#conf
Dell(conf)# snmp-server group harig 3 priv read rview
Dell#
```
snmp-server host

Configure the recipient of an SNMP trap operation.

Syntax

```
snmp-server host ip-address | ipv6-address [vrf vrf-name] traps | informs
[version 1 | 2c | 3] [auth | no auth | priv] [community-string] [udp-port port-number] [notification-type]
```

To remove the SNMP host, use the no snmp-server host ip-address [vrf vrf-name] traps | informs [version 1 | 2c | 3] [auth | noauth | priv] [community-string] [udp-port number] [notification-type] 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:x::x format.

  | NOTE | The :: notation specifies successive hexadecimal fields of zero.

- **vrf vrf-name**
  - Enter the keyword vrf and then the name of the VRF that the SNMP server uses to connect to the host.

  | NOTE | You can use this attribute to inform the SNMP engine about the vrf instance to be used to reach the corresponding remote host to send Trap or Inform message. If no VRF is specified, then the default VRF is used.

- **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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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</table>

**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 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`— enables SNMP traps.

### snmp-server user

Configure a new user to an SNMP group.

**Syntax**

```
snmp-server user name {group_name [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]}
```

To remove a user from the SNMP group, use the no `snmp-server user name {group_name [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]}` command.

**Parameters**

- `name` Enter the name of the user (not to exceed 20 characters), on the host that connects to the agent.
- `group_name` Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults):
  - `v1v2creadu`— maps to a community with ro permissions.
  - `v1v2cwriteu`— maps to a community rw permissions.
- `access access-list-name` (Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).
**ipv6 access-list-name**  (Optional) Enter the keyword ipv6 then the IPv6 access list name (a string up to 16 characters long).

**access-list-name**

**ipv6 access-list-name**  (Optional) Enter both an IPv4 and IPv6 access list name.

### Defaults
As above.

### Command Modes
CONFIGURATION

### Supported Modes
Programmable-Mux (PMUX)

### 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.

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### Usage Information

**NOTE:** For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP. TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs port rules are not valid for SNMP.

No default values exist for authentication or privacy algorithms and no default password exists. If you forget a password, you cannot recover it; the user must be reconfigured. You can specify either a plain-text password or an encrypted cypher-text password. In either case, the password is stored in the configuration in an encrypted form and displayed as encrypted in the show running-config command.

If you have an encrypted password, you can specify the encrypted string instead of the plain-text password. The following command is an example of how to specify the command with an encrypted string.

**NOTE:** The number of configurable users is limited to 16.

**Example**

Dell# snmp-server user privuser v3group v3 encrypted auth md5 9fc53d9d908118b2804fe80e3ba8763d priv des56 d0452401a8c3ce42804fe80e3ba8763d

**Usage Information**

The following command is an example of how to enter a plain-text password as the string authpasswd for user authuser of group v3group.

**Example**

Dell# conf
Dell(conf)# snmp-server user authuser v3group v3 auth md5 authpasswd

**Usage Information**

The following command configures a remote user named n3user with a v3 security model and a security level of authNOPriv.

**Example**

Dell#conf
Dell(conf)# snmp-server user n3user ngroup remote 172.31.1.3 udp-port 5009 3 auth md5 authpasswd

**Related Commands**

- `show snmp user` — displays the information configured on each SNMP user name.
**snmp-server view**

Configure an SNMPv3 view.

**Syntax**

```
snmp-server view view-name oid-tree {included | excluded}
```

To remove an SNMPv3 view, use the `no snmp-server view view-name oid-tree {included | excluded}` command.

**Parameters**

- **view-name**
  Enter the name of the view (not to exceed 20 characters).

- **oid-tree**
  Enter the OID sub tree for the view (not to exceed 20 characters).

- **included**
  (OPTIONAL) Enter the keyword included to include the MIB family in the view.

- **excluded**
  (OPTIONAL) Enter the keyword excluded to exclude the MIB family in the view.

**Defaults**

none

**Command Modes**

CONFIGURATION

**Supported Modes**

Programmable-Mux (PMUX)

**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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

The `oid-tree` variable is a full sub-tree starting from 1.3.6 and cannot specify the name of a sub-tree or a MIB.

The following Example configures a view named `rview` that allows access to all objects under 1.3.6.1.

**Example**

```
Dell# conf
Dell(conf) snmp-server view rview 1.3.6.1 included
```

**Related Commands**

- `show running-config snmp` — displays the SNMP running configuration.
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 iom-mode`
- `show system stack-unit stack-group`
- `stack-unit iom-mode`

**NOTE:** The terms `stack-unit-id`, `unit-id`, `stack-unit-number`, `stack-number`, and `unit-number` mentioned in this chapter refers to the `stack-unit-number`.

Topics:

- 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 iom-uplink-speed
- show system stack-unit stack-group
- stack-unit iom-mode
- stack-unit iom-mode uplink-speed
- stack-unit priority
- stack-unit renumber

**power-cycle stack-unit**

To hard reset any stack unit including master unit.

**Syntax**

```
power-cycle stack-unit unit-number
```
Parameter  | Unit number  
The unit number ranges from 0 to 5.

Defaults  | None

Command Modes  | EXEC Privilege

Supported Modes  | All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6.(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Usage Information

This command is supported on the M I/O, FN410S, and FN410T Aggregators.

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

**Supported Modes**

All Modes

**Command History**

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

**Usage Information**

This command is supported on the M I/O, FN410S, and FN410T Aggregators.

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-M:CP %IFMGR-1-DEL_PORT: Removed port: Te 1/1-32,41-56
01:02:05: %I/O-Aggregator:0 %FACT-5-STACK_PORT_LINK_DOWN: Changed stack port state to down: 0/10
01:02:11: %STKUNIT0-M:CP %POLLMGR-2-ALT_STACK_UNIT_STATE: Alternate Stack-unit is not present
Dell#01:02:12: %STKUNIT0-M:CP %CHMGR-2-STACKUNIT_DOWN: Stack unit 1 down - card removed

Related Commands
reload — reboots the system.

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

Supported Modes
All Modes

Command History

Version Description
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>Link Speed (Gb/s)</th>
<th>Admin Status</th>
<th>Link Status</th>
<th>Trunk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/33</td>
<td>40</td>
<td>up</td>
<td>down</td>
<td></td>
</tr>
<tr>
<td>0/37</td>
<td>1/37</td>
<td>up</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>1/33</td>
<td>40</td>
<td></td>
<td></td>
<td>down</td>
</tr>
</tbody>
</table>
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> <0–5>` Enter the number of the member stack unit. The range is from 0 to 5.

**Defaults**

none

**Command Modes**

- EXEC Privilege

**Supported Modes**

All Modes

**Command History**

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

**Example**

```
Dell#show system stack-unit 0 fanout ?
configured Configured fan out ports
Dell#show system stack-unit 0 fanout configured ?
| Pipe through a command
<cr>
Dell#show system stack-unit 0 fanout configured
Configured fan out ports in stack-unit 0
Configured Next Boot
33 33
```
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 <0–5>  Enter the number of the member stack unit. The range is from 0 to 5.

Command Modes

  EXEC Privilege

Supported Modes

  All Modes

Command History

  Version    Description
  9.6.0.0      Supported on the FN I/O Aggregator.
  8.3.17.0    Supported on the M I/O Aggregator.

Usage information

  This command is supported on the M I/O, FN410S, and FN410T Aggregators

Example

Dell#show system stack-unit all iom-mode ?
  | Pipe through a command
  <cr>
Dell#show system stack-unit all iom-mode
Unit       Boot-Mode             Next-Boot
------------------------------------------------
0           stack                 stack
1           stack                 stack
2           stack                 stack
3           stack                 stack
4       Not Present
5       Not Present
Dell#

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

Parameters

  unit number <0–5>  Enter the number of the member stack unit. The range is from 0 to 5.

Command Modes

  EXEC Privilege

Supported Modes

  All Modes

Command History

  Version    Description
  9.3(0.0)    Introduced on the M I/O Aggregator
Usage Information

The value under the Boot-speed field in the output of the show command indicates the uplink speed that is currently effective on the LAG bundles, whereas the value under the Next-Boot field indicates the uplink speed that is applicable for the LAG bundle after the next reboot of the switch.

Example

Dell# show system stack-unit 0 iom-uplink-speed
Unit  Boot-speed          Next-Boot
----------------------  ---------
0         10G                    40G

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 <0–5> Enter the number of the member stack unit. The range is from 0 to 5.

Defaults

none

Command Modes

EXEC Privilege

Supported Modes

All Modes

Command History

Version     Description
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 operating mode between programmable multiplex, standalone, stack, and VLT modes.

Syntax

stack-unit <unit-number> iom-mode [programmable-mux | stack | standalone | vlt | full-switch]

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
Supported Modes       All Modes
Command History

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

Usage Information  This command is supported on the M I/O, FN410S, and FN410T Aggregators.

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)#

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

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.
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

**Supported Modes**
All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**
This command is supported on the M I/O, FN410S, and FN410T Aggregators.

**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 to 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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6.(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.3(0.0)</td>
<td>Supported on the MI/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

This command is supported on the FN410S and the FN410T Aggregators.

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

Topics:
- io-aggregator broadcast storm-control
- show io-aggregator broadcast storm-control status
- storm-control PFC/LLFC
- storm-control multicast (Interface)
- storm-control broadcast (Interface)
- show storm-control unknown-unicast
- storm-control unknown-unicast (Interface)

io-aggregator broadcast storm-control

Rate-limit the traffic storm 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

**Supported Modes**

Standalone-Mux (SMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

This command is not available in PMUX mode.

---

**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

**Supported Modes**

Standalone-Mux (SMUX)

**Command History**

<table>
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<tr>
<th>Version</th>
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</tr>
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<td>9.4(0.0)</td>
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</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Example**

```
Dell#show io-aggregator broadcast storm-control status
Storm-Control Enabled
Broadcast Traffic limited to 1000 Mbps
Dell#
```

---

**storm-control PFC/LLFC**

Shut down the port if it receives the PFC/LLFC frames more than the configured rate.

**Syntax**

`storm-control pfc-llfc [pps]in shutdown`

**Parameters**

- `pfc-llfc in` Enter the keyword `pfc-llfc` to get the flow control traffic. The range is from 0 to 33554368 packets per second.
- `shutdown` Enter the keyword `shutdown` to shut down the port when the rate exceeds.

**Defaults**

none

**Command Modes**

INTERFACE (conf-if-interface-slot/port)
Command History

This guide is platform-specific. For command information about other platforms, see 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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Supported on the FN IOM, FN I/O Aggregator, and M I/O Aggregator</td>
</tr>
</tbody>
</table>

Usage Information

**NOTE:** PFC/LLFC storm control enabled interfaces disable the interfaces if it receives continuous PFC/LLFC packets. It can be a result of a faulty NIC/Switch that sends spurious PFC/LLFC packets.

**storm-control multicast (Interface)**

Configure the percentage of multicast traffic allowed on the interface.

**Syntax**

```
storm-control multicast packets_per_second in
```

To disable multicast storm control on the interface, use the **no storm-control multicast packets_per_second in** command.

**Parameters**

- `packets_per_second`
  - Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

**Command Modes**

INTERFACE (conf-if-interface-slot/port)

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**storm-control broadcast (Interface)**

Configure the percentage of broadcast traffic allowed on an interface.

**Syntax**

```
storm-control broadcast [packets_per_second in]
```

To disable broadcast storm control on the interface, use the **no storm-control broadcast [packets_per_second in]** command.

**Parameters**

- `packets_per_second`
  - Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

**Command Modes**

INTERFACE (conf-if-interface-slot/port)

**Supported Modes**

Programmable-Mux (PMUX)
**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

**Supported Modes**

Programmable-Mux (PMUX)

**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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**storm-control unknown-unicast (Interface)**

Configure percentage of unknown-unicast traffic allowed on the interface.

**Syntax**

```
storm-control unknown-unicast [packets_per_second in]
```

To disable unknown-unicast storm control on the interface, use the `no storm-control unknown-unicast [packets_per_second in]` command.

**Parameters**

- **packets_per_second** Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554431.
<table>
<thead>
<tr>
<th>Command Modes</th>
<th>INTERFACE (conf-if-interface-slot/port)</th>
</tr>
</thead>
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<tr>
<td>Supported Modes</td>
<td>Programmable-Mux (PMUX)</td>
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<table>
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<th>Command History</th>
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<tr>
<td></td>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td></td>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
SupportAssist sends troubleshooting data securely to Dell. SupportAssist in this Dell EMC Networking OS release does not support automated email notification at the time of hardware fault alert, automatic case creation, automatic part dispatch, or reports. SupportAssist requires Dell EMC Networking OS 9.9(0.0) and SmartScripts 9.7 or later to be installed on the Dell EMC Networking device. For more information on SmartScripts, see Dell EMC Networking Open Automation guide.

**NOTE:** SupportAssist is enabled by default on the system. To disable SupportAssist, enter the `eula-consent support-assist reject` command in Global Configuration mode and save the configuration.

**Topics:**
- `eula-consent`
- `support-assist`
- `support-assist activate`
- `support-assist activity`
- SupportAssist Commands
- SupportAssist Activity Commands
- SupportAssist Company Commands
- SupportAssist Person Commands
- SupportAssist Server Commands
- `show eula-consent`
- `show running-config`
- `show support-assist status`

### eula-consent

Accept or reject the end user license agreement (EULA).

**Syntax**
```
eula-consent {support-assist} {accept | reject}
```

**Parameters**
- `support-assist` Enter the keywords `support-assist` to either accept or reject the EULA for the specified service.
- `accept` Enter the keyword `accept` to accept the EULA for the specified service.
- `reject` Enter the keyword `reject` to reject the EULA for the specified service.

**Defaults**
None

**Command Modes**
- CONFIGURATION

**Command History**
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.
<table>
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**Usage Information**

- When you run the command, the system displays a message with the information directing to the URL for further information.
- Even before you accept or reject the EULA, the configuration data is sent to the default centrally deployed SupportAssist Server. If you reject the EULA, the configuration data is not transmitted to the SupportAssist server.
- If there is an existing SupportAssist configuration, the configuration is not removed and the feature is disabled.

**Example**

Accept the EULA:

DellEMC(conf)# eula-consent support-assist accept
I accept the terms of the license agreement. You can reject the license agreement by configuring this command 'eula-consent support-assist reject'.

By installing SupportAssist, you allow Dell to save your contact information (e.g. name, phone number and/or email address) which would be used to provide technical support for your Dell products and services. Dell may use the information for providing recommendations to improve your IT infrastructure.

Dell SupportAssist also collects and stores machine diagnostic information, which may include but is not limited to configuration information, user supplied contact information, names of data volumes, IP addresses, access control lists, diagnostics & performance information, network configuration information, host/server configuration & performance information and related data ("Collected Data") and transmits this information to Dell. By downloading SupportAssist and agreeing to be bound by these terms and the Dell end user license agreement, available at: www.dell.com/aeula, you agree to allow Dell to provide remote monitoring services of your IT environment and you give Dell the right to collect the Collected Data in accordance with Dells Privacy Policy, available at: www.dell.com/privacypolicycopyrightspecific, in order to enable the performance of all of the various functions of SupportAssist during your entitlement to receive related repair services from Dell,. You further agree to allow Dell to transmit and store the Collected Data from SupportAssist in accordance with these terms. You agree that the provision of SupportAssist may involve international transfers of data from you to Dell and/or to Dells affiliates, subcontractors or business partners. When making such transfers, Dell shall ensure appropriate protection is in place to safeguard the Collected Data being transferred in connection with SupportAssist. If you are downloading SupportAssist on behalf of a company or other legal entity, you are further certifying to Dell that you have appropriate authority to provide this consent on behalf of that entity. If you do not consent to the collection,
transmission and/or use of the Collected Data, you may not download, install or otherwise use SupportAssist.

Reject the EULA:

DellEMC(conf)#eula-consent support-assist reject
Aug 24 22:35:38: %STKUNIT1-M:CP %SUPPORT_ASSIST-6-SUPASSIST_EVT: Event monitor service stopped
I do not accept the terms of the license agreement. The SupportAssist feature has been deactivated and can no longer be used.
To enable SupportAssist configurations, accept the terms of the license agreement by configuring this command 'eula-consent support-assist accept'.
DellEMC(conf)#
DellEMC(conf)#
DellEMC(conf)#

Related Commands
- support-assist — moves to the SupportAssist Configuration mode.

**support-assist**

Move to the SupportAssist configuration mode.

**Syntax**

```
support-assist
```

To remove all the configuration of the SupportAssist service, use the `no support-assist` command.

**Command Modes**

CONFIGURATION

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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**Usage Information**

If you reject the EULA, the data is not transmitted to the SupportAssist server.

**Related Commands**

- `eula-consent` — accept or reject the EULA.

**support-assist activate**

Launch the configuration wizard that enables SupportAssist service and guides through a series of commands to configure SupportAssist.

**Syntax**

```
support-assist activate
```

DellEMC(conf)
support-assist activity

trigger an activity event immediately.

Syntax

```
support-assist activity {full-transfer | core-transfer} start now
```

Parameters

- **full-transfer**: Enter the keyword `full-transfer` to specify transfer of configuration, inventory, logs, and other information.
- **core-transfer**: Enter the keyword `core-transfer` to specify transfer of core files.

Command Modes

- **EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version | Description
--- | ---
9.11(0.0) | Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1) | Introduced on the S6010-ON and S4048T-ON.
9.10(0.0) | Introduced on the S3148.
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9.9(0.0) | Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

Usage Information

You are guided through a series of queries to configure SupportAssist. The generated commands are added to the running configuration, including the DNS resolve commands, if configured.

This command starts the configuration wizard for the SupportAssist. At any time, you can exit by entering Ctrl-C. If necessary, you can skip some data entry.

Once you exit the wizard, the Dell EMC Networking OS starts a full transfer.

Use the command to trigger the activity that enables transfer of information. You can choose a full transfer that includes all the details or core transfer that includes only the core files.
NOTE: The full transfer includes the core files as well in the information sent. The core transfer does not send core files that are older than 30 days.

SupportAssist Commands

Dell EMC Networking OS supports the following SupportAssist mode commands.

activity

Move to the SupportAssist Activity mode for an activity. Allow the user to configure customized details for a specific activity.

Syntax

```
activity {activity-name}
```

To remove all customized detail for a specific activity, use the no activity {activity-name} command.

Parameters

- `activity-name` Enter one of the following keywords:
  - Enter the keyword **full-transfer** to enable or disable full transfer. You can create a custom file to transfer the outputs from a set of show commands. By default, the full transfer runs once in every 30 days.
  - Enter the keyword **core-transfer** to enable or disable core transfer.
  - Enter the keyword **event-transfer** to enable or disable event transfer. You can create a custom file to monitor a set of events.

Command Modes

SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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Usage Information

By default, each activity follows a set of default actions using a default schedule. Using this command, you can customize the set of actions and disable a certain activity.
**contact-company**

Configure the contact information for the company.

**Syntax**

```
contact-company name {company-name}[company-next-name] ... [company-next-name]
```

To remove the contact company information, use the `no contact-company` command.

**Parameters**

- **company-name**
  - Enter the name for the company. If there are multiple words in the name, use optional additional fields.

- **company-next-name**
  - (OPTIONAL) Enter the next components of the company name, up to 5 components are allowed.

**Command Modes**

SUPPORTASSIST

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</table>

**Usage Information**

- You can configure only one contact-company.
- It is not possible to remove the components of the company name. The no form of the command removes the entire contact-company entry.
- This command is optional for SupportAssist service configuration.

**contact-person**

Configure the contact name for an individual.

**Syntax**

```
contact-person [first <first-name>] last <last-name>
```

To remove the contact person and all their details, use the `no contact-person [first <first-name>] last <last-name>` command.

**Parameters**

- **first-name**
  - (Optional) Enter the first name for the contact person. This is optional provided each contact person name is unique. To include a space, enter a space within double quotes.

- **last-name**
  - Enter the last name for the contact person. To include a space, enter a space within double quotes.
Command Modes

SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</table>

Usage Information

Each contact person must be unique by their name.

You can configure only one contact person.

It is not possible to remove the first name or last name. The no form of the command removes the entire contact-person entry.

This command is optional for SupportAssist service configuration.

enable

Enable all activities and severs for the SupportAssist service.

Syntax

```
enable all
```

To disable the SupportAssist activities temporarily, use the `no enable all` command.

Parameters

all

Enter the keyword `all` to enable all SupportAssist service activities.

Defaults

Enabled or All Enabled

Command Modes

SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</table>
server

Configure the name of the remote SupportAssist Server and move to SupportAssist Server mode.

Syntax

```
server {default | server-name}
```

To delete a server, use the no server server-name command.

Parameters

- **default**
  - Enter the keyword default for the default server.
- **server-name**
  - Enter the name of the custom server to which the logs would be transferred. To include a space, enter a space within double quotes.

Defaults

Default server has URL stor.g3.ph.dell.com

Command Modes

SUPPORTASSIST

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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Usage Information

The server-name is used as a reference only and is not required to be used as part of a URL definition.

There is a reserved name of default for the default server at stor.g3.ph.dell.com. You can customize the defaults for this server by entering the server default command and use the custom commands.

You can configure one additional server.

SupportAssist Activity Commands

Dell EMC Networking OS supports the following SupportAssist Activity mode commands.

**action-manifest get**

Copy an action-manifest file for an activity to the system.

Syntax

```
action-manifest get tftp | ftp | flash <file-specification> <local-file-name>
```
Parameters

**file-specification**
Enter the full file specification for the action-manifest file. For example:

- tftp://hostip/filepath
- ftp://userid:password@hostip/filepath
- scp://userid:password@hostip/filepath

**local-file-name**
Enter the name of the local action-manifest file, up to 32 characters long. Allowable characters are: a to z, A to Z, 0 to 9, -, _, and space.

Command Modes

SUPPORTASSIST ACTIVITY FULL-TRANSFER
SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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Usage Information

The remote file specification for full transfer includes the protocol that is used to copy the file from the remote system.

The default Manifest-file for full transfer includes records like alarms, logs, operational, and configuration data.

Related Commands

- `action-manifest install` — configure the action-manifest to use for a specific activity.
- `action-manifest show` — view the list of action-manifest for a specific activity.
- `action-manifest remove` — remove the action-manifest file for an activity.

**action-manifest install**

Configure action-manifest to transfer a set of customized records for full transfer and to monitor a set of specified events for event transfer.

**Syntax**

```
action-manifest install {default | <local-file-name>}
```

To revert to the default action-manifest file, use the `action-manifest install default` command.

**Parameters**

- `default`
  - Enter the keyword `default` to revert back to the default set of actions for an activity.

- `local-file-name`
  - Enter the name of the local action-manifest file. Allowable characters are: a to z, A to Z, 0 to 9, -, _, and space.
Defaults

Command Modes

Command History

Usage Information

Related Commands

action-manifest remove

Remove the action-manifest file from Dell EMC Networking OS.

Syntax

Parameters

local-file-name Enter the name of the local action-manifest file. Allowable characters are: a to z, A to Z, 0 to 9, _, and space.

Command Modes

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version Description

9.11(0.0) Introduced on the M I/O Aggregator and FN IOM.

9.10(0.1) Introduced on the S6010-ON and S4048T-ON.

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9.10(0.0) Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.

9.9(0.0) Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON, Z9500, MXL.

To replace the default action-manifest file with a customized one, copy the action-manifest file to the system using the action-manifest get command and then use the action-manifest install command. To revert to the default action-manifest file, use the action-manifest install default command.

- action-manifest get — copy an action-manifest file for an activity to the system.
- action-manifest show — view the list of action-manifest for a specific activity.
- action-manifest remove — remove the action-manifest file for an activity.
action-manifest show

View the list of action-manifest for a specific activity.

Syntax

action-manifest show {all}

Parameters

- **all**
  - Enter the keyword **all** to view the entire list of action-manifests that are available for an activity.

Command Modes

- SUPPORTASSIST ACTIVITY FULL-TRANSFER
- SUPPORTASSIST ACTIVITY EVENT-TRANSFER

Command History

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Related Commands

- action-manifest get — copy an action-manifest file for an activity to the system.
- action-manifest install — configure the action-manifest to use for a specific activity.
- action-manifest remove — remove the action-manifest file for an activity.

enable

Enable a specific SupportAssist activity.

Syntax

enable
To disable a particular SupportAssist activity, use the `no enable` command.

**Defaults**

Enabled

**Command Modes**

SUPPORTASSIST ACTIVITY FULL-TRANSFER
SUPPORTASSIST ACTIVITY CORE-TRANSFER
SUPPORTASSIST ACTIVITY EVENT-TRANSFER

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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**Usage Information**

Enter the specific SupportAssist activity mode and then enable it.

**NOTE:** By default, the full transfer includes the core files. When you disable the core transfer activity, the full transfer excludes the core files.

**Related Commands**

- `activity` — move user to the SupportAssist Activity mode for that activity.

---

**SupportAssist Company Commands**

Dell EMC Networking OS supports the following SupportAssist Company mode commands.

**address**

Configure the address information for the company.

**Syntax**

```
address [city company-city] [(province | region | state) name] [country company-country] [(postalcode | zipcode) company-code]
```

To remove a portion of the company address information, use the `no address [city | province | region | state | country | postalcode | zipcode] company-code` command. For example, to remove the city alone, use the `no address city` command.

To remove the complete company contact information, use the `no address` command.

**Parameters**

- `city company-city` (OPTIONAL) Enter the keyword `city` then the city or town for the company site. To include a space, enter a space within double quotes.
province | region | state name (OPTIONAL) Enter the keyword province, region or state then the name of
province, region or state for the company site. To include a space, enter a space within
double quotes.
country company-
country (OPTIONAL) Enter the keyword country then the country for the company site. To
include a space, enter a space within double quotes.
postalcode | zipcode company-
code (OPTIONAL) Enter the keyword postalcode or zipcode then the postal code or zip
code for the company site, as one string with no spaces.

Command Modes SUPPORTASSIST COMPANY

Command History This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC

Version Description
9.11(0.0) Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1) Introduced on the S6010-ON and S4048T-ON.
9.10(0.0) Introduced on the S3148.
9.10(0.0) Introduced on the C9010, Z9100–ON, S6100–ON, and S3100 series.
9.9(0.0) Introduced on the S4810, S4820T, S3048–ON, S4048–ON, S5000, S6000, S6000–ON,
Z9500, MXL.

Usage Information The optional parameters must be provided in the following order: city state country postalcode. If
specified in a different order, the command returns an error as follows:

DellEMC(conf-supportassist-cmpy-test)# address city Minneapolis postalcode 55344 country USA state Minnesota
^%
% Error: Invalid input at "^^" marker.

This command is optional for SupportAssist service configuration.

Example

DellEMC(conf-supportassist-cmpy-test)# address city Minneapolis state Minnesota
country USA postalcode 55344

street-address

Configure the street address information for the company.

Syntax

street-address {address1} [address2]...[address8]

To remove the street address, use the no street-address command.

Parameters

address1 Enter the street address for the company.
address2..address8 (OPTIONAL) Enter the street address of the company site. Up to 8 fields are allowed.

Command Modes SUPPORTASSIST COMPANY
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

### Command History

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</tr>
</tbody>
</table>

### Usage Information

This command is optional for SupportAssist service configuration.

---

## territory

Configure the territory and set the coverage for the company site.

### Syntax

```plaintext
territory company-territory
```

To remove the company territory information, use the `no territory` command.

### Parameters

- **company-territory**
  - Enter the territory name for the company. To include a space, enter a space within double quotes. Use three-letter country codes like USA, IND, FRA, GER and so on.

### Command Modes

SUPPORTASSIST COMPANY

### Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

<table>
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</tr>
</tbody>
</table>

### Usage Information

This command is optional for SupportAssist service configuration.

---

## SupportAssist Person Commands

Dell EMC Networking OS supports the following SupportAssist Person mode commands.
email-address

Configure the email addresses to reach the contact person.

**Syntax**

```
email-address primary email-address [alternate email-address]
```

To remove an email address, use the `no email-address` command. To remove the primary and alternate email addresses, use the `no email-address primary` and `no email-address alternate` commands respectively.

**Parameters**

- `primary email-address`
  - Enter the keyword `primary` then the primary email address for the person.
- `alternate email-address`
  - Enter the keyword `alternate` then the alternate email address for the person.

**Command Modes**

```
SUPPORTASSIST PERSON
```

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

<table>
<thead>
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</tr>
</tbody>
</table>

**Usage Information**

The email addresses must have the standard form of `<username>@<email system>` to be considered valid.

This command is optional for SupportAssist service configuration.

**Related Commands**

- `preferred-method` — configure the preferred method for contacting the person.

phone

Configure phone numbers to reach the contact person.

**Syntax**

```
phone primary phone [alternate phone]
```

To remove a phone number, use the `no phone` command. To remove the primary and alternate phone numbers, use the `no phone primary` and `no phone alternate` commands respectively.

**Parameters**

- `primary phone`
  - Enter the keyword `primary` then the primary phone number for the person.
**alternate phone**
Enter the keyword `alternate` then the alternate phone number for the person.

**Command Modes**
SUPPORTASSIST PERSON

**Command History**
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</tr>
</tbody>
</table>

**Usage Information**
The phone numbers may contain country codes, area codes and extensions, if necessary. Allowable characters are 0 to 9, x, (, ), - and +.

This command is optional for SupportAssist service configuration.

**Related Commands**
- `preferred-method` — configure the preferred method for contacting the person.

---

**preferred-method**
Configure the preferred method for contacting the person.

**Syntax**

```
preferred-method {email | no-contact | phone}
```

**Parameters**

- `email`
  Enter the keyword `email` to specify email as preferred method.

- `no-contact`
  Enter the keywords `no-contact` to specify that there is no preferred method.

- `phone`
  Enter the keyword `phone` to specify phone as preferred method.

**Defaults**

no-contact

**Command Modes**
SUPPORTASSIST PERSON

**Command History**
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</table>
### time-zone

Configure the time zone for contacting the person.

**Syntax**

```
time-zone zone +HH:MM [start-time HH:MM] [end-time HH:MM]
```

To remove the time zone, use the `no time-zone [zone | start-time | end-time]` command.

**Parameters**

- **zone +HH:MM**: Enter the keyword `zone` then a time difference from GMT expressed as HH:MM. This number may be preceded by either a + or – sign.
- **start-time HH:MM**: Enter the keywords `start-time` then a starting time expressed as HH:MM. Use the 24-hour clock format.
- **stop-time HH:MM**: Enter the keywords `stop-time` then a stopping time expressed as HH:MM. Use the 24-hour clock format.

**Command Modes**

SUPPORTASSIST PERSON

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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**Usage Information**

This command is optional for SupportAssist service configuration.

---

**SupportAssist Server Commands**

Dell EMC Networking OS supports the following SupportAssist Server mode commands.
**proxy-ip-address**

Configure a proxy for reaching the SupportAssist remote server.

```
Syntax
proxy-ip-address {ipv4-address | ipv6-address} port port-number [ username userid password [encryption-type] password ]
```

To remove the proxy, use the `no proxy-ip-address` command.

**Parameters**

- `ipv4-address` Enter the IP address of the proxy server in a dotted decimal format (A.B.C.D).
- `ipv6-address` Enter the IPv6 address of the proxy server in the x:x:x:x::x format.
  
  **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
  
  **NOTE:** To use the IPv6 address, the Open Automation package should also support IPv6 communications. For this purpose, SupportAssist requires Dell EMC Networking Open Automation 9.10(0.0) package or later.

- `port port-number` Enter the keyword `port` then the TCP/IP port number. The port number range is from 1024 to 65534.

- `username userid` (OPTIONAL) Enter the keyword `username` then the user ID used for the proxy server.

- `password` Enter the keyword `password` then the encryption-type or the user password.

- `encryption-type` (OPTIONAL) Enter an encryption type for the `password` you enter.
  
  - 0 directs the system to interpret the password as clear text.
  - 7 indicates that the password is encrypted using a DES hashing algorithm.

- `password` Enter a string up to 32 characters long.

**Defaults**

- `encryption-type for the password is 0`.

**Command Modes**

- SUPPORTASSIST SERVER

**Command History**

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

**Version**

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</table>

**Usage Information**

The passwords are stored encrypted in the running configuration.
**enable**

Enable communication with the SupportAssist server.

**Syntax**
```
enable
```

To disable communication to a specific SupportAssist server, use the `no enable` command.

**Defaults**
Enabled

**Command Modes**
SUPPORTASSIST SERVER

**Command History**
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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**Related Commands**
- `server` — configure the name of the remote SupportAssist server.

**url**

Configure the URL to reach the SupportAssist remote server.

**Syntax**
```
url uniform-resource-locator
```

To delete the URL for the server, use the `no url` command.

**Parameters**
- `uniform-resource-locator`  
  Enter a text string for the URL using one of the following formats:
  - `http://[username:password@]<hostip>:<portNum>/<filepath>`
  - `https://[username:password@]<hostip>:<portNum>/<filepath>`

**NOTE:** The host IP for the server may be specified as an IPv4 address, an IPv6 address or as a DNS hostname. If using the DNS hostname, the DNS resolver will need to be configured and enabled.

**Command Modes**
SUPPORTASSIST SERVER

**Command History**
This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.
show eula-consent

Display the EULA for the feature.

Syntax

```
show eula-consent {support-assist | other feature}
```

Parameters

- `support-assist`
- `other feature`

Enter the keywords `support-assist` or the text corresponding to other feature.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

Version Description

9.11(0.0) Introduced on the M I/O Aggregator and FN IOM.
9.10(0.1) Introduced on the S6010-ON and S4048T-ON.
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9.9(0.0) Introduced on the S4810, S4820T, S3048-ON, S4048-ON, S5000, S6000, S6000-ON, Z9500, MXL.

Example

```
DellEMC# show eula-consent support-assist
SupportAssist EULA has been: Accepted
Additional information about the SupportAssist EULA is as follows:

By installing SupportAssist, you allow Dell to save your contact information (e.g. name, phone number and/or email address) which would be used to provide technical support for your Dell products and services. Dell may use the information for providing recommendations to improve your IT infrastructure.

Dell SupportAssist also collects and stores machine diagnostic information, which may include but is not limited to configuration information, user supplied contact information, names of data volumes, IP addresses, access control lists, diagnostics & performance information, network configuration information, host/server configuration
```
& performance information and related data (Collected Data) and transmits this information to Dell. By downloading SupportAssist and agreeing to be bound by these terms and the Dell end user license agreement, available at: www.dell.com/aeula, you agree to allow Dell to provide remote monitoring services of your IT environment and you give Dell the right to collect the Collected Data in accordance with Dells Privacy Policy, available at: www.dell.com/privacypolicycountryspecific, in order to enable the performance of all of the various functions of SupportAssist during your entitlement to receive related repair services from Dell,. You further agree to allow Dell to transmit and store the Collected Data from SupportAssist in accordance with these terms. You agree that the provision of SupportAssist may involve international transfers of data from you to Dell and/or to Dells affiliates, subcontractors or business partners. When making such transfers, Dell shall ensure appropriate protection is in place to safeguard the Collected Data being transferred in connection with SupportAssist. If you are downloading SupportAssist on behalf of a company or other legal entity, you are further certifying to Dell that you have appropriate authority to provide this consent on behalf of that entity. If you do not consent to the collection, transmission and/or use of the Collected Data, you may not download, install or otherwise use SupportAssist.

show running-config

Display the current configuration and changes from the default values.

Syntax

```
show running-config support-assist
```

Parameters

```
support-assist
```

Enter the keyword support-assist to view the detailed configuration for the feature.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

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</table>

Example

```
DellEMC# show running-config support-assist
!
support-assist
```
enable all
!
activity event-transfer
  enable
  action-manifest install default
!
activity core-transfer
  enable
!
contact-company name Dell
  street-address F lane , Sector 30
  address city Brussels state HeadState country Belgium postalcode S328J3
!
contact-person first Fred last Nash
  email-address primary des@sed.com alternate sed@dol.com
  phone primary 123422 alternate 8395729
  preferred-method email
  time-zone zone +05:30 start-time 12:23 end-time 15:23
!
server Dell
  enable
  url http://1.1.1.1:1332
DellEMC#

show support-assist status

Display information on SupportAssist feature status including any activities, status of communication, last time communication sent, and so on.

Syntax

    show support-assist status

Command Modes

    EXEC Privilege

Command History

    This guide is platform-specific. For command information about other platforms, see the relevant Dell EMC Networking OS Command Line Reference Guide.

    Version     Description
    9.11(0.0)    Introduced on the M I/O Aggregator and FN IOM.
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Example

    DellEMC#show support-assist status
    SupportAssist Service: Installed
    EULA: Accepted
    Server: default
      Enabled: Yes
      URL: https://stor.g3.ph.dell.com
    Server: Dell
      Enabled: Yes
      URL: http://1.1.1.1:1332
    Service status: Enabled
    Activity                         State         Last Start                Last Success
    -------------------------------  -------  ------------------------
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Status</th>
<th>Start Time</th>
<th>End Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:38:27 IST</td>
<td>DellEMC#</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 Networking OS 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

Topics:
- calendar set
- clock read-calendar
- clock set
- clock summer-time date
- clock summer-time recurring
- clock timezone
- clock update-calendar
- ntp server
- show calendar
- show clock

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

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
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<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
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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.

---

**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

**Supported Modes**
All Modes

**Command History**

<table>
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<td>Supported on the M I/O Aggregator.</td>
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**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

**Supported Modes**

All Modes

**Command History**

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</table>

**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.

**end-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`.

**end-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`.

**end-time**
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**.

---

**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

**Supported Modes**
All Modes

**Command History**

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**Related Commands**
- `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

Supported Modes

- All Modes

Command History

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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

```
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.

Defaults  Not configured.

Command Modes  CONFIGURATION

Supported Modes  All Modes

Command History  Version  Description
9.2(0.0)  Supported on the M I/O Aggregator.

Usage Information  You can configure multiple time-serving hosts (up to 250). From these time-serving hosts, the operating system chooses one NTP host with which to synchronize.

Because many polls to NTP hosts can impact network performance, Dell Networking recommends limiting the number of hosts configured.

show calendar
Display the current date and time based on the switch hardware clock.

Syntax  show calendar

Command Modes  •  EXEC
•  EXEC Privilege

Supported Modes  All Modes

Command History  Version  Description
9.4(0.0)  Supported on the FN I/O Aggregator.
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

Supported Modes
All Modes

Command History

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Example

```
Dell#show clock
12:30:04.402 pacific Tue May 22 2012
Dell#
```

Example (Detail)

```
Dell#show clock detail
12:30:26.892 pacific Tue May 22 2012
Time source is RTC hardware
Summer time starts 00:00:00 UTC Wed Mar 14 2012
Summer time ends 00:00:00 pacific Wed Nov 7 2012
Dell#
```

Related Commands

- `clock summer-time recurring` — sets the software clock to convert to daylight saving time on a specific day each year.
- `ntp server` — configures an NTP time-serving host.
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.

Topics:
- clear ufd-disable
- debug uplink-state-group
- defer-timer
- description
- downstream
- downstream auto-recover
- downstream disable links
- enable
- show running-config uplink-state-group
- show uplink-state-group
- uplink-state-group
- upstream

### 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 interface**
  
  Specify one or more downstream interfaces. For *interface*, enter one of the following interface types:
  
  - 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: `tengigabitethernet 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.
debug uplink-state-group

Enable debug messages for events related to a specified uplink-state group or all groups.

Syntax
debug 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

Supported Modes

Programmable-Mux (PMUX)

Command History

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</table>

Related Commands

- clear ufd-disable — re-enables downstream interfaces that are in a UFD-Disabled Error state.

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

Supported Modes

Standalone, Stacking, VLT
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

Supported Modes: Programmable-Mux (PMUX)

Command History:

<table>
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</table>

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

Supported Modes Programmable-Mux (PMUX)

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.

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<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
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</table>

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.

**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

Supported Modes Programmable-Mux (PMUX)

Command History

Version Description

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

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

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**

```text
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.

**Defaults**

No downstream links are disabled when an upstream link in an uplink-state group goes down.

**Command Modes**

- UPLINK-STATE-GROUP

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

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**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**

Re-enable upstream-link tracking for an uplink-state group after it has been disabled.

**Syntax**

```text
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.

**Defaults**

Upstream-link tracking is automatically enabled in an uplink-state group.

**Command Modes**

- UPLINK-STATE-GROUP

**Supported Modes**

All Modes

**Command History**

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</table>
show running-config uplink-state-group

Display the current configuration of one or more uplink-state groups.

Syntax
\[
\text{show running-config uplink-state-group} \ [\text{group-id}] \n\]

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 Modes
- EXEC
- EXEC Privilege

Supported Modes
Programmable-Mux (PMUX)

Command History

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Example
```
Dell#show running-config uplink-state-group
!
no enable
uplink state track 1
downstream TengigabitEthernet 0/2,4,6,11
upstream TengigabitEthernet 0/8, 12
upstream PortChannel 1
##
uplink state track 2
downstream TengigabitEthernet 0/1,3,5
upstream TengigabitEthernet 0/9,10
```

Related Commands
- show uplink-state-group — displays the status information on a specified uplink-state group or all groups.
- 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
\[
\text{show uplink-state-group} \ [\text{group-id}] \ [\text{detail}] \n\]

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

Supported Modes Programmable-Mux (PMUX)

Command History
This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

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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 : 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 : 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)
```

**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

Supported Modes
Programmable-Mux (PMUX)

Command History

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Usage Information

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.

Example

```plaintext
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
```

Related Commands
- 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.

**upstream**

Assign a port or port-channel to the uplink-state group as an upstream interface.

Syntax

```plaintext
upstream interface
```

To delete an uplink-state group, use the no upstream 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}
  - 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

**Supported Modes**

Programmable-Mux (PMUX)

**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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.2(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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.
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.

Topics:

- back-up destination
- clear vlt statistics
- lacp ungroup member-independent
- peer-link port-channel
- show vlt backup-link
- show vlt brief
- show vlt detail
- show vlt mismatch
- show vlt role
- show vlt statistics
- stack-unit iom-mode
- system-mac
- unit-id
- vlt domain
- vlt-peer-lag port-channel
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:XX:XX::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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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

**Supported Modes**

Programmable-Mux (PMUX)

Full–Switch

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
lACP Ungroup Member-Independent

Prevent possible loop during the bootup of a VLT peer switch or a device that accesses the VLT domain.

Syntax

```markdown
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

Supported Modes

- Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

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.

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

```markdown
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

Supported Modes
Programmable-Mux (PMUX)

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the MI/O Aggregator.</td>
</tr>
</tbody>
</table>

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. To ensure that the DHCP discover packets are forwarded to the VLAN that has the DHCP server, use this configuration.

show vlt backup-link

Displays information on the backup link operation.

Syntax
show vlt backup-link

Default
Not configured.

Command Modes
EXEC

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the MI/O Aggregator.</td>
</tr>
</tbody>
</table>

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

Supported Modes
All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
</tbody>
</table>
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

Supported Modes

    All Modes

Command History

    Version  Description
    9.4(0.0)  Supported on the FN I/O Aggregator.
    9.2(0.0)  Supported on the M I/O Aggregator.

Example

    Dell# show vlt detail
    Local LAG Id Peer LAG Id Local Status  Peer Status  Active VLANs
    ---------------- ----------- ------------  -----------  -------------
    128            128            UP            UP        1000
    Dell#

show vlt mismatch

Display mismatches in VLT parameters.

Syntax

    show vlt mismatch

Command Modes

    EXEC

Supported Modes

    Programmable-Mux (PMUX)
Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
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<tbody>
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<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

Dell#show vlt mismatch

Domain

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Local</th>
<th>Peer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit-ID</td>
<td>0</td>
<td>15</td>
</tr>
</tbody>
</table>

Vlan-config

<table>
<thead>
<tr>
<th>Vlan-ID</th>
<th>Local Mode</th>
<th>Peer Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>--</td>
<td>L3</td>
</tr>
</tbody>
</table>

Vlan IPV4 Multicast Status

<table>
<thead>
<tr>
<th>Vlan-ID</th>
<th>Local Status</th>
<th>Peer Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>4094</td>
<td>Active</td>
<td>Inactive</td>
</tr>
</tbody>
</table>

Dell#

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

Supported Modes

All Modes

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
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<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

Dell#show vlt role

VLT Role

<table>
<thead>
<tr>
<th>VLT Role:</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>System MAC address:</td>
<td>00:01:05:08:02:05</td>
</tr>
<tr>
<td>Primary Role Priority:</td>
<td>32768</td>
</tr>
<tr>
<td>Local System MAC address:</td>
<td>00:01:e8:00:ab:03</td>
</tr>
<tr>
<td>Local System Role Priority:</td>
<td>32768</td>
</tr>
<tr>
<td>Local Unit Id:</td>
<td>0</td>
</tr>
</tbody>
</table>

Dell#
show vlt statistics

Displays statistics on VLT operations.

Syntax

  show vlt statistics

Default

  Not configured.

Command Modes

  EXEC

Supported Modes

  All Modes

Command History

  Version  Description
  9.4(0.0)  Supported on the FN I/O Aggregator.
  9.2(0.0)  Supported on the M 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 switch 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**

**Supported Modes**

- All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**Usage Information**

This command resets the operating mode to VLT. You must reboot the switch after using this command.

---

**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

**Supported Modes**

- Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4(0.0)</td>
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</tr>
<tr>
<td>9.2(0.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
<thead>
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</tr>
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<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

**Supported Modes**

Programmable-Mux (PMUX)
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.

**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

**Supported Modes**

Programmable-Mux (PMUX)

**Command History**

<table>
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<tr>
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</tr>
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This chapter contains the following sections:

- Offline Diagnostic Commands
- Hardware Commands

Topics:

- Offline Diagnostic Commands
- Hardware Commands
- clear hardware stack-unit
- diag stack-unit
- hardware watchdog
- offline stack-unit
- show diag
- show hardware stack-unit
- show hardware counters interface
- show hardware buffer interface
- show hardware system-flow
- show hardware buffer-stats-snapshot
- show hardware stack-unit buffer-stats-snapshot (Total Buffer Information)
- show hardware drops

**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` 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.

**Defaults**
```
none
```

**Command Modes**
```
EXEC Privilege
```

**Supported Modes**
```
All Modes
```

**Command History**
```
Version   Description
8.3.17.0   Supported 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.
```

**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.
## 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.

### Defaults

- none

### Command Modes

- EXEC Privilege

### Supported Modes

- All Modes

### Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>
**hardware watchdog**

Set the watchdog timer to trigger a reboot and restart the system.

**Syntax**

```
hardware watchdog
```

**Defaults**

Enabled

**Command Modes**

- CONFIGURATION

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.4(0.0)</td>
<td>Supported on the FN I/O Aggregator.</td>
</tr>
<tr>
<td>8.3.17.0</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>
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

**Supported Modes**

All Modes

**Command History**

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

**Example 1 (show diag information Command)**

```
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
************************

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Description</th>
<th>Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>POWERRAILSTATUSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>2</td>
<td>OPTMODSLOTPOWERSTATUSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>3</td>
<td>TSENSORACCESSSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>4</td>
<td>RTCPRESENCETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>5</td>
<td>CPUSSDRAMPRESENCETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>6</td>
<td>CPUSSDRAMSIZETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>7</td>
<td>USBAACCESSSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>8</td>
<td>USBHOSTCONTROLLERACCESSSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>9</td>
<td>SDFLASHACCESSSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>10</td>
<td>QSFPPLUSPOWERMODESTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>11</td>
<td>CPLDPRESENCETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>12</td>
<td>FLASHACCESSSTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>13</td>
<td>BOARDREVTST</td>
<td>Level0</td>
</tr>
<tr>
<td>14</td>
<td>MGMTPHYPRESENCETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>15</td>
<td>OPTMODTYPESTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>16</td>
<td>QSFPPLUSPRESENCETEST</td>
<td>Level0</td>
</tr>
<tr>
<td>17</td>
<td>CPUPREDTECTTEST</td>
<td>Level0</td>
</tr>
<tr>
<td>101</td>
<td>RTCFUNCTIONTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>102</td>
<td>RTCROLLOVERTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>103</td>
<td>GPIOACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>104</td>
<td>PSOCACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>105</td>
<td>PCIIEBCM56846ACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>106</td>
<td>CPUSSDRAMACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>107</td>
<td>CPUSSDRAMDATALINETEST</td>
<td>Level1</td>
</tr>
<tr>
<td>108</td>
<td>CPUSSDRAMADDRESLINETEST</td>
<td>Level1</td>
</tr>
<tr>
<td>109</td>
<td>USBFILECOPYTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>110</td>
<td>FLASHRTWST</td>
<td>Level1</td>
</tr>
<tr>
<td>111</td>
<td>I2CSTRESSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>112</td>
<td>AVSPWERNCRNTRLACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>113</td>
<td>SERVERPORTPHYACCESSSTEST</td>
<td>Level1</td>
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<tr>
<td>114</td>
<td>SERVERPORTPHYRTWST</td>
<td>Level1</td>
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<tr>
<td>115</td>
<td>QSFPPLUSPHYACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>116</td>
<td>QSFPPLUSPHYRTWST</td>
<td>Level1</td>
</tr>
<tr>
<td>117</td>
<td>QSFPPLUSPHYEXTLINKTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>118</td>
<td>QSFPPLUSPEEFORMATTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>119</td>
<td>OPTMODPHYACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>120</td>
<td>OPTMODPHYRTWST</td>
<td>Level1</td>
</tr>
<tr>
<td>121</td>
<td>OPTMODPHYEXTLINKTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>122</td>
<td>OPTMODMODEEEXTLINKTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>123</td>
<td>MGMTPHYACCESSSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>124</td>
<td>SDFLASHFILECOPYSTRESSTEST</td>
<td>Level1</td>
</tr>
<tr>
<td>201</td>
<td>QSFPPLUSPHYLNKSPEEDTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>202</td>
<td>OPTMODPHYLNKSPEEDTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>203</td>
<td>MGMTPHYLOOPBACKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>204</td>
<td>MGMTMACLOOPBACKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>205</td>
<td>CPUSNAKESERVERPORTPHYPBKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>206</td>
<td>CPUSNAKESERVERPORTMACLPBKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>207</td>
<td>CPUSNAKEOPTMODPHYLPBKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>208</td>
<td>CPUSNAKEOPTMODMACLPBKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>209</td>
<td>CPUSNAKEOPTMODPHYLPBKTEST</td>
<td>Level2</td>
</tr>
<tr>
<td>210</td>
<td>CPUSNAKEOPTMODMACLPBKTEST</td>
<td>Level2</td>
</tr>
</tbody>
</table>

Total Diagnostic Testcases in All Levels: 51
Example 4 (show diag testcase stack-unit interactive Command)

```
Dell#show diag testcase stack-unit 0 interactive
**************************** Navasota Diagnostics Test
Test ID Test Description    Test Level
------- ----------------    ----------
401 POWERLEDTEST              Interactive
402 DEBUGLEDTEST              Interactive
403 STATUSLEDTEST             Interactive
404 OPTMOLDEDCONTROLTEST      Interactive
405 FIXEDLEDCONTROLTEST       Interactive
406 RTCBATTERYTEST            Interactive
407 CPLDRESETTEST             Interactive
408 I2CDEVICESCANTEST         Interactive
409 SERVERPORTPHYEXTLINKTEST  Interactive
410 CPUSNAKEQSFPEXTLPBKTEST   Interactive
411 CPUSNAKEOPTMODEXTLPBKTEST Interactive
Total Diagnostic Testcases in Interactive: 11
```

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 [ unit 0 ] total buffer | buffer unit 0 interface all 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] | stack-port 33-56 | unit 0-0 {counters | details | port-stats [detail] | register}]
```

**Parameters**

- **stack-unit 0–5 (command-option)**: 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 display a collection of data based on the option entered.
- **buffer**: Enter the keyword `buffer`. To display buffer statistics for all interface, enter the keyword `interface all queue [(0-14) | all] buffer-info`. To display the forwarding plane statistics containing the packet buffer usage per port per stack unit, enter the keyword `unit` then 0 for port-pipe 0, then `port` and the port number (42-53, and then `buffer-info`.
- **fpga**: Enter the keyword `fpga`, to display fpga details.
- **fru**: Enter the keyword `fru`, to display fru details.
- **phy-firmware-version**: 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 `phy-firmware-version`.
- **cpu data-plane statistics**: Enter the keywords `cpu data-plane statistics`, optionally followed by the keywords `stack 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.
- **cpu party-bus statistics**: Enter the keywords `cpu party-bus statistics`, to display the Management plane input/output counter statistics of the Private Management interface.
Enter the keywords `cpu private-mgmt statistics` to display the Management plane input/output counter statistics of the Private Management interface.

Enter the keyword `drops` to display internal drops on the selected stack member.

Enter the keywords `stack-port` 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.

**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.

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

**Supported Modes**

All Modes

**Command History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.8(0.0)</td>
<td>Replaced the keyword <code>port</code> with <code>interface</code>.</td>
</tr>
<tr>
<td>8.3(17.0)</td>
<td>Supported on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

**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)**

```
Dell#show hardware stack-unit 1 cpu data-plane statistics

bc pci driver statistics for device:
rxHandle :7392
noMhdr :0
noMbuf :0
noClus :0
```
Example

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)

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
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
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
0 0

Debugging and Diagnostics
Example (drop counters)

Dell# show hardware stack-unit 1 unit 0 counters
unit: 0 port: 1 (interface Te 1/1)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX - IPV4 L3 Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - IPV4 L3 Routed Multicast Packets</td>
<td>0</td>
</tr>
<tr>
<td>RX - IPV6 L3 Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - IPV6 L3 Routed Multicast Packets</td>
<td>0</td>
</tr>
<tr>
<td>RX - Unicast Packet Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 64 Byte Frame Counter</td>
<td>336186</td>
</tr>
<tr>
<td>RX - 65 to 127 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 128 to 255 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 256 to 511 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 512 to 1023 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 1024 to 1518 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 1519 to 1522 Byte Good VLAN Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 1519 to 2047 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 2048 to 4095 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 4096 to 9216 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Good Packet Counter</td>
<td>336186</td>
</tr>
<tr>
<td>RX - Packet/Frame Counter</td>
<td>336186</td>
</tr>
<tr>
<td>RX - Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Multicast Frame Counter</td>
<td>336186</td>
</tr>
<tr>
<td>RX - Broadcast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Byte Counter</td>
<td>21515904</td>
</tr>
<tr>
<td>RX - Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Pause Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Oversized Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Jabber Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Double VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - RUNT Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Fragment Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - VLAN Tagged Packets</td>
<td>0</td>
</tr>
<tr>
<td>RX - Ingress Dropped Packet</td>
<td>0</td>
</tr>
<tr>
<td>RX - MTU Check Error Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 0</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 3</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 4</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 5</td>
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<tr>
<td>RX - PFC Frame Priority 6</td>
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<tr>
<td>RX - PFC Frame Priority 7</td>
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<tr>
<td>RX - Debug Counter 0</td>
<td>336186</td>
</tr>
<tr>
<td>RX - Debug Counter 1</td>
<td>336186</td>
</tr>
<tr>
<td>RX - Debug Counter 2</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 3</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 4</td>
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<tr>
<td>RX - Debug Counter 5</td>
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<tr>
<td>RX - Debug Counter 6</td>
<td>0</td>
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<tr>
<td>RX - Debug Counter 7</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 8</td>
<td>0</td>
</tr>
<tr>
<td>TX - 64 Byte Frame Counter</td>
<td>166</td>
</tr>
<tr>
<td>TX - 65 to 127 Byte Frame Counter</td>
<td>112</td>
</tr>
<tr>
<td>TX - 128 to 255 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 256 to 511 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 512 to 1023 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 1024 to 1518 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 1519 to 1522 Byte Good VLAN Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 1519 to 2047 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 2048 to 4095 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - 4096 to 9216 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Good Packet Counter</td>
<td>278</td>
</tr>
<tr>
<td>TX - Packet/Frame Counter</td>
<td>278</td>
</tr>
<tr>
<td>TX - Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Multicast Frame Counter</td>
<td>278</td>
</tr>
<tr>
<td>TX - Broadcast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Byte Counter</td>
<td>18688</td>
</tr>
<tr>
<td>TX - Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Pause Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Oversized Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Jabber Counter</td>
<td>0</td>
</tr>
<tr>
<td>Description</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>TX - VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Double VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - RUNT Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - Fragment Counter</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 0</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 3</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 4</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 5</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 6</td>
<td>0</td>
</tr>
<tr>
<td>TX - PFC Frame Priority 7</td>
<td>0</td>
</tr>
<tr>
<td>TX - Debug Counter 0</td>
<td>0</td>
</tr>
<tr>
<td>TX - Debug Counter 1</td>
<td>0</td>
</tr>
<tr>
<td>TX - Debug Counter 2</td>
<td>0</td>
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<tr>
<td>TX - Debug Counter 3</td>
<td>0</td>
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<tr>
<td>TX - Debug Counter 4</td>
<td>0</td>
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<td>TX - Debug Counter 5</td>
<td>0</td>
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<tr>
<td>TX - Debug Counter 6</td>
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<td>TX - Debug Counter 7</td>
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<td>TX - Debug Counter 8</td>
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<td>TX - Debug Counter 9</td>
<td>0</td>
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<tr>
<td>TX - Debug Counter 10</td>
<td>0</td>
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<tr>
<td>TX - Debug Counter 11</td>
<td>0</td>
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<tr>
<td>RX - IPV4 L3 Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - IPV4 L3 Routed Multicast Packets</td>
<td>0</td>
</tr>
<tr>
<td>RX - IPV6 L3 Unicast Frame Counter</td>
<td>0</td>
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<tr>
<td>RX - IPV6 L3 Routed Multicast Packets</td>
<td>0</td>
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<tr>
<td>RX - Unicast Packet Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 64 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 65 to 127 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 128 to 255 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 256 to 511 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 512 to 1023 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 1024 to 2047 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 2048 to 4095 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - 4096 to 9216 Byte Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Good Packet Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Packet/Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Unicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Multicast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Broadcast Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Byte Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Pause Control Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Oversized Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Jabber Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Double VLAN Tag Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - RUNT Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - Fragment Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - VLAN Tagged Packets</td>
<td>0</td>
</tr>
<tr>
<td>RX - Ingress Dropped Packet</td>
<td>0</td>
</tr>
<tr>
<td>RX - MTU Check Error Frame Counter</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 0</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 3</td>
<td>0</td>
</tr>
<tr>
<td>RX - PFC Frame Priority 4</td>
<td>0</td>
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<tr>
<td>RX - PFC Frame Priority 5</td>
<td>0</td>
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<td>RX - PFC Frame Priority 6</td>
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</tr>
<tr>
<td>RX - PFC Frame Priority 7</td>
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<tr>
<td>RX - Debug Counter 0</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 1</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 2</td>
<td>0</td>
</tr>
<tr>
<td>RX - Debug Counter 3</td>
<td>0</td>
</tr>
</tbody>
</table>
### RX - Debug Counter
- Counter 4: 0
- Counter 5: 0
- Counter 6: 0
- Counter 7: 0
- Counter 8: 0

### TX - Frame Counters
- 64 Byte Frame Counter: 0
- 65 to 127 Byte Frame Counter: 0
- 128 to 255 Byte Frame Counter: 0
- 256 to 511 Byte Frame Counter: 0
- 512 to 1023 Byte Frame Counter: 0
- 1024 to 1518 Byte Frame Counter: 0
- 1519 to 2047 Byte Frame Counter: 0
- 2048 to 4095 Byte Frame Counter: 0
- 4096 to 9216 Byte Frame Counter: 0

### TX - Good VLAN Frame Counters
- 1519 to 1522 Byte Good VLAN Frame Counter: 0
- 2047 to 4095 Byte Frame Counter: 0

### TX - Packet Counters
- Packet/Frame Counter: 0
- Unicast Frame Counter: 0
- Multicast Frame Counter: 0
- Broadcast Frame Counter: 0
- Byte Counter: 0
- Control Frame Counter: 0
- Pause Control Frame Counter: 0
- Oversized Frame Counter: 0
- Jabber Counter: 0
- VLAN Tag Frame Counter: 0
- Double VLAN Tag Frame Counter: 0
- RUNT Frame Counter: 0
- Fragment Counter: 0

### Example (port-statistics)
```
Dell#show hardware stack-unit 1 unit 0 port-stats
ena/ speed/ link auto STP    ena/ speed/ link auto STP
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
```
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
0x03323000 ASF_PORT_SPEED.xe4 = 0x00000000
0x03327000 ASF_PORT_SPEED.xe5 = 0x00000000
0x0332b000 ASF_PORT_SPEED.xe6 = 0x00000000
0x0332f000 ASF_PORT_SPEED.xe7 = 0x00000000
0x03334000 ASF_PORT_SPEED.xe8 = 0x00000000
0x03338000 ASF_PORT_SPEED.xe9 = 0x00000000
0x0333c000 ASF_PORT_SPEED.xe10 = 0x00000000
0x03340000 ASF_PORT_SPEED.xe11 = 0x00000000
0x03344000 ASF_PORT_SPEED.xe12 = 0x00000000
0x03348000 ASF_PORT_SPEED.xe13 = 0x00000000
0x0334c000 ASF_PORT_SPEED.xe14 = 0x00000000
0x03350000 ASF_PORT_SPEED.xe15 = 0x00000000
0x03354000 ASF_PORT_SPEED.xe16 = 0x00000000
0x03358000 ASF_PORT_SPEED.xe17 = 0x00000000
0x0335c000 ASF_PORT_SPEED.xe18 = 0x00000000
0x03360000 ASF_PORT_SPEED.xe19 = 0x00000000
0x03364000 ASF_PORT_SPEED.xe20 = 0x00000000
0x03368000 ASF_PORT_SPEED.xe21 = 0x00000000
0x0336c000 ASF_PORT_SPEED.xe22 = 0x00000000
0x03370000 ASF_PORT_SPEED.xe23 = 0x00000000
0x03374000 ASF_PORT_SPEED.xe24 = 0x00000000
0x03378000 ASF_PORT_SPEED.xe25 = 0x00000000
0x0337c000 ASF_PORT_SPEED.xe26 = 0x00000000
0x03380000 ASF_PORT_SPEED.xe27 = 0x00000000
0x03384000 ASF_PORT_SPEED.xe28 = 0x00000000
0x03388000 ASF_PORT_SPEED.xe29 = 0x00000000
!------------------------------------------------- output truncated -------------------------!

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 starting 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 0x0000000000
**********************************************************************************
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
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 (Queue2/Buffer-Info)
Dell#show hardware stack-unit 1 buffer unit 0 interface all queue 6 buffer-info

Example (queue buffer)
Dell(conf)#show hardware stack-unit 0 buffer unit 0 port 1 queue 2 buffer-info

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 counters interface

Display the counter information for a specific interface.

Syntax

```
show hardware counters interface interface
```

Parameters

counters

Enter the keywords `counters` to display counter value for the specified stack-member the port-pipe.

interface interface

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

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.

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.8(0.0)</td>
<td>Introduced on the M I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example

```
Dell#show hardware counters interfac tengigabitethernet 5/1
unit: 0 port: 2 (interface Te 5/1)
Description                                      Value
RX - IPV4 L3 Unicast Frame Counter                 0
RX - IPV4 L3 Routed Multicast Packets              0
RX - IPV6 L3 Unicast Frame Counter                 0
RX - IPV6 L3 Routed Multicast Packets              0
RX - Unicast Packet Counter                        0
RX - 64 Byte Frame Counter                         0
RX - 65 to 127 Byte Frame Counter                  0
RX - 128 to 255 Byte Frame Counter                 0
RX - 256 to 511 Byte Frame Counter                 0
RX - 512 to 1023 Byte Frame Counter                0
RX - 1024 to 1518 Byte Frame Counter               0
RX - 1519 to 1522 Byte Good VLAN Frame Counter     0
RX - 1519 to 2047 Byte Frame Counter               0
RX - 2048 to 4095 Byte Frame Counter               0
RX - 4095 to 2046 Byte Frame Counter               0
RX - Good Packet Counter                           0
RX - Packet/Frame Counter                         0
RX - Unicast Frame Counter                         0
RX - Multicast Frame Counter                       0
RX - Broadcast Frame Counter                       0
RX - Byte Counter                                  0
RX - Control Frame Counter                         0
RX - Pause Control Frame Counter                   0
RX - Oversized Frame Counter                       0
```
show hardware buffer interface

Display buffer statistics for a specific interface.

Syntax

  show hardware buffer interface interface{priority-group { id | all } | queue { id | all } } buffer-info

Parameters

  interface interface  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.

  priority-group  Identifier of the priority group in the range of 0 to 7.

  queue  Enter the keyword queue followed by id for specific queue or keyword all.

  buffer-info  To display total buffer information for the interface, enter the keywords buffer-info.

Command Modes

  EXEC
  EXEC Privilege

Command History

  Version  Description

  9.9(0.0)   Introduced on the FN IOM.

  9.8(0.0)   Introduced on the M I/O Aggregator and FN I/O Aggregator.

Example displaying total-buffer information for the interface

Dell# show hardware buffer interface tengigabitethernet 1/1 buffer-info
----- Buffer Stats for Interface Te 1/1 -----
Maximum Shared Limit for the Interface: 38336
Default Packet Buffer allocate for the Interface: 120
Used Packet Buffer for the Interface: 0

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 [counters]**

Enter the keywords **port-set** with a port-pipe number—0.

(Optional) Enter the keyword **counters** to display hit counters for the selected ACL or QoS option.

Defaults

none

Command Modes

EXEC Privilege

Supported Modes

All Modes

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
---------------------------------------------------------------------
EntryId  Description                 #HITS
---------------------------------------------------------------------
2048     STP BPDU Redirects           0
2047     LLDP BPDU Redirects          164904
2045     LACP traffic Redirects       0
2044     GVRP traffic Redirects       0
2043     ARP Reply Redirects          0
2042     802.1x frames Redirects      0
2041     VRRP frames Redirects        0
2040     IPv6VRRP frames Redirects    0
2039     GRAT ARP                     0
2036     IPv6 Mcast Control Traffic   128840
2000     VLT ARP SYNC Frames          0
1999     ICL Hellos                   0
1998     ICL MAC SYNC Frames          0
1997     VLT Tunneled STP Frames      0
1995     DROP Cases                   43207
1917     L3 Term Traffic ClassID 1 to Q6       0
1916     L3 CPU Bound Traffic ClassId 2 to Q5  0
1915     Unknown MCAST Packets                 0
1792     BGP with TTL1, L4 SRC port Redirects 0
1791     BGP with TTL1, L4 DST Port Redirects 0
25
Dell#

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 00000000 00000000,  
FPF4=0x00  
MASK=0x00000000 00000000 00000000 ffffffff ffffffff ffffffff ffffffff,  
0x00  
action={act=Drop, param0=0(0x00), param1=0(0x00)},  
anction={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},  
anction={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},  
meter=NULL,
*************** 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
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
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), 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
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
00000000
, 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), param1=0(0x00)},
meter=NULL,
counter={idx=2, 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
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000 00000000
00000000
, 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), 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 00000806
00001600
, FPF4=0x00
MASK=0x00000000 00000000 00000000 00000000 00000000 0000806
00001600
, 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 -----------------!
show hardware buffer-stats-snapshot

Displays buffer statistics tracking resource information for a specific interface.

Syntax
Dell#show hardware stack-unit <id> buffer-stats-snapshot unit <id> resource x

Parameters
buffer-info Displays total buffer information for a group, where x can be one of the following:
- All - Displays ingress and egress device, port, and queue snapshots
- Interface all queue (all) - egress queue-level snapshot for both unicast and multicast packets
- Interface all queue ucast (id | all) - egress queue-level snapshot for unicast packets only
- Interface all queue mcast (id | all) - egress queue-level snapshot for multicast packets only
- Interface all prio-group (id | all) - ingress priority-group level snapshot

buffer-stats-snapshot unit number Display the historical snapshot of buffer statistical values unit Enter the keyword unit along with a port-pipe number. The range is from 0 to 0.

Command Modes
EXEC
EXEC Privilege

Command History
Version 9.8(0.0) Introduced on the M I/O Aggregator and the FN I/O Aggregator.

Usage Information
Interface slot/port—Queue ucast/mcast — Displays the total unicast/multicast buffer usage on per-port per-queue basis. For CPU port, counters for queues 0 to 11 displays and there is no differentiation between unicast and multicast queues.

Example displaying egress queue-level snapshot for both unicast and multicast packets for the specific interface
Dell# show hardware buffer-stats-snapshot resource interface fortyGigE 1/1 queue all
Unit 1 unit: 0 port: 1 (interface Fo 1/1)
Q# TYPE Q# TOTAL BUFFERED CELLS
UCAST 0 0
UCAST 1 0
UCAST 2 0
UCAST 3 0
UCAST 4 0
UCAST 5 0
UCAST 6 0
UCAST 7 0
UCAST 8 0
UCAST 9 0
UCAST 10 0
UCAST 11 0
MCAST 0 0

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Example displaying egress queue-level snapshot for unicast packets for the specific interface:

```
Dell#show hardware buffer-stats-snapshot resource interface fortyGigE 0/0 queue ucast 10
Unit 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
UCAST       10     0
```

Example displaying egress queue-level snapshot for multicast packets for the specific interface:

```
Dell#show hardware buffer-stats-snapshot resource interface fortyGigE 0/0 queue mcast 3
Unit 1 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
MCAST       3      0
```

Example displaying ingress priority-group level snapshot for the specific interface:

```
Dell#show hardware buffer-stats-snapshot resource interface fortyGigE 1/1 priority-group 7
Unit 1 unit: 0 port: 1 (interface Fo 1/1)
---------------------------------------
PG# SHARED CELLS HEADROOM CELLS
```
show hardware stack-unit buffer-stats-snapshot (Total Buffer Information)

View the buffer statistics tracking resource information depending on the type of buffer information, such as device-level details, port-level counters, queue-based snapshots, or priority group-level snapshot in the egress and ingress direction of traffic.

**Syntax**

```
show hardware stack-unit {id} buffer-stats-snapshot unit {id} resource interface all {priority-group { id | all } | queue { ucast{id | all} | mcast {id | all} | all}}
```

**Parameters**

- `stack-unit stack-unit-number` Unique ID of the stack unit 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. The range is from 0 to 11.
buffer-stats-snapshot unit number

buffer-info

Display the historical snapshot of buffer statistical values unit Enter the keyword unit along with a port-pipe number. The range is from 0 to 0.

buffer-info Displays total buffer information for a group, where x can be one of the following:

- All - Displays ingress and egress device, port, and queue snapshots
- Interface all queue (all) - egress queue-level snapshot for both unicast and multicast packets
- Interface all queue ucast {id | all} - egress queue-level snapshot for unicast packets only
- Interface all queue mcast {id | all} - egress queue-level snapshot for multicast packets only
- Interface all prio-group {id | all} - ingress priority-group level snapshot

Command Modes
EXEC
EXEC Privilege

Command History

Version Description
9.8(0.0) Introduced on the M/I/O Aggregator, and FN I/O Aggregator.

Usage Information

The following information is displayed based on the buffer-info type, such as device-level details, queue-based snapshots, or priority group-level snapshot in the egress and ingress direction of traffic:

- Device-ingress – Displays total buffer accounting usage for the unit.
- Device-egress – Display total buffer usage for the unit, total multicast buffer usage for the unit and also on per-service-pool basis. Counters will be displayed for the 2 service-pools – one for normal traffic and other for DCB traffic.

When the buffer-stats-snapshot is disabled, the following informational message is displayed when you run the show command:

%Info: Buffer-stats-snapshot feature is disabled.

Example

Dell#show hardware stack-unit 1 buffer-stats-snapshot unit 3 resource interface all queue mcast 3
Unit 1 unit: 3 port: 1 (interface Fo 1/144)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TYPE</th>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCAST</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 5 (interface Fo 1/148)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TYPE</th>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCAST</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 9 (interface Fo 1/152)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TYPE</th>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCAST</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 13 (interface Fo 1/156)

Debugging and Diagnostics
<table>
<thead>
<tr>
<th>Q#</th>
<th>TYPE</th>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>MCAST</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 17 (interface Fo 1/160)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 21 (interface Fo 1/164)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 25 (interface Fo 1/168)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 29 (interface Fo 1/172)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 33 (interface Fo 1/176)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Unit 1 unit: 3 port: 37 (interface Fo 1/180)

<table>
<thead>
<tr>
<th>Q#</th>
<th>TOTAL BUFFERED CELLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

**show hardware drops**

Displays internal drops on the specified interface or for a range of interface.

**Syntax**

show hardware drops interface interface

**Parameters**

- **interface**
  
Enter any of the following keywords and slot/port or slot/port-range 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.

- **drops**
  
Enter the keyword drops to display internal drops.

**Command Modes**

EXEC
EXEC Privilege

Command History

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9(0.0)</td>
<td>Introduced on the FN IOM.</td>
</tr>
<tr>
<td>9.8(0.0)</td>
<td>Introduced on the M I/O Aggregator and the FN I/O Aggregator.</td>
</tr>
</tbody>
</table>

Example displaying internal drops for the specific interface

Dell#show hardware drops interface tengigabitethernet 2/1

Drops in Interface Te 2/1:
--- 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 ---
  Ingress MMU Drops : 0
  HOL DROPS(TOTAL) : 0
  HOL DROPS on COS0 : 0
  HOL DROPS on COS1 : 0
  HOL DROPS on COS2 : 0
  HOL DROPS on COS3 : 0
  HOL DROPS on COS4 : 0
  HOL DROPS on COS5 : 0
  HOL DROPS on COS6 : 0
  HOL DROPS on COS7 : 0
  HOL DROPS on COS8 : 0
  HOL DROPS on COS9 : 0
  HOL DROPS on COS10 : 0
  HOL DROPS on COS11 : 0
  HOL DROPS on COS12 : 0
  HOL DROPS on COS13 : 0
  HOL DROPS on COS14 : 0
  HOL DROPS on COS15 : 0
  HOL DROPS on COS16 : 0
  HOL DROPS on COS17 : 0
  TxPurge CellErr : 0
  Aged Drops : 0
--- Egress MAC counters---
  Egress FCS Drops : 0
--- Egress FORWARD PROCESSOR Drops ---
  IPv4 L3UC Aged & Drops : 0
  TTL Threshold Drops : 0
  INVALID VLAN CNTR Drops : 0
  L2MC Drops : 0
  PKT Drops of ANY Conditions : 0
  Hg MacUnderflow : 0
  TX Err PKT Counter : 0
--- Error counters---
  Internal Mac Transmit Errors : 0
  Unknown Opcodes : 0
  Internal Mac Receive Errors : 0

Example displaying internal drops for FC port

Dell(conf)#do show hardware drops interface fibreChannel 0/49

Drops in Interface Fc 0/49:
--- Ingress Drops ---
Ingress Drops : 10
IBP CBP Full Drops : 0
PortSTPnotFwd Drops : 0
IPv4 L3 Discards : 0
Policy Discards : 0
Packets dropped by FP : 10
(L2+L3) Drops : 0
Port bitmap zero Drops : 1
Rx VLAN Drops : 1

--- Ingress MAC counters---
Ingress FCSDrops : 0
Ingress MTUExceeds : 0

--- MMU Drops ---
Ingress MMU Drops : 0
Ingress Drops Bytes : 0
HOL DROPS(TOTAL) : 0
HOL DROPS on COS0 : 0
HOL DROPS on COS1 : 0
HOL DROPS on COS2 : 0
HOL DROPS on COS3 : 0
HOL DROPS on COS4 : 0
HOL DROPS on COS5 : 0
HOL DROPS on COS6 : 0
HOL DROPS on COS7 : 0
HOL DROPS on COS8 : 0
HOL DROPS on COS9 : 0
HOL DROPS on COS10 : 0
HOL DROPS on COS11 : 0
HOL DROPS on COS12 : 0
HOL DROPS on COS13 : 0
HOL DROPS on COS14 : 0
TxPurge CellErr : 0
Aged Drops : 0

--- Egress MAC counters---
Egress FCS Drops : 0

--- Egress FORWARD PROCESSOR Drops ---
IPv4 L3UC Aged & Drops : 0
TTL Threshold Drops : 0
INVALID VLAN CNTR Drops : 0
L2MC Drops : 0
PKT Drops of ANY Conditions : 0
Hg MacUnderflow : 0
TX Err PKT Counter : 0

--- Error counters---
Internal Mac Transmit Errors : 0
Unknown Opcodes : 0
Internal Mac Receive Errors : 0

Dell(conf)#
The 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 5. ICMP messages and their definitions

<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>0</td>
<td>3</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>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
<td>host unreachable</td>
<td>.</td>
<td>.</td>
</tr>
<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>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td>fragmentation needed but don’t fragment bit set</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td>source route failed</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td>destination network unknown</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td></td>
<td>destination host unknown</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
<td>source host isolated (obsolete)</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td>destination network administratively prohibited</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>destination host administratively prohibited</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td></td>
<td>network unreachable for TOS</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
<td>host unreachable for TOS</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td></td>
<td>communication administratively prohibited by filtering</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td></td>
<td>host precedence violation</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>precedence cutoff in effect</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>0</td>
<td>source quench</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td>redirect</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td>redirect for network</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
<td>redirect for host</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>redirect for type-of-service and network</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>redirect for type-of-service and host</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0</td>
<td>echo request</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>0</td>
<td>router advertisement</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Type</td>
<td>Code</td>
<td>Description</td>
<td>Query</td>
<td>Error</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>------</td>
<td>------------------------------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>router solicitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&amp;</td>
<td>11</td>
<td>0</td>
<td>time exceeded:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>time-to-live equals 0 during transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>parameter problem:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>timestamp request</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>timestamp reply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>information request (obsolete)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>information reply (obsolete)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>address mask request</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>address mask reply</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>