



Cisco ONS 15540 ESP Command Reference Guide

Cisco IOS Release 12.2SV
February 2006

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Preface

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

This section provides the following information:

- Document Objectives
- Audience
- Document Organization
- Related Documentation
- About the CLI
- About Cisco IOS Command Modes
- Document Conventions
- Where to Find Safety and Warning Information
- Obtaining Documentation
- Documentation Feedback
- Cisco Product Security Overview
- Obtaining Technical Assistance
- Obtaining Additional Publications and Information

Document Objectives

This guide explains the commands to configure and manage the Cisco ONS 15540 ESP system. Use this guide in conjunction with the appropriate publications listed in the Related Documentation section.

Audience

To use this publication, you should be familiar with Cisco or equivalent optical transmission hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Document Organization

This Cisco ONS 15540 ESP Command Reference Guide is organized into the following chapters:

- Chapter 1, “APS Commands,” lists the commands to configure and monitor APS operations.
- Chapter 2, “Debug Commands,” lists the commands to debug the Cisco ONS 15540 ESP.
- Chapter 3, “Interface Configuration Commands,” lists the commands to configure and monitor the interfaces on the Cisco ONS 15540 ESP.
- Chapter 4, “Online Diagnostics Commands,” lists the commands to configure and monitor online diagnostic operations.
- Chapter 5, “OSCP Commands,” lists the commands to configure and monitor OSCP operations.
- Chapter 6, “Processor Card Redundancy Commands,” lists the commands to configure and monitor processor card redundancy operations.
- Chapter 7, “SNMP Commands,” lists the Cisco ONS 15540 ESP-specific SNMP commands.
- Chapter 8, “System Management Commands,” lists the commands to manage your Cisco ONS 15540 ESP.
- Chapter 9, “Threshold Commands,” lists the commands to configure and monitor interface alarm threshold operations.
- Chapter 10, “Topology Neighbor Commands,” lists the commands to configure and monitor network topology neighbors.

Related Documentation

Use this Cisco ONS 15540 ESP Command Reference Guide in conjunction with the following referenced publications:

- *Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series*
Provides the regulatory compliance and safety information for the Cisco ONS 15500 Series.
- *Cisco ONS 15540 ESP Planning Guide*
Provides detailed information on the Cisco ONS 15540 ESP architecture and functionality.
- *Cisco ONS 15540 ESP Hardware Installation Guide*
Provides detailed information about installing the Cisco ONS 15540 ESP.
- *Cisco ONS 15540 ESP Optical Transport Turn-Up and Test Guide*
Provides acceptance testing procedures for Cisco ONS 15540 ESP nodes and networks.
- *Cisco ONS 15540 ESP Configuration Guide*
Describes how to configure the Cisco ONS 15540 ESP.
- *Cisco ONS 15540 ESP System Alarms and Error Messages*
Describes the system alarms and error messages for the Cisco ONS 15540 ESP.
- *Cisco ONS 15540 ESP Troubleshooting Guide*
Describes how to identify and resolve problems with the Cisco ONS 15540 ESP.
- *Network Management for the Cisco ONS 15540 ESP*
Provides information on the network management systems that support the Cisco ONS 15540 ESP.

- *Cisco ONS 15540 ESP TL1 Commands*
Provides a full TL1 command and autonomous message set including parameters, AIDs, conditions and modifiers for the Cisco ONS 15540 ESP.
- *MIB Quick Reference for the Cisco ONS 15500 Series*
Describes the Management Information Base (MIB) objects and explains how to access Cisco public MIBs for the Cisco ONS 15500 Series.
- *Cisco ONS 15540 ESP Software Upgrade Guide*
Describes how to upgrade system images and functional images on the Cisco ONS 15540 ESP.
- *Introduction to DWDM Technology*
Provides background information on the dense wavelength division multiplexing (DWDM) technology.
- *Cisco IOS Configuration Fundamentals Configuration Guide*
Provides useful information on the CLI (command-line interface) and basic shelf management.

About the CLI

You can configure the Cisco ONS 15540 ESP from the CLI (command-line interface) that runs on the system console or terminal, or by using remote access.

To use the CLI, your terminal must be connected to the Cisco ONS 15540 ESP through the console port or one of the TTY lines. By default, the terminal is configured to a basic configuration, which should work for most terminal sessions.

About Cisco IOS Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. To get a list of the commands available in a given mode, type a question mark (?) at the system prompt.

When you start a session on the system, you begin in user mode, also called EXEC mode. Only a limited subset of the commands are available in EXEC mode. To have access to all commands, you must enter privileged EXEC mode. Normally, you must type in a password to access privileged EXEC mode. From privileged mode, you can type in any EXEC command or access global configuration mode. Most of the EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The EXEC commands are not saved across system reboots or across processor switchovers.

You can monitor and control the standby processor with commands entered on the active processor. A subset of EXEC and privileged EXEC commands are available through the standby processor console.



Note

You can easily determine if you are accessing the active or the standby processor: The standby processor has “sby-” prefixed to the command prompt.

The configuration modes allow you to make changes to the running configuration. If you later save the configuration, these commands are stored across system reboots. You must start at global configuration mode. From global configuration mode, you can enter interface configuration mode, subinterface configuration mode, and a variety of submodes.

ROM (read-only memory) monitor mode is a separate mode used when the system cannot boot properly. For example, your system or access server might enter ROM monitor mode if it does not find a valid system image when it is booting, or if its configuration file is corrupted at startup.

Table 1 lists and describes the most commonly used modes, how to enter the modes, and the resulting system prompts. The system prompt helps you identify which mode you are in and, therefore, which commands are available to you.

Table 1 Frequently Used IOS Command Modes

| Mode | Description of Use | How to Access | Prompt |
|--------------------------------|---|--|---------------------------|
| User EXEC | To connect to remote devices, change terminal settings on a temporary basis, perform basic tests, and display system information. | Log in. | Switch> |
| Privileged EXEC (Enable) | To set operating parameters. The privileged command set includes the commands in user EXEC mode, as well as the configure command. Use this command to access the other command modes. | From the user EXEC mode, enter the enable command and the enable password. | Switch# |
| Global configuration | To configure features that affect the system as a whole. | From the privileged EXEC mode, enter the configure terminal command. | Switch(config)# |
| Interface configuration | To enable features for a particular interface. Interface commands enable or modify the operation of a port. | From global configuration mode, enter the interface type location command. For example, enter interface fastethernet 0 | Switch(config-if)# |
| Line configuration | To configure the console port or VTY line from the directly connected console or the virtual terminal used with Telnet. | From global configuration mode, enter the line console 0 command to configure the console port, or the line vty line-number command to configure a VTY line. | Switch(config-line)# |
| Redundancy configuration | To configure system redundancy. | From global configuration mode, enter the redundancy command. | Switch(config-red)# |
| APS ¹ configuration | To configure APS redundancy features. | From redundancy configuration mode, enter the associate group command. | Switch(config-aps)# |
| Threshold list configuration | To configure alarm threshold list attributes and thresholds. | From the global configuration mode, enter the threshold-list command. | Switch(config-t-list)# |
| Threshold configuration | To configure alarm threshold attributes. | From threshold list configuration mode, enter the threshold command. | Switch(config-threshold)# |

1. Automatic Protection Switching

The Cisco IOS command interpreter, called the EXEC, interprets and executes the commands you enter. You can abbreviate commands and keywords by entering just enough characters to make the command unique from other commands. For example, you can abbreviate the **show** command to **sh** and the **configure terminal** command to **confi t**.

When you type **exit**, the CLI backs out one command mode level. In general, typing **exit** returns you to global configuration mode. To exit configuration mode completely and return to privileged EXEC mode, press **Ctrl-Z** or **end**.

Listing Cisco IOS Commands and Syntax

In any command mode, you can get a list of available commands by entering a question mark (?).

```
Switch> ?
```

To obtain a list of commands that begin with a particular character sequence, type in those characters followed immediately by the question mark (?). Do not include a space. This form of help is called word help, because it lists the words for you.

```
Switch# c?
calendar cd clear clock configure
connect copy
```

To list keywords or arguments, enter a question mark in place of a keyword or argument. Include a space before the question mark. This form of help is called command syntax help, because it reminds you which keywords or arguments are applicable based on the command, keywords, and arguments you have already entered.

```
Switch# configure ?
memory          Configure from NV memory
network         Configure from a TFTP network host
overwrite-network Overwrite NV memory from TFTP network host
terminal        Configure from the terminal
<cr>
```

To redisplay a command you previously entered, press the Up-arrow key. You can continue to press the Up-arrow key to see more previously issued commands.



Tip

If you are having trouble entering a command, check the system prompt and enter the question mark (?) for a list of available commands. You might be in the wrong command mode or using incorrect syntax.

You can press **Ctrl-Z** or **end** in any mode to immediately return to privileged EXEC (enable) mode, instead of entering **exit**, which returns you to the previous mode.

Document Conventions

This publication uses the following conventions:

| Convention | Application |
|-----------------------------|---|
| boldface | Commands and keywords in body text. |
| <i>italic</i> | Command input that is supplied by the user. |
| [] | Keywords or arguments that appear within square brackets are optional. |
| { x x x } | A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one. |
| Ctrl | The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key. |
| screen font | Examples of information displayed on the screen. |
| boldface screen font | Examples of information that the user must enter. |
| < > | Command parameters that must be replaced by module-specific codes. |

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

**Caution**

Means *reader be careful*. In this situation, the user might do something that could result in equipment damage or loss of data.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Where to Find Safety and Warning Information

For safety and warning information, refer to the *Cisco Optical Transport Products Safety and Compliance Information* document that accompanied the product. This publication describes the international agency compliance and safety information for the Cisco ONS 15xxx systems. It also includes translations of the safety warnings that appear in the ONS 15xxx system documentation.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/techsupport>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a comprehensive library of technical product documentation on a portable medium. The DVD enables you to access multiple versions of installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the same HTML documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .PDF versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at this URL:

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Cisco Product Security Overview

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From this site, you will find information about how to:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

<http://www.cisco.com/go/psirt>

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For Emergencies only—security-alert@cisco.com

An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

**Tip**

We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.x through 9.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT at the aforementioned e-mail addresses or phone numbers before sending any sensitive material to find other means of encrypting the data.

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

**Note**

Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is down, or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired, while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco offerings. To order and find out more about the Cisco Product Quick Reference Guide, go to this URL:

<http://www.cisco.com/go/guide>

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>
or view the digital edition at this URL:
<http://ciscoiq.texterity.com/ciscoiq/sample/>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
<http://www.cisco.com/ipj>
- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:
<http://www.cisco.com/en/US/products/index.html>
- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:
<http://www.cisco.com/discuss/networking>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>



APS Commands

APS (Automatic Protection Switching) provides protection against signal failure. Use the following commands to configure and monitor APS operations.

aps clear

To clear an external APS switchover request or an APS lockout request, use the **aps clear** command.

```
aps clear group-name
```

| | | |
|---------------------------|------------|--|
| Syntax Description | group-name | Specifies the name of the associated pair of interfaces. |
|---------------------------|------------|--|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|-----------------|
| Command Modes | Privileged EXEC |
|----------------------|-----------------|

| | |
|------------------------|---|
| Command History | This table includes the following release-specific history entries: |
|------------------------|---|

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

The Cisco ONS 15540 ESP supports external APS switchover requests from the CLI (command-line interface). These requests have priorities depending on the condition of the working and protection signal, and whether another switchover or lockout request is in effect. There are three types of requests:

- Lockout requests—Have the highest priority and take effect regardless of the condition of the protection signal. A lockout prevents the signal from switching over from the working channel to the protection channel.
- Forced switchover requests—Have the next highest priority and are only prevented if there is an existing lockout on the protection interface, or the protection signal has failed.

- Manual switchover requests—Have the lowest priority and only occur if there is no existing lockout on the protection path, forced switchover request, or signal failure or degradation.

The **aps clear** command clears the external requests on the APS group and returns the interfaces to the initial default state, with the working channel active and no active requests in effect. However, if the working channel is defective, the protection channel could become the active channel after the working channel fails and another switchover occurs.

The **aps clear** command differs from y-cable revertive switching behavior. Where the **aps clear** command returns the interfaces to the initial default state and clears the current external request, y-cable revertive switching behavior switches the active signal back to the working channel after the expiration of the wait-to-restore timer (if no external switchover request occur during that interval).

Examples

The following example shows how to clear an APS request on an associated interface pair named blue.

```
Switch# aps clear blue
```

The following example shows how to clear an APS request for an associated interface pair with the default group name.

```
Switch# aps clear Wavepatch2/0/0
```

Related Commands

| Command | Description |
|-------------|--|
| aps lockout | Prevents switchovers to the protection path. |
| aps switch | Requests an APS switchover. |
| show aps | Displays APS configuration information and status. |

aps direction

To specify unidirectional or bidirectional path switching, use the **aps direction** command. To revert to the default behavior, use the **no** form of this command.

aps direction { **unidirectional** | **bidirectional** }

no aps direction

| Syntax Description | | |
|--------------------|-----------------------|--|
| | unidirectional | Specifies unidirectional path switching. |
| | bidirectional | Specifies bidirectional path switching. |

| Defaults | |
|----------|----------------|
| | Unidirectional |

| Command Modes | |
|---------------|-------------------|
| | APS configuration |

| Command History | |
|-----------------|---|
| | This table includes the following release-specific history entries: |

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

In unidirectional path switching, only the node that detects a signal failure switches over. The other node continues to receive its signal on the original path. In bidirectional path switching, when a node detects a signal failure it sends a message to the other node about the failure causing that node switches over. Both nodes then use the same path through the network.

Use the **aps direction** command only with splitter and y-cable line card protection configurations. Client line card protection handles switchovers in the client equipment, not in the Cisco ONS 15540 ESP.

When using bidirectional path switching, always configure the nodes so that they communicate over the same working path and the same protection path. Also, configure both nodes that support the channel with the same APS features, such as y-cable support, revertive behavior, and path switching.

Before changing the type of path switching, disable the standby interface with the **shutdown** command. After changing the type of path switching, reenable the standby interface with the **no shutdown** command

**Note**

Bidirectional path switching only operates on networks that support the OSC.

**Note**

Configure bidirectional path switching on interfaces configured with Sysplex ETR or Sysplex CLO protocol encapsulation.

Examples

The following example shows how to configure bidirectional path switching for transparent interfaces in a y-cable protection configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group alpha
Switch(config-red-aps)# working transparent 2/0/0
Switch(config-red-aps)# protection transparent 4/0/0
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
```

The following example shows how to configure bidirectional path switching in a splitter protection configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group chicago
Switch(config-red-aps)# working wavepatch 10/2/0
Switch(config-red-aps)# protection wavepatch 10/2/1
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
```

The following example shows how to change the path switching operation for a y-cable APS group from unidirectional to bidirectional.

```
Switch# show aps group alpha

APS Group alpha :

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end (client side y-cable)
direction....: prov: uni, current: uni, remote prov: bi
revertive....: no
created.....: 14 hours, 53 minutes
aps state....: associated (enabled)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
switched chan: 0
channel ( 0): Transparent4/3/0 (STANDBY - UP), Wave4/3 (UP)
               : channel request: no-request
               : transmit request: no-request
```

```

        : receive request: no-request
channel ( 1): Transparent2/3/0 (ACTIVE - UP), Wave2/3 (UP)
        : channel request: no-request
        : switchover count: 0
        : last switchover: never

Switch# configure terminal
Switch(config)# interface transparent 4/3/0
Switch(config-if)# shutdown
Switch(config-if)# exit
Switch(config)# redundancy
Switch(config-red)# associate group Denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
Switch(config-red-aps)# exit
Switch(config-red)# exit
Switch(config)# interface transparent 4/3/0
Switch(config-if)# no shutdown
Switch(config-if)# end
Switch#

```

Related Commands

| Command | Description |
|---|--|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps far-end | Configures information about the other node that supports the channel. |
| aps revertive | Configures revertive APS for y-cable line card protection. |
| aps timer message holddown | Modifies the APS Channel Protocol message holddown timer interval and message count value. |
| aps timer message max-interval | Modifies the APS Channel Protocol maximum inactivity interval timer value. |
| aps timer search-for-up | Modifies the minimum and maximum timer intervals on an APS timer that the system must wait for a splitter protection connection to come up when both connections are down. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| aps timer wait-to-restore | Modifies the number of seconds an APS timer must wait before switching back to the preferred working signal. |
| aps working | Configures the working interface of an associated interface pair. |
| aps y-cable | Enables y-cable protection. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration information and status. |

aps disable

To disable APS activity between an associated interface pair, use the **aps disable** command. To reenable APS activity, use the **aps enable** command.

aps disable

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Before changing the APS configuration of an associated interface pair, use this command to disable APS activity between the interfaces. When an interface pair is initially associated, APS activity is disabled.

Examples

The following example shows how to disable APS activity between associated transparent interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
```

Related Commands

| Command | Description |
|------------------------|---|
| aps enable | Enables APS activity between associated interfaces. |
| associate group | Creates an APS group and enters APS configuration mode. |

aps enable

To enable APS activity between an associated interface pair, use the **aps enable** command. To disable APS activity, use the **aps disable** command.

aps enable

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

After changing the APS configuration of an associated interface pair, use this command to enable APS activity between the interfaces.

Examples

The following example shows how to enable APS activity between associated transparent interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group london
Switch(config-red-aps)# aps working transparent 2/0/0
```

aps enable

```
Switch(config-red-aps)# aps protection transparent 4/0/0  
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|------------------------|---|
| aps disable | Disables APS activity between associated interfaces. |
| associate group | Creates an APS group and enters APS configuration mode. |

aps far-end

To configure the remote node APS group name and IP address for a line card protected channel supported on a dual shelf node, use the **aps far-end** command. To remove remote node group name and IP address information, use the **no** form of this command.

```
aps far-end [group group-name] [ip-address address]
```

```
no aps far-end [group] [ip-address]
```

Syntax Description

| | |
|----------------------------------|---|
| group <i>group-name</i> | The name of the APS group at the other node that supports the channel. The group name can differ from the name on the local node. |
| ip-address <i>address</i> | The IP address of the other node that supports the channel. |

Defaults

None

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to configure APS for line card protected channels supported on a dual shelf node.

The APS Channel Protocol uses the OSC to communicate between nodes. When a channel is supported on a dual shelf node, the other nodes in the topology do not have full OSC access in both the east and west directions. Without full OSC access to the channel, APS will no function correctly. To compensate for this, you must provide the APS group name and IP address of the other node that supports the channel.

Configure both shelves in the network that support the channel.

Examples

The following example shows how to configure the information for the remote node that supports the channel.

```
Switch(config)# redundancy
Switch(config-red)# associate group tokyo
Switch(config-red-aps)# aps working transparent 3/0/0
Switch(config-red-aps)# aps protection transparent 5/0/0
Switch(config-red-aps)# aps far-end group blue ip-addr 10.1.1.2
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|------------------------|---|
| aps direction | Modifies path switching behavior. |
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| associate group | Creates an APS group and enters APS configuration mode. |
| show aps | Displays APS configuration and operation information. |

aps lockdown

To lock out an APS switchover to the protection path, thus preventing any further APS switchovers for any reason, including manual or forced switchovers and signal failures, use the **aps lockdown** command. To remove an APS lockdown request, use the **aps clear** command.

aps lockdown *group-name*

Syntax Description

This command has no other arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to configure APS signal switchover lockout on the protection path. This is useful when you want to prevent a switchover during shelf maintenance, or when the protection signal has degraded or failed.

You can only lock out switchovers to the protection path, not the working path. A lockout request only succeeds when the protection path interface is also acting as the standby interface. If the protection path interface is the active interface, use the **aps switch** command to switch the active interface role back to the working interface.

**Note**

The APS lockout does not persist across system reloads or processor card switchovers.

Examples

The following example shows how to lock out switchover to the protection path on an associated group named group1.

```
Switch# aps lockout group1
```

Related Commands

| Command | Description |
|--------------------|---|
| aps clear | Clears the APS switchover or lockout. |
| aps switch | Requests an APS switchover. |
| aps working | Configures the working interface of an associated interface pair. |
| show aps | Displays APS configuration information and status. |

aps message-channel

To configure message channel to send APS channel protocol messages for the Cisco ONS 15540 ESP, use the **aps message-channel** command. To revert to the default behavior, use the **no** form of this command.

```
aps message-channel { auto-select [far-end group-name name] |
  inband dcc [far-end group-name name] | ip far-end group-name name ip-address ip-address
  | osc [far-end group-name name] }
```

```
no aps message-channel
```

Syntax Description

| | |
|---------------------------------------|---|
| auto-select | APS automatically selects a transport mechanism to send APS messages. |
| far-end group-name <i>name</i> | Specifies the APS group name for the channel at the remote node. |
| inband dcc | Specifies APS to use the in-band message channel for sending APS messages. |
| ip | Specifies APS messages are sent over IP. APS addresses the messages to a specified group name on the remote node identified by this ip address. |
| ip-address <i>ip-address</i> | Specifies the IP address to use to send the APS channel protocol messages. |
| osc | APS messages are sent on the OSC. |

Defaults

auto-select

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |

| SV-Release | Modification |
|------------|--|
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Using OSC provided hop-by-hop support and easier fault isolation. The in-band message channel provides channel-based support without the overhead of the OSC. Using IP sends the message outside the optical network.

Examples

The following example shows how to create an APS group and configure the message channel:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group aps_group1
Switch(config-red-aps)# aps message-channel osc
```

Related Commands

| Command | Description |
|----------------------------|---|
| aps lockout | Prevents switchover to the protection path. |
| aps working | Configures the working interface for an APS interface pair. |
| aps y-cable | Enables y-cable protection. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps protection

To configure the protection path interface of an APS group, use the **aps protection** command. To remove to the protection path interface, use the **no** form of this command.

```
aps protection { transparent slot/subcard/port | wavepatch slot/subcard/port }
```

```
no aps protection { transparent slot/subcard/port | wavepatch slot/subcard/port }
```

| Syntax Description | transparent <i>slot/subcard/port</i> | Specifies the transparent interface to use as the protection path in y-cable line card protection. |
|--------------------|---|--|
| | wavepatch <i>slot/subcard/port</i> | Specifies the wavepatch interface to use as the protection path in splitter protection. |

Defaults None

Command Modes APS configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Each interface in an associated pair has a configured role to perform: one is the *working* interface and the other is the *protection* interface. However, at any given instant, the interfaces also have a current mode of operation: *active* and *standby*. The interface that is in active mode and receives the signal may or may not be the working interface. The working interface is the *preferred* interface to receive the active signal. The protection interface is the *preferred* interface for the standby signal.

When a pair of interfaces is associated for APS protection using the **associate interface** command, the interface with the higher interface number is the protection interface by default. To override this default configuration, use the **aps protection** command.

Examples

The following example shows how to create an APS group and configure an APS protection interface:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps working transparent 2/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|----------------------------|---|
| aps lockout | Prevents switchover to the protection path. |
| aps working | Configures the working interface for an APS interface pair. |
| aps y-cable | Enables y-cable protection. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps revertive

To configure revertive APS for y-cable line card protection, use the **aps revertive** command. To disable revertive APS, use the **no** form of this command.

aps revertive

no aps revertive

Syntax Description

This command has no other arguments or keywords.

Defaults

Disabled

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

When revertive APS is configured and a switchover to the protection signal has occurred, the system automatically switches back to the preferred working signal when it becomes operational. Use the **aps timer wait-to-restore** command to control how quickly the signal reverts back to the working path.



Note

Revertive APS is only supported with y-cable line card protection.

Examples

The following example shows how to configure revertive APS on an associated transparent interface pair.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group dallas
Switch(config-red-aps)# aps working transparent 2/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps revertive
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|---|---|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| aps timer wait-to-restore | Modifies the wait-to-restore timer interval. |
| associate group | Creates an APS group and enters APS configuration mode. |
| show aps | Displays APS configuration and operation information. |

aps switch

To request an APS switchover from the working path to the protection path, or from the protection path to the working path, use the **aps switch** command. To clear an APS switchover request, use the **aps clear** command.

```
aps switch group-name {force | manual} {protection-to-working | working-to-protection}
```

Syntax Description

| | |
|-----------------------|---|
| group-name | Specifies the name of the associated pair of interfaces. |
| force | Causes a switchover if no lockout is in effect regardless of the status of the signal. |
| manual | Causes a switchover if the signal is good and no lockout is in effect. |
| protection-to-working | Causes a manual switchover of the active signal from the protection path to the working path. |
| working-to-protection | Causes a manual switchover of the active signal from the working path to the protection path. |

Defaults

None

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

The Cisco ONS 15540 ESP supports APS switchover requests from the CLI (command-line interface). These requests have priorities depending on the condition of the protection signal and the existence of other switchover requests. There are three types of requests:

- Lockout requests—Have the highest priority and take effect regardless of the condition of the protection signal. A lockout prevents the signal from switching over from the working channel to the protection channel.
- Forced switchover requests—Have the next highest priority and are only prevented if there is an existing lockout on the protection interface, or the protection signal has failed.
- Manual switchover requests—Have the lowest priority and only occur if there is no existing lockout on the protection path, forced switchover request, or signal failure or degradation.

For y-cable protected configurations, the transponder modules monitor both the active and standby interfaces.

The APS priority scheme for y-cable protected configurations is the following:

1. Lockout
2. Signal failure on the protection path
3. Forced switchover on the protection path (**aps switch force protection-to-working** command)
4. Forced switchover on the working path (**aps switch force working-to-protection** command)
5. Signal failure on the working path
6. Signal degrade on the protection path
7. Signal degrade on the working path
8. Manual switchover on the protection path (**aps switch manual protection-to-working** command)
9. Manual switchover on the working path (**aps switch manual working-to-protection** command)

For splitter protected configurations, the transponder module cannot monitor the signal on the standby interface. Only the active signal is monitored. This limitation prevents APS switchovers due to signal degrade or signal failure when error thresholds are exceeded. Signal failure switchovers are only triggered by loss of light. Therefore, the APS priority scheme for splitter protected configurations differs slightly from y-cable protected configurations:

1. Lockout
2. Signal failure based on loss of light on the protection path
3. Signal failure based on loss of light on the working path
4. Forced switchover on the protection path (**aps switch force protection-to-working** command)
5. Forced switchover on the working path (**aps switch force working-to-protection** command)
6. Manual switchover on the protection path (**aps switch manual protection-to-working** command)
7. Manual switchover on the working path (**aps switch manual working-to-protection** command)

**Note**

The associated group names are case sensitive and must be entered exactly as they are shown in the **show aps** command output.

Examples

The following example shows how to make a manual switchover request from the working path to the protection path for an associated interface pair named blue.

```
Switch# aps switch blue manual working-to-protection
```

The following example shows how to make a force switchover request from the working to the protection path for an associated interface pair with the default group name.

```
Switch# aps switch Wavepatch2/0/0 force protection-to-working
```

Related Commands

| Command | Description |
|----------------------------|---|
| aps clear | Clears APS switchover or lockout. |
| aps lockout | Prevents switchover to the protection interface. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps timer message holddown

To modify the APS Channel Protocol holddown timer, use the **aps timer message holddown** command. To revert to the default values, use the **no** form of this command.

aps timer message holddown *milliseconds* [*count number*]

no aps timer message holddown

| Syntax Description | | |
|--------------------|---------------------|---|
| | milliseconds | Specifies the number of seconds to wait before sending an APS Channel Protocol message. The range is 100 to 10,000 milliseconds. The default timer interval is 5000 milliseconds (5 seconds). |
| | count number | Specifies the number of messages to send to the destination node before starting the hold-down timer. The range is 2 to 10. The default message count is 2. |

Defaults See the “Syntax Description” section.

Command Modes APS configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

The holddown timer prevents APS Channel Protocol message flooding over the OSC. The holddown message count allows a specified number of messages to exchange between the nodes before the holddown timer starts. For example, if the holddown message count is set to 2, the node sends and receives two messages before the timer starts. This allows the protocol to operate efficiently without affecting system performance.

**Note**

The default values for the holddown timer and message count are sufficient for most network configurations.

Examples

The following example shows how to modify the holddown timer and count values.

```
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer message holddown 4000 count 4
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|---------------------------------------|---|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps timer message max-interval | Modifies the APS Channel Protocol maximum interval timer value. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps timer message max-interval

To modify the maximum interval for the APS Channel Protocol inactivity timer, use the **aps timer message max-interval** command. To revert to the default value, use the **no** form of this command.

aps timer message max-interval *seconds*

no aps timer message max-interval

| | | |
|---------------------------|---------|---|
| Syntax Description | seconds | Specifies the maximum number of seconds to wait before sending an APS Channel Protocol inactivity message. The range is 1 to 120 seconds. |
|---------------------------|---------|---|

| | |
|-----------------|------------|
| Defaults | 15 seconds |
|-----------------|------------|

| | |
|----------------------|-------------------|
| Command Modes | APS configuration |
|----------------------|-------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines To ensure that the APS Channel Protocol is still functioning between the nodes, periodic messages are sent during periods of inactivity. The maximum interval of the inactivity timer determines how often to send the inactivity messages.

**Note**

The default value for the inactivity timer maximum interval is sufficient for most network configurations.

Examples

The following example shows how to modify the maximum interval for the inactivity timer.

```
Switch(config)# redundancy
Switch(config-red)# associate group dallas
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer message max-interval 30
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|-----------------------------------|--|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps timer message holddown | Modifies the APS Channel Protocol holddown timer and message count values. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps timer search-for-up

To modify the minimum and maximum timer intervals on an APS timer for the length of time the system waits for a splitter protected connection to come up when both connections are down, use the **aps timer search-for-up** command. To revert to the default values, use the **no** form of this command.

```
aps timer search-for-up min-interval max-interval
```

```
no aps timer search-for-up
```

Syntax Description

| | |
|--------------|---|
| min-interval | Specifies the minimum time interval to wait for a splitter protection connection to come up before checking the other signal. The range is 1 to 120 seconds. |
| max-interval | Specifies the maximum timer interval to wait for a splitter protection connection to come up before checking the other signal. The range is 1 to 120 seconds. |

Defaults

Minimum interval: 2 seconds
Maximum interval: 32 seconds

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to modify the minimum and maximum timer intervals on an APS timer that causes the system to wait for a splitter protection connection to come up before checking the other splitter protection connection.

When both members of a splitter pair are down, the system first checks one signal for the minimum time interval. If the splitter protection connection does not come up, the system checks the other connection and doubles the time interval. This process repeats until the maximum timer interval is reached or exceeded. Checking continues at the maximum timer interval until one of the splitter protection connections becomes active.

**Note**

The default values for the search-for-up timer are sufficient for most network configurations.

Examples

The following example shows how to modify the minimum and maximum timer intervals for how often the system switches to check the other splitter protection connection.

```
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer search-for-up 4 16
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|---|---|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps timer switchover-enable min-interval

To modify the minimum time interval between successive APS switchovers in a splitter protected configuration, use the **aps timer switchover-enable min-interval** command. To revert to the default value, use the **no** form of this command.

aps timer switchover-enable min-interval *seconds*

no aps timer switchover-enable min-interval

| | | |
|---------------------------|---------|--|
| Syntax Description | seconds | Specifies the minimum number of seconds between successive switchovers. The range is 1 to 120 seconds. |
|---------------------------|---------|--|

| | |
|-----------------|-----------|
| Defaults | 3 seconds |
|-----------------|-----------|

| | |
|----------------------|-------------------|
| Command Modes | APS configuration |
|----------------------|-------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| 12.1(12c)EV2 | Default value was changed from 2 seconds to 3 seconds. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to modify the minimum time interval between successive APS switchovers. This prevents data loss from excessive switchovers caused by active interface failures.

**Note**

This switchover timer is not supported for y-cable protected configurations.

**Note**

The default value for the switchover timer is sufficient for most network configurations.

Examples

The following example shows how to modify the minimum interval between successive signal switchovers.

```
Switch(config)# redundancy
Switch(config-red)# associate group sanfrancisco
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer switchover-enable min-interval 4
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|----------------------------------|---|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps timer wait-to-restore | Modifies the wait-to-restore timer interval. |
| associate group | Creates an APS group and enters APS configuration mode. |
| show aps | Displays APS configuration and operation information. |

aps timer wait-to-restore

To modify the number of seconds on the APS wait-to-restore timer before reverting to the preferred working signal in a y-cable protection configuration, use the **aps timer wait-to-restore** command. To return to the default value, use the **no** form of this command.

aps timer wait-to-restore *seconds*

no aps timer wait-to-restore

| | | |
|---------------------------|---------|---|
| Syntax Description | seconds | Specifies the number of seconds the system must wait before switching to the preferred working signal. The range is 0 to 720 seconds. |
|---------------------------|---------|---|

| | |
|-----------------|-------------|
| Defaults | 300 seconds |
|-----------------|-------------|

| | |
|----------------------|-------------------|
| Command Modes | APS configuration |
|----------------------|-------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines This command prevents oscillations when revertive switching is configured for y-cable line card protection configurations. If the preferred working signal in a y-cable line card protection configuration is unstable, the wait-to-restore timer prevents possible data loss that could result from frequent switchovers.

**Caution**

Setting the wait-to-restore timer interval to 0 seconds disables the timer.

**Note**

The wait-to-restore timer is only supported in y-cable line card protection configurations.

**Note**

The default value for the wait-to-restore timer is sufficient for most network configurations.

Examples

The following example shows how to modify the APS wait-to-restore timer.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer wait-to-restore 180
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|---|---|
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps revertive | Enables revertive behavior for line card protection. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| associate group | Creates an APS group and enters APS configuration mode. |
| show aps | Displays APS configuration and operation information. |

aps working

To configure the working interface of an APS group, use the **aps working** command. To remove the working interface, use the **no** form of this command.

```
aps working { transparent slot/subcard/port | wavepatch slot/subcard/port }
```

```
no aps working { transparent slot/subcard/port | wavepatch slot/subcard/port }
```

| Syntax Description | transparent <i>slot/subcard/port</i> | Specifies the transparent interface to use as the working interface in y-cable line card protection. |
|--------------------|---|--|
| | wavepatch <i>slot/subcard/port</i> | Specifies the wavepatch interface to use as the working interface in splitter protection. |

Defaults None

Command Modes APS configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Each interface in an associated pair has a configured role to perform: one is the *working* interface and the other is the *protection* interface. However, at any given instant, the interfaces also have a current mode of operation: *active* and *standby*. The interface that is in active mode, and is receiving the signal, may or may not be the working interface. The working interface is the *preferred* interface to receive the active signal. The protection interface is the *preferred* interface for the standby signal.

This command persists across system reloads.

When a pair of interfaces is associated for APS protection, the interface with the lower interface number is the working interface by default. To override this default configuration, use the **aps working** command. If there is an **aps lockout** command in effect on the protection interface, it cannot become the working interface.

Examples

The following example shows how to configure a working interface on an existing APS group:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps working transparent 4/0/0
Switch(config-red-aps)# aps protection transparent 2/0/0
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|----------------------------|---|
| aps lockout | Prevents switchover to the protection interface. |
| aps y-cable | Enables y-cable protection. |
| associate group | Creates an APS group and enters APS configuration mode. |
| associate interface | Associates multiple wavepatch interface pairs for APS protection. |
| show aps | Displays APS configuration and operation information. |

aps y-cable

To configure y-cable line card protection, use the **aps y-cable** command. To disable y-cable line card protection, use the **no** form of this command.

aps y-cable

no aps y-cable

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes APS configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to ensure that only one interface of an associated transparent interface pair transmits to the client. Signal corruption occurs when both interfaces in the pair transmit to the client over the y-cable.



Caution

Do not configure y-cable protection with Sysplex CLO, Sysplex ETR, or ISC compatibility protocol encapsulation, or with the OFC safety protocol.

Examples

The following example shows how to configure y-cable line card protection.

```
Switch(config)# redundancy
Switch(config-red)# associate group seattle
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps enable
```

Related Commands

| Command | Description |
|---|--|
| aps direction | Modifies path switching behavior. |
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps revertive | Enables revertive behavior for line card protection. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| aps timer wait-to-restore | Modifies the wait-to-restore timer interval. |
| associate group | Creates or specifies an APS interface group and enters APS configuration mode. |
| show aps | Displays APS configuration and operation information. |

associate group

To enter APS configuration subcommand mode and to associate interfaces for APS protection, or to modify the attributes of an existing APS group, use the **associate group** command. To remove the group, use the **no** form of this command.

aps group *group-name*

no aps group *group-name*

| | | |
|---------------------------|------------|--|
| Syntax Description | group-name | Specifies a group name for the interface pair. Group names are case sensitive and cannot have embedded blanks. |
|---------------------------|------------|--|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|--------------------------|
| Command Modes | Redundancy configuration |
|----------------------|--------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| | |
|-------------------------|--|
| Usage Guidelines | Use this command to create an APS group, or specify an existing group, and enter APS configuration mode. You can specify group names created with this command or with the associate interface command. |
|-------------------------|--|

Examples

The following example shows how to select an APS group and enter APS configuration mode.

```
Switch# configure terminal
Switch#(config)# redundancy
Switch#(config-red)# associate group blue
Switch#(config-red-aps)#
```

Related Commands

| Command | Description |
|---|--|
| aps clear | Clears APS switchover or lockout. |
| aps direction | Modifies path switching behavior. |
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps lockout | Prevents switchover to the protection interface. |
| aps revertive | Enables revertive behavior for line card protection. |
| aps switch | Requests an APS switchover. |
| aps timer message holddown | Modifies the hold-down timer for APS Channel Protocol messages. |
| aps timer message max-interval | Modifies the maximum interval timer for APS Channel Protocol messages. |
| aps timer search-for-up | Modifies the search-for-up timer interval. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| aps timer wait-to-restore | Modifies the wait-to-restore timer interval. |
| aps working | Configures the working interface of an associated interface pair. |
| aps y-cable | Enables y-cable protection. |
| associate interface | Associates wavepatch interfaces for APS splitter protection. |
| debug aps | Enables debugging of APS and APS Channel Protocol. |
| show aps | Displays APS configuration and operation information. |
| show aps trace | Displays APS and APS Channel Protocol activity information. |
| snmp-server enable traps aps | Enables SNMP trap notifications for APS. |

associate interface

To associate the wavepatch interface pairs in a slot, or in the entire shelf, for APS splitter protection using one command, use the **associate interface** command. To disable APS protection for the interfaces, use the **no** form of this command.

```
associate interface wavepatch */*/working-port wavepatch */*/protection-port [enable | disable]
```

```
associate interface wavepatch slot*/working-port wavepatch slot*/protection-port [enable | disable]
```

```
no associate interface wavepatch */*/working-port wavepatch */*/protection-port
```

```
no associate interface wavepatch slot*/working-port wavepatch slot*/protection-port
```

Syntax Description

| | |
|--|--|
| <code>wavepatch */*/working-port</code> | Specifies all wavepatch interfaces on the shelf to configure as working interfaces. |
| <code>wavepatch */*/protection-port</code> | Specifies all wavepatch interfaces in the shelf to configure as protection interfaces. |
| <code>enable</code> | Enables activity on the associated interface pairs. (Optional) |
| <code>disable</code> | Disables activity on the associated interface pairs. This is the default state. (Optional) |
| <code>wavepatch slot*/working-port</code> | Specifies all wavepatch interfaces in a slot to configure as working interfaces. |
| <code>wavepatch slot*/protection-port</code> | Specifies all wavepatch interfaces in a slot to configure as protection interfaces. |

Defaults

The default working interface for each of the interface pairs is the first interface in the command. APS activity between the interfaces is disabled when the interface pairs are first associated. The default group name for each of the interface pairs is the lower interface number.

Command Modes

Redundancy configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|------------------------------|
| 12.1(7a)EY2 | This command was introduced. |

| | |
|-------------------|--|
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to associate the interfaces for APS protection, and then enter APS configuration mode, or to change the configuration of associated pairs. Also use this command to change the association of one interface to another interface.

When associating wavepatch interfaces with wildcards, the command mode does not enter APS configuration mode as it does when associating a pair of interfaces. Changes to the default APS attribute values must be entered for interface pairs individually. See the “Examples” section.

Associating wavepatch interfaces with wildcards does not overwrite attributes configured for a specific interface pair. For example, if you configure attributes for interface pair wavepatch 3/0/0 and wavepatch 3/0/1 with the **associate group** command, a subsequent **associate interface wavepatch 3/*/0 wavepatch 3/*/1** command does not change the attributes for the specific interface pair.

When a pair of interfaces is associated for APS protection with the **associate interface** command, the interface entered first in the command is the working interface by default.

Interfaces can be associated without being physically present in the shelf.

Examples

The following example shows how to associate all the wavepatch interfaces in the shelf for splitter protection while leaving APS activity between the interfaces disabled.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate interface wavepatch */*/0 wavepatch */*/1
Switch(config-red)#
```

The following example shows how to associate all the wavepatch interfaces in slot 2 for splitter protection, while enabling APS activity between the interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate interface wavepatch 2/*/0 wavepatch 2/*/1 enable
Switch(config-red)#
```

Related Commands

| Command | Description |
|----------------------|--|
| aps clear | Clears APS switchover or lockout. |
| aps direction | Modifies path switching behavior. |
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps lockout | Prevents switchover to the protection interface. |

| Command | Description |
|---------------------------------------|--|
| aps switch | Requests an APS switchover. |
| aps timer message holddown | Modifies the hold-down timer for APS Channel Protocol messages. |
| aps timer message max-interval | Modifies the maximum interval timer for APS Channel Protocol messages. |
| aps timer search-for-up | Modifies the search-for-up timer interval. |
| aps working | Configures the working interface of an associated interface pair. |
| associate group | Creates or specifies an APS interface group and enters APS configuration mode. |
| debug aps | Enables debugging of APS and APS Channel Protocol. |
| show aps | Displays APS configuration and operation information. |
| show aps trace | Displays APS and APS Channel Protocol activity information. |
| snmp-server enable traps aps | Enables SNMP trap notifications for APS. |

show aps

To display APS configuration and status information for the system, use the **show aps** command.

```
show aps [detail | group name | interface interface]
```

Syntax Description

| | |
|----------------------------|---|
| detail | Displays detailed APS information for all APS groups. |
| interface <i>interface</i> | Displays detailed APS information for an interface. |
| group <i>name</i> | Displays detailed APS information for an APS group. |

Defaults

Displays summary APS information

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display APS information for an interface, an APS group, or the entire shelf.

At least one interface in an associated pair must be present on the system to use the **show aps interface** command. Otherwise, use the **show aps detail** command or the **show aps group** command to display APS information for the associated interface pair.



Note

The associated group names are case sensitive. To see all the group names, use the **show aps** command.

Examples

The following example shows how to display detailed APS information for all APS groups. (See Table 1-1 for field descriptions.)

```
Switch# show aps detail

APS Group blue:

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end (client side y-cable)
direction...: prov: uni, current: uni, remote prov: uni
revertive...: yes, wtr: 60 secs (not running)
created.....: 4 minutes
aps state...: associated (enabled)
request timer: holddown: 5000 ms, max: 15000 secs, count 2
switched chan: 0
channel ( 0): Transparent5/0/0 (STANDBY - UP), Wave5/0 (UP)
               : channel request: no-request
               : transmit request: no-request
               : receive request: no-request
channel ( 1): Transparent3/0/0 (ACTIVE - UP), Wave3/0 (UP)
               : channel request: no-request
               : switchover count: 0
               : last switchover: never
```

Table 1-1 *show aps group and show aps interface Field Descriptions*

| Field | Description |
|---------------|--|
| architecture | Shows APS architecture. Only 1+1 is supported. |
| remote prov | Shows the architecture provisioning for the remote node that supports the same channel. Only 1+1 is supported. |
| span | Shows the APS span. Only end-to-end is supported. Also indicates if y-cable is configured. |
| direction | Shows signal switching behavior, either unidirectional or bidirectional. |
| prov | Shows the direction provisioning for the local node. |
| current | Shows the current direction status for the local node. |
| remote prov | Shows the direction provisioning for the remote node that supports the same channel. |
| revertive | Indicates whether the group is APS revertive. Only y-cable line card protection supports revertive behavior. |
| wtr: | Shows the wait-to-restore timer value and its current running status. |
| created | Shows how long ago the group was created. |
| aps state | Indicates whether the working and protection channels have been associated and if APS activity is enabled. |
| request timer | Shows attribute values for the APS Channel Protocol timers. |
| holddown | Shows the APS Channel Protocol message holddown timer value. |
| max | Shows the APS Channel Protocol maximum inactivity interval timer |
| count | Shows the APS Channel Protocol message count value. |
| switched chan | Shows the switched channel number. |
| channel (0) | Shows the configured protection channel in the group and its current status. |

Table 1-1 *show aps group and show aps interface Field Descriptions (continued)*

| Field | Description |
|------------------|--|
| channel request | Shows the current lockout or switchover request in effect, if any. Valid values are: <ul style="list-style-type: none"> no-request manual-switch forced-switch lockout-of-protection |
| transmit request | Shows the APS Channel Protocol message being transmitted to the remote node. Valid values are: <ul style="list-style-type: none"> no-request (No request pending) do-not-revert (Revertive behavior not enabled) reverse-request (Response to a do-not-revert or wait-to-restore request) wait-to-restore (Wait-to-restore timer active) sd-lp (Signal degrade) sf-lp (Signal failure) |
| receive request | Shows the APS Channel Protocol message being received from the remote node. Values are the same as the transmit request field. |
| channel (1) | Shows the configured working channel in the group and its current status. |
| switchover count | Shows the number of times a switchover has occurred for this pair of interfaces. Zero (0) indicates that no switchover has occurred since the system was booted. |
| last switchover | Shows the elapsed time since the last switchover occurred. "Never" means that no switchover has occurred since the system was booted. |

The following example shows how to display APS information for an APS group with the default group name (the default working interface). (See Table 1-1 for field descriptions.)

```
Switch# show aps group Wavepatch8/0/0

APS Group Wavepatch8/0/0 :

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end (network side splitter)
direction....: prov: bi, current: bi, remote prov: bi
revertive....: no
created.....: 3 hours, 6 minutes
aps state....: associated (enabled)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
search-up int: min: 2 secs, max: 32 secs
switched chan: 0
channel ( 0): Wavepatch8/0/1 (STANDBY - UP)
             : channel request: no-request
             : transmit request: no-request
             : receive request: no-request
channel ( 1): Wavepatch8/0/0 (ACTIVE - UP)
             : channel request: no-request
             : switchover count: 1
             : last switchover: 1 hour, 0 minutes
```

The following example shows how to display APS information for a wavepatch interface. (See Table 1-1 for field descriptions.)

```
Switch# show aps interface transparent 8/0/0

APS Group blue :

  architecture.: 1+1, remote prov: 1+1
  span.....: end-to-end (client side y-cable)
  direction...: prov: uni, current: uni, remote prov: uni
  revertive....: no
  created.....: 1 minute
  aps state...: associated (enabled)
  request timer: holddown: 5000 ms, max: 15000 ms, count 2
  switched chan: 0
  channel ( 0): Transparent10/0/0 (STANDBY - UP)
                  : external request: no-request
                  : transmit request: no-request
                  : receive request: no-request
  channel ( 1): Transparent8/0/0 (STANDBY - UP)
                  : external request: no-request
                  : switchover count: 0
                  : last switchover.: never
```

The following example shows how to display APS summary information. (See Table 1-2 for field descriptions.)

```
Switch# show aps

AR :APS Role, Wk:Working, Pr:Protection
AS :APS State, Ac:Active, St:Standby
IS :Interface State, Up:Up, Dn:Down
MPL:Minimum Protection Level, SD:Signal Degrade, SF:Signal Failure
    LOL:Loss of Light, - not currently protected

Interface      AR AS IS MPL Redundant Intf      Group Name
-----
Wavepatch3/1/0  Wk Ac Up  LOL Wavepatch3/1/1  Wavepatch3/1/0
Wavepatch3/1/1  Pr St Up  LOL Wavepatch3/1/0  Wavepatch3/1/0
```

Table 1-2 *show aps summary Field Descriptions*

| Field | Description |
|----------------------|--|
| Interface | Shows the name of the interface. |
| AR (APS Role) | Shows the configured role for the interface, either Wk (working) or Pr (protection). Working and protection are preferred roles configured by the associate interface command and the associate group command. |
| AS (APS State) | Shows the APS state, either Ac (active) or St (standby). The interface currently chosen by the system to receive the channel signal is the active interface; the other interface in the associated pair is the standby. |
| IS (Interface State) | Shows the interface state, either Up (up) or Dn (down). |

Table 1-2 *show aps summary Field Descriptions (continued)*

| Field | Description |
|--------------------------------|--|
| MPL (Minimum Protection Level) | Shows the minimum protection level for signal switchover. Valid values are: <ul style="list-style-type: none"> • SD (signal degrade) • SF (signal failure) • LOL (Loss of Light) • - (not currently protected) |
| Redundant Intf (Interface) | Shows the other interface in the APS group. |
| Group Name | Shows the APS group name for the interface. |

Related Commands

| Command | Description |
|---|--|
| aps direction | Specifies unidirectional or bidirectional path switching. |
| aps disable | Disables APS activity between associated interfaces. |
| aps enable | Enables APS activity between associated interfaces. |
| aps lockout | Configures APS lockout on a protection interface. |
| aps revertive | Configures revertive APS for y-cable line card protection. |
| aps switch | Causes a manual switchover from the working interface to the protection interface or vice versa. |
| aps timer message holddown | Modifies the APS Channel Protocol message holddown timer interval and message count value. |
| aps timer message max-interval | Modifies the APS Channel Protocol maximum inactivity interval timer value. |
| aps timer search-for-up | Modifies the minimum and maximum timer intervals on an APS timer that the system must wait for a splitter protection connection to come up when both connections are down. |
| aps timer switchover-enable min-interval | Modifies the minimum timer interval before reenabling APS switchover. |
| aps timer wait-to-restore | Modifies the number of seconds an APS timer must wait before switching back to the preferred working signal. |
| aps working | Explicitly configures the working interface of an associated interface pair. |
| aps y-cable | Configures y-cable line card protection. |
| associate group | Creates or specifies an APS interface group and enters APS configuration mode. |
| associate interface | Associates wavepatch interfaces for APS splitter protection. |
| show aps trace | Shows APS and APS Channel Protocol activity information. |

show aps trace

To display APS and APS Channel Protocol activity information in the system memory, use the **show aps trace** command.

```
show aps trace [clear | stop | resume]
```

Syntax Description

| | |
|--------|---|
| clear | Clears the APS activity trace table in memory. |
| stop | Stops the collection of APS activity information. |
| resume | Resumes the collection of APS activity information. |

Defaults

Displays APS and APS Channel Protocol activity information.

Trace is active.

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

APS trace information is similar to **show aps** command output except that it is stored in processor memory. The trace buffer contains activity information for APS and for the APS Channel Protocol.

The trace collection status and information are not saved across system or processor card reloads. After the reload, the trace status returns to the default active state and the trace buffer in memory is cleared.

Examples

The following example shows how to clear the APS trace buffer:

```
Switch# show aps trace clear
```

The following example shows how to stop the APS trace activity information collection:

```
Switch# show aps trace stop
```

The following example shows how to resume the APS trace activity information collection:

```
Switch# show aps trace resume
```

The following example shows how to display detailed APS information for all APS groups. (See Table 1-3 for field descriptions.)

```
Switch# show aps trace
APS: Wavepatch10/0/0: searchup timer expired
APS: Wave10/0: wave state WAVE_DOWN
APS: wp event SEARCHUP_EXP: wv state WAVE_DOWN
APS: switch optk swpos to 1
APS: restart searchup timer: check after 32 sec
ACP: Wavepatch10/0/0: service request timer
ACP: Wavepatch10/0/0: xmit request failed: protection oscp idb missing
ACP: Transparent10/0/0: service request timer
ACP: Transparent10/0/0: xmit request failed: neither y-cable nor splitter
ACP: Wavepatch10/0/0: service request timer
ACP: Wavepatch10/0/0: xmit request failed: protection oscp idb missing
ACP: Transparent10/0/0: service request timer
ACP: Transparent10/0/0: xmit request failed: neither y-cable nor splitter
APS: Wavepatch10/0/0: searchup timer expired
APS: Wave10/0: wave state WAVE_DOWN
APS: wp event SEARCHUP_EXP: wv state WAVE_DOWN
APS: switch optk swpos to 0
APS: restart searchup timer: check after 32 sec
ACP: Transparent10/0/0: service request timer
ACP: Transparent10/0/0: xmit request failed: neither y-cable nor splitter
```

Table 1-3 *show aps trace* Field Descriptions

| Field | Description |
|-------|--|
| APS | Specifies APS activity. |
| ACP | Specifies APS Channel Protocol activity. |

Related Commands

| Command | Description |
|----------------------------|--|
| associate interface | Associates two interfaces for APS protection. |
| debug aps | Enables debugging of APS and APS Channel Protocol. |
| show aps | Shows APS configuration and status information. |



Debug Commands

Use the following commands to debug the Cisco ONS 15540 ESP. For information on other debug commands refer to the *Cisco IOS Debug Command Reference* document.

debug aps

To debug APS operation, use the **debug aps** command. To disable APS debugging, use the **no** form of this command.

debug aps

no debug aps

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to enable debugging of APS operations.

```
Switch# debug aps
```

Related Commands

| Command | Description |
|---------------------|--|
| associate group | Creates or specifies an APS interface group and enters APS configuration mode. |
| associate interface | Associates wavepatch interfaces for APS splitter protection. |
| undebug all | Disables all debugging. |

debug cpu

To debug IPC (interprocess communication) initialization and switchover events, use the **debug cpu** command. To disable debugging IPC initialization and switchover events, use the **no** form of this command.

debug cpu { ipc | redundancy | ehsa | sub-ipc }

no debug cpu { ipc | redundancy | ehsa | sub-ipc }

Syntax Description

| | |
|----------------|--|
| ipc | Enables debugging for processor IPC (interprocessor communications) initialization and switchover events. |
| redundancy | Enables debugging for processor card redundancy initialization and operation. |
| ehsa | Enables debugging for processor EHSA (enhanced high system availability) services such as hostname, config register, and calendar synchronizing to the standby processor card. |
| sub-ipc | Enables debugging for the IPC channel layer below the IPC level. |

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to enable debugging of IPC initialization and switchover events. To debug redundancy software operations, use the **debug redundancy** command.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to enable redundancy state debugging.

```
Switch# debug cpu redundancy
```

Related Commands

| Command | Description |
|-------------------------|---|
| debug redundancy | Enables debugging of redundancy software operation. |
| undebug all | Disables all debugging. |

debug diag online

To enable debugging for online diagnostics, use the **debug diag online** command. To disable debugging for online diagnostics, use the **no** form of this command.

debug diag online [online-insertion-removal | background | redundancy]

no debug diag online [online-insertion-removal | background | redundancy]

| Syntax Description | | |
|--------------------------|---|--|
| online-insertion-removal | Enables debugging of OIR (online insertion and removal) tests for online diagnostics. | |
| background | Enables debugging of background tests for online diagnostics. | |
| redundancy | Enables debugging of redundancy tests for online diagnostics. | |

Defaults Disabled

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable debugging for online diagnostics.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to enable debugging of background tests for online diagnostics.

```
Switch# debug diag online background
```

Related Commands

| Command | Description |
|-------------------------|---|
| diag online | Enables online diagnostics for the system. |
| diag online slot | Enables online diagnostics for a specified slot number. |
| undebg all | Disables all debugging. |

debug oscp

To debug OSCP operations, use the **debug oscp** command. To disable debugging for OSCP operations, use the **no** form of this command.

```
debug oscp { events | hello-packet | transport } [wave slot]
```

```
no debug oscp { events | hello-packet | transport } [wave slot]
```

| Syntax Description | | |
|--------------------|---------------------|--|
| | events | Enables debugging for OSCP events. |
| | hello-packet | Enables printing of the information contained in the OSCP Hello packets. |
| | transport | Enables debugging for OSCP transport services. |
| | wave slot | Specifies the OSC interface on which to enable debugging. (Optional) |

Defaults Disabled

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable debugging for OSCP activity.

To disable all debugging, use the **undebug all** command.

**Caution**

This command can generate a significant amount of output and may interfere with other activity on the system once the command is invoked.

Examples

The following example shows how to enable debugging for OSCP events.

```
Switch# debug oscp events
01:53:59:Control interface Wave1 is going up
01:54:00:OSCP:Adding neighbor on wave Wave1
```

The following example shows how to display information contained in the OSCP Hello packets.

```
Switch# debug oscp hello-packet wave 0
01:53:08:OSCP:Hello at Wave1 Tx, state 2way
01:53:08:  NodeId:0202.0304.0506  Port:10000
01:53:08:  Remote:NodeId:0202.0304.0506  Port:10000
01:53:08:OSCP:Hello at Wave1 Rx, state 2way
01:53:08:  NodeId:0202.0304.0506  Port:10000
01:53:08:  Remote:NodeId:0202.0304.0506  Port:10000
01:53:08:OSCP:Hello event 2wayd
```

Related Commands

| Command | Description |
|-----------------------------|--|
| show oscp info | Displays OSCP configuration information. |
| show oscp neighbor | Displays OSCP neighbor information. |
| show oscp statistics | Displays OSCP activity statistics. |
| show oscp traffic | Displays OSCP message traffic information. |
| undebug all | Disables all debugging. |

debug ports

To debug port operations, use the **debug ports** command. To disable debugging for port operations, use the **no** form of this command.

```
debug ports { connect | errors [type slot[/subcard[/port]]] | events [type slot[/subcard[/port]]] | patch }
```

```
no debug ports { connect | errors [type slot[/subcard[/port]]] | events [type slot[/subcard[/port]]] | patch }
```

Syntax Description

| | |
|-----------------------------------|---|
| connect | Enables debugging for cross connection. |
| errors | Enables debugging for internal software error conditions. |
| <i>type slot[/subcard[/port]]</i> | Specifies an interface on which debugging is enabled. Valid <i>type</i> values are filter , filterband , filtergroup , thru , transparent , wave , wavepatch , and wdm . (Optional) |
| events | Enables debugging for internal software event conditions. |
| patch | Enables debugging for patch connections. |

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to debug common software errors and events, patch connection activity, and cross connection activity. If the interface option is not specified, debugging is enabled for all interfaces.

To disable all debugging, use the **undebug all** command.

Examples

The following example shows how to enable error debugging for transparent interface 2/0/0.

```
Switch# debug ports errors transparent 2/0/0
```

Related Commands

| Command | Description |
|-----------------------|---|
| clock rate | Configures a clock rate on a transparent interface. |
| encapsulation | Configures the encapsulation of the client signal on the transparent interface. |
| monitor enable | Enables signal monitoring for certain protocol encapsulations. |
| patch | Configures patch connections for a shelf. |
| undebug all | Disables all debugging. |

debug redundancy

To debug redundancy operations, use the **debug redundancy** command. To disable debugging for redundancy operations, use the **no** form of this command.

```
debug redundancy {ehsa | errors | fsm | kpa | msg | progression | status | timer}
```

```
no debug redundancy {ehsa | errors | fsm | kpa | msg | progression | status | timer}
```

Syntax Description

| | |
|-------------|---|
| ehsa | Enables debugging for early software initialization suspend points associated with EHS (enhanced high system availability). |
| errors | Enables debugging for redundancy internal software error conditions. |
| fsm | Enables debugging for redundancy finite state machine transition events. |
| kpa | Enables debugging for redundancy keepalive messaging events. |
| msg | Enables debugging for general redundancy messaging software. |
| progression | Enables debugging for redundancy internal state progression software. |
| status | Enables debugging for redundancy internal status notification software. |
| timer | Enables debugging for redundancy internal timers. |

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to debug redundancy software operations. Use the **debug cpu** command to debug processor card redundancy.

To disable all debugging, use the **undebug all** command.

**Caution**

This command can generate a significant amount of output and may interfere with other activity on the system once the command is invoked.

Examples

The following example shows how to debug finite state machine transition events.

```
Switch# debug redundancy fsm
```

Related Commands

| Command | Description |
|--------------------------------|--|
| debug cpu | Enables debugging of processor card redundancy. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |
| undebug all | Disables all debugging. |

undebug all

To disable all debugging, use the **undebug all** command.

undebug all

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to turn off all debugging.

Examples The following example shows how to turn off all debugging.

```
Switch# undebug all
```

Related Commands

| Command | Description |
|--------------------------|--|
| debug aps | Enables debugging of APS and APS Channel Protocol activity. |
| debug cpu | Enables debugging of IPC initialization and switchover events. |
| debug diag online | Enables debugging of the online diagnostics. |
| debug oscp | Enables debugging of OSCP activity. |
| debug ports | Enables debugging of optical port activity. |
| debug redundancy | Enables debugging of redundancy software operation. |

■ `undebg all`



Interface Configuration Commands

Use the following commands to configure and monitor the interfaces on the Cisco ONS 15540 ESP.

clock rate

To configure the signal clock rate without an associated protocol on a transparent interface, use the **clock rate** command. To disable the clock rate, use the **no** form of this command.

clock rate *value*

no clock rate

| | | |
|---------------------------|--------------|---|
| Syntax Description | <i>value</i> | Specifies the signal rate. The range is 16000 to 2500000 kHz. |
|---------------------------|--------------|---|

| | |
|-----------------|----------|
| Defaults | Disabled |
|-----------------|----------|

| | |
|----------------------|-------------------------|
| Command Modes | Interface configuration |
|----------------------|-------------------------|

| | |
|------------------------|---|
| Command History | This table includes the following release-specific history entries: |
|------------------------|---|

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| | |
|-------------------------|---|
| Usage Guidelines | You can configure either the signal clock rate with either the encapsulation command or the clock rate command, but not both. Protocol monitoring cannot be enabled on the interface when the clock rate command is configured because no protocol is specified. |
|-------------------------|---|

Table 3-1 lists the clock rates for well-known protocols supported by the 2.5-Gbps transponder module:

Table 3-1 Supported Clock Rates for Well-Known Protocols

| Well-Known Protocol | Clock Rate (in kbps) |
|---|----------------------|
| DS3 | 44,736 |
| DV1 ¹ in ADI ² mode | 270,000 |
| E3 | 34,368 |
| ESCON | 200,000 |
| Fibre Channel (1 Gbps) | 1,062,500 |
| Fibre Channel (2 Gbps) | 2,125,000 |
| FICON (1 Gbps) | 1,062,500 |
| FICON (2 Gbps) | 2,125,000 |
| Gigabit Ethernet | 1,250,000 |
| ISC compatibility mode (ISC-1) | 1,062,500 |
| ISC peer mode (ISC3) | 2,125,000 |
| SONET OC-1 | 51,840 |
| SONET OC-3/SDH STM-1 | 155,520 |
| SONET OC-12/SDH STM-4 | 622,080 |
| SONET OC-24/SDH STM-8 | 933,120 |
| SONET OC-48SDH STM-16 | 2,488,320 |

1. DV = digital video
2. ADI = Asynchronous Digital Interface

The following ranges are not supported by the transponder module hardware:

- 851,000 kbps to 999,999 kbps
- 1,601,000 kbps to 1,999,999 kbps

For clock rates outside of these unsupported ranges and not listed in Table 3-1, contact your SE (systems engineer) at Cisco Systems.

Examples

The following example shows how to configure the signal clock rate on an interface.

```
Switch# configure terminal
Switch(config)# interface transparent 10/0/0
Switch(config-if)# clock rate 125000
```

Related Commands

| Command | Description |
|------------------------|---|
| encapsulation | Specifies the protocol encapsulation for a transparent interface. |
| show interfaces | Displays interface information. |

clear performance history

To clear and reset the performance history counters, use the **clear performance history** command.

```
clear performance history [interface]
```

| Syntax Description | <i>interface</i> Specifies the interface on which the command is to be executed. | | | | | | | | |
|-------------------------------------|---|------------|--------------|-------------------------|--|-----------------------|------------------------------------|-------------------------------------|---|
| Defaults | Clears all the performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15540 ESP interfaces. | | | | | | | | |
| Command Modes | EXEC and privileged EXEC. | | | | | | | | |
| Command History | This table includes the following release-specific history entries: <table border="1"> <thead> <tr> <th>SV-Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.2(29)SV</td> <td>This command was introduced.</td> </tr> </tbody> </table> | SV-Release | Modification | 12.2(29)SV | This command was introduced. | | | | |
| SV-Release | Modification | | | | | | | | |
| 12.2(29)SV | This command was introduced. | | | | | | | | |
| Usage Guidelines | Use this command to clear and reset the performance history counters. | | | | | | | | |
| Examples | The following example shows how to clear the performance history counters for a transparent interface. <pre>Switch# clear performance history transparent 8/0/0 Reset performance history on interface?[confirm] Switch#</pre> | | | | | | | | |
| Related Commands | <table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show performance</td> <td>Displays the performance history counters for the specified interface.</td> </tr> <tr> <td>clear counters</td> <td>Clears all the interface counters.</td> </tr> <tr> <td>auto-sync counters interface</td> <td>Enables the automatic synchronization of the performance history counters and interface counters.</td> </tr> </tbody> </table> | Command | Description | show performance | Displays the performance history counters for the specified interface. | clear counters | Clears all the interface counters. | auto-sync counters interface | Enables the automatic synchronization of the performance history counters and interface counters. |
| Command | Description | | | | | | | | |
| show performance | Displays the performance history counters for the specified interface. | | | | | | | | |
| clear counters | Clears all the interface counters. | | | | | | | | |
| auto-sync counters interface | Enables the automatic synchronization of the performance history counters and interface counters. | | | | | | | | |

encapsulation

To configure the protocol encapsulation for the client signal on a transparent interface, use the **encapsulation** command. To disable the encapsulation for the client signal, use the **no** form of this command.

```
encapsulation {fastethernet |
  fddi |
  gigabitethernet |
  escon |
  sysplex {clo | etr | isc {compatibility | peer [1g | 2g]}}
  ficon {1g | 2g} |
  sonet {oc3 | oc12 | oc48} |
  sdh {stm-1 | stm-4 | stm-16} |
  fibrechannel {1g | 2g} [ofc {enable | disable}]}
no encapsulation
```

| Syntax | Description |
|-------------------------------------|--|
| fastethernet | Specifies Fast Ethernet encapsulation. The OFC (open fiber control) safety protocol is disabled. |
| fddi | Specifies FDDI encapsulation. OFC is disabled. |
| gigabitethernet | Specifies Gigabit Ethernet encapsulation. OFC is disabled. |
| escon | Specifies ESCON encapsulation. OFC is disabled. |
| sysplex | Specifies Sysplex encapsulation. Note This encapsulation is only supported on the multimode transponder modules. |
| clo | Specifies CLO (control link oscillator) timing. OFC is disabled. Forward laser control is enabled on both the transparent and wave interfaces. |
| etr | Specifies ETR (external time reference) timing. OFC is disabled. |
| isc | Specifies ISC (intersystem channel) encapsulation. |
| compatibility | Specifies ISC compatibility mode (ISC1) with rate of 1.0625 Gbps. OFC is enabled. |
| peer | Specifies ISC peer mode (ISC3). OFC is disabled. |
| 1g | Specifies 1 Gbps rate. |
| 2g | Specifies 2 Gbps rate. |
| ficon | Specifies FICON encapsulation. OFC is disabled. |
| sonet {oc3 oc12 oc48} | Specifies SONET encapsulation and rate. OFC is disabled. |
| sdh {stm-1 stm-4 stm-16} | Specifies SDH encapsulation and rate. OFC is disabled. |
| fibrechannel rate 1g | Specifies Fibre Channel encapsulation and rate. |
| ofc {enable disable} | Enables or disables OFC. The default OFC state is disabled. (Optional) |

Defaults

Encapsulation is disabled. See the “Syntax Description” section for the default OFC state.

1g is the default rate for ISC links peer mode.

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| 12.2(23)SV | Added support for 1 Gbps ISC links peer mode. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to provide clocking for the client signal for specific protocols. The protocol encapsulation must be configured for the transparent interface to allow signal monitoring to be enabled with the **monitor enable** command. The following protocol encapsulation types are supported in 3R mode plus protocol monitoring:

- ESCON (200 Mbps) SM and MM
- Fibre Channel (1 Gbps and 2 Gbps) SM
- FICON (Fiber Connection) (1 Gbps and 2 Gbps) SM
- Gigabit Ethernet (1250 Mbps) SM
- ISC (InterSystem Channel) links compatibility mode
- ISC links peer mode (1 Gbps and 2 Gbps) SM
- SDH (Synchronous Digital Hierarchy) STM-1 SM and MM
- SDH STM-4 SM and MM
- SDH STM-16 SM
- SONET OC-3 SM and MM
- SONET OC-12 SM and MM
- SONET OC-48 SM

The following protocol encapsulation types are supported in 3R mode without protocol monitoring:

- Fast Ethernet

- FDDI
- Sysplex CLO (control link oscillator)
- Sysplex ETR (external timer reference)

To specify the signal clock rate without specifying a protocol, use the **clock rate** command.

Sysplex CLO and Sysplex ETR are supported outside the nominal range of the clock rates for the Cisco ONS 15540 ESP because of the nature of the traffic type.

**Note**

Encapsulation cannot be changed without first disabling monitoring using the **no monitor enable** command.

Removing the encapsulation on a transparent interface with the **no encapsulation** command does not turn off the laser. To turn off the transmit laser to the client equipment, use the **shutdown** command.

Examples

The following example shows how to configure SONET encapsulation at a rate of OC-3 on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# encapsulation sonet oc3
```

Related Commands

| Command | Description |
|------------------------|--|
| clock rate | Configures a clock rate on a transparent interface. |
| monitor enable | Enables signal monitoring for certain protocol encapsulations. |
| show interfaces | Displays interface information. |
| shutdown | Disables an interface. |

laser control forward enable

To enable forward laser control, which automatically shuts down transponder lasers when a loss of light failure occurs, use the **laser control forward enable** command. To disable this feature, use the **no** form of this command.

laser control forward enable

no laser control forward

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable forward laser control on both the client side and trunk side interfaces of a transponder module and on the OSC wave interfaces. If configured on a transparent interface, the client side laser of the transponder shuts down when the trunk side receiver detects a loss of light. If configured on the wave interface, the trunk side laser of the transponder shuts down when client side receiver detects a loss of light.

**Note**

To function correctly, configure forward laser control on both the client side and trunk side interfaces on a transponder module. For y-cable protection, configure forward laser control on both interfaces on both transponder modules.

Automatically shutting down the laser prevents the transmission of unreliable data. However, when the laser is shut down, fault isolation is more difficult.

This feature is convenient for configurations, such as Sysplex, where signal protection is performed in the client hardware and quick laser shutdown causes quick path switchover.

**Caution**

Do not configure forward laser control when OFC is enabled. Combining these features interferes with the OFC protocol.

Examples

The following example shows how to enable forward laser control on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 3/2/0
Switch(config-if)# laser control forward enable
```

The following example shows how to enable forward laser control on a wave interface.

```
Switch# configure terminal
Switch(config)# interface wave 2/0
Switch(config-if)# laser control forward enable
```

Related Commands

| Command | Description |
|------------------------------|---------------------------------|
| <code>show interfaces</code> | Displays interface information. |

laser control safety enable

To enable laser safety control on a wave interface, use the **laser control safety enable** command. To disable laser safety control, use the **no** form of this command.

laser control safety enable

no laser control safety

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to automatically shut down the lasers transmitting to the trunk fiber when a loss of light failure occurs, such as a trunk fiber cut. Enable laser safety control on all wave interfaces in the shelf, including the OSC wave interface.

Laser safety control uses the same protocol state machine as OFC, but not the same timing. Laser safety control uses the pulse interval and pulse durations timers compliant with the ALS (automatic laser shutdown) standard (ITU-T G.664).

**Caution**

Do not configure laser safety control when OFC is enabled. Combining these features interferes with the OFC safety protocol operation.

**Caution**

Use this command only with line card protected configurations or unprotected configurations.

Examples

The following example shows how to enable laser safety control on a wave interface.

```
Switch# configure terminal
Switch(config)# interface wave 2/0
Switch(config-if)# laser control safety enable
```

Related Commands

| Command | Description |
|------------------------------|---------------------------------|
| <code>show interfaces</code> | Displays interface information. |

loopback

To configure a signal loopback on a transponder module interfaces, use the **loopback** command. To disable interface loopback, use the **no** form of this command.

loopback

no loopback

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to configure internal loopbacks on transparent or wave interfaces. For any given transponder module, you can configure an internal loopback on either the client side interface or the trunk side interface, but not both simultaneously.

An internal loopback differs from an external loopback where you simply run a cable from the output of a given interface to its input. Using the **loopback** command, you can set loopbacks *without* the need to change the cabling. This is useful for remote testing, configuration, and troubleshooting.

**Note**

If you enable loopback on an interface and save the configuration to NVRAM, the interface comes up with loopback enabled when the system boots.

Examples

The following example shows how to enable loopback on a transparent interface.

```
Switch# configure terminal  
Switch(config)# interface transparent 2/0/0  
Switch(config-if)# loopback
```

The following example shows how to enable loopback on a wave interface.

```
Switch# configure terminal  
Switch(config)# interface wave 10/0  
Switch(config-if)# loopback
```

Related Commands

| Command | Description |
|------------------------|---------------------------------|
| show interfaces | Displays interface information. |

monitor enable

To monitor signal quality and protocol error statistics in the transponder module, use the **monitor enable** command. To disable monitoring, use the **no** form of this command.

monitor enable

no monitor

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|---|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release and added monitoring support for 2-Gbps FICON and FC. |
| 12.2(22)SV | Added monitoring support for 2-Gbps ISC links peer mode. |
| 12.2(23)SV | Added monitoring support for 1-Gbps ISC links peer mode. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to collect error statistics on signal quality in the transponder module. The following protocols can be monitored:

- ESCON (200 Mbps) SM and MM

- Fibre Channel (1 Gbps and 2 Gbps) SM
- FICON (Fiber Connection) (1 Gbps and 2 Gbps) SM
- Gigabit Ethernet (1250 Mbps) SM
- ISC (InterSystem Channel) links compatibility mode SM
- ISC links peer mode (1 Gbps and 2Gbps) SM
- SDH (Synchronous Digital Hierarchy) STM-1 SM and MM
- SDH STM-4 SM and MM
- SDH STM-16 SM
- SONET OC-3 SM and MM
- SONET OC-12 SM and MM
- SONET OC-48 SM

When monitoring is enabled on the transparent interface, it is automatically enabled on the corresponding wave interface.

For GE, FC, and FICON traffic, the Cisco ONS 15540 ESP monitors the following conditions:

- CVRD (code violation running disparity) error counts
- Loss of Sync
- Loss of Lock
- Loss of Light

For SONET errors, the Cisco ONS 15540 ESP monitors the SONET section overhead only, not the SONET line overhead. Specifically, the Cisco ONS 15540 ESP monitors the B1 byte and the framing bytes. The system can detect the following defect conditions:

- Loss of Light
- Loss of Lock (when the clock cannot be recovered from the received data stream)
- Severely Errored Frame
- Loss of Frame

For SONET performance, the system monitors the B1 byte, which is used to compute the four SONET section layer performance monitor parameters:

- SEFS-S (section severely errored framing seconds)
- CV-S (section code violations)
- ES-S (section errored seconds)
- SES-S (section severely errored seconds)

For ISC traffic, the system monitors the following conditions:

- CVRD error counts
- Loss of CDR (clock data recovery) Lock
- Loss of Light

**Note**

Before monitoring can be enabled, you must configure protocol encapsulation for the interface using the **encapsulation** command.

Monitoring signal error statistics is useful for isolating system and network faults.

Examples

The following example shows how to monitor error counters on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# monitor enable
```

Related Commands

| Command | Description |
|------------------------|---|
| encapsulation | Configures the encapsulation of the client signal on the transparent interface. |
| show interfaces | Displays interface information. |

optical threshold power receive

To set the optical threshold power for alarms on wavepatch interfaces, use the **optical threshold power receive** command. To revert to the default values, use the **no** form of the command.

optical threshold power receive {low | high} {alarm | warning} *value* [severity {critical | major | minor | not alarmed | not reported}]

no optical threshold power receive {low | high} {alarm | warning}

Syntax Description

| | |
|--------------|--|
| low | Specifies a low threshold value. |
| high | Specifies a high threshold value. |
| alarm | Indicates that an alarm will be raised when the threshold is exceeded. |
| warning | Indicates that a warning indication will be reported when the threshold is exceeded. The severity of a warning threshold must be less than the severity of the corresponding alarm threshold. |
| <i>value</i> | The threshold value in tenths of a dBm. The range is -80 to -280 for 2.5-Gbps transponder modules. |
| severity | Specifies the severity for the threshold. |
| critical | Indicates the threshold level for service-affecting conditions that require immediate corrective action. |
| major | Indicates the threshold level for hardware or software conditions that cause serious service disruption, or malfunctioning or failure of important hardware. These problems require the immediate attention and response of a technician to restore or maintain system capability. The urgency is less than in critical situations because of a lesser immediate or impending effect on service or system performance. This is the default value for alarms. |
| minor | Indicates the threshold level for problems that do not have a serious effect on service, or for problems in hardware that do not affect the essential operation of the system. |
| not alarmed | Indicates the threshold level for negligible discrepancies, and that do not cause alarm notifications to be generated. The information for these events is retrievable from the network element. This is the default value for warnings. |
| not reported | Indicates the threshold level for negligible discrepancies, and that do not cause notifications to be generated. The information for these events is retrievable from the network element. |

Defaults

| Interface Type | Low Alarm | Low Warning | High Warning | High Alarm |
|--|-----------|-------------|--------------|------------|
| Wavepatch on a 2.5-Gbps transponder module | -28 dBm | -24 dBm | -10 dBm | -8 dBm |

Alarm severity: **major**

Warning severity: **not alarmed**

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

The default value for high alarm threshold corresponds to the receiver saturation level for the transponder module.

The default value for low alarm threshold corresponds to the Loss of Light condition. Exceeding the low alarm threshold on the active wavepatch interface causes a protection switchover to the standby wavepatch interface, provided that the standby interface is up and operating normally prior to the protection switchover.

The default values cover most network configurations. However, when optical amplifiers are used in the network in the receive direction as preamplifiers, the low alarm threshold value should be reconfigured, since the amplified noise level might be higher than the sensitivity of the receiver and the protection switchover might not be triggered. In such cases, we recommend setting the low alarm threshold to 10 dB below the power level measured at the interface when a signal exists or to -28 dB, whichever value is higher.



Note

For this command to function correctly, the functional image version must be 1.A0 (or later) for multimode 2.5-Gbps transponder modules and 1.A1 (or later) for single-mode 2.5-Gbps transponder modules. Use the **show hardware detail** command to verify the functional image version.

Examples

The following example shows how to set the optical power low alarm threshold.

```
Switch(config)# interface wavepatch 8/0/0
Switch(config-if)# optical threshold power receive after-attenuation low alarm -210
```

Related Commands

| Command | Description |
|------------------------------|---------------------------------|
| <code>show interfaces</code> | Displays interface information. |

patch

To configure the patch connections within a shelf, use the **patch** command. To remove the patch connection configuration, use the **no** form of the command.

```
patch interface1 [transmit | receive] interface2
```

```
no patch interface1 [transmit | receive] interface2
```

| | | |
|---------------------------|--|---|
| Syntax Description | <i>interface1</i> [<i>transmit</i> / <i>receive</i>] <i>interface2</i> | Specifies the interfaces to be patched. See the “Usage Guidelines” section for valid interface types. |
| | transmit | Specifies the patch is for the transmit direction only. |
| | receive | Specifies the patch is for the receive direction only. |

Defaults None

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| 12.1(10)EV2 | Exgtended to accept an optional directional parameter (transmit or receive). |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to describe the patch connections between the mux/demux modules.

Valid patch connections between modules within the same slot are:

- Wdm interface to thru interface between mux/demux modules
wdm slot/subcard1 thru slot/subcard2
- Thru interface to wdm interface between mux/demux modules
thru slot/subcard1 wdm slot/subcard2
- Filterband interface to filtergroup interface
filterband slot/subcard1/port1 filtergroup slot/subcard2/port2
- Filtergroup interface to filterband interface
filtergroup slot/subcard1/port1 filterband slot/subcard2/port2
- OSC wave interface to OSC oscfilter interface
wave slot oscfilter slot/subcard
- OSC oscfilter interface to OSC wave interface
oscfilter slot/subcard wave slot

Valid patch connection between modules in the different slots are:

- Thru interface to thru interface between mux/demux modules
thru slot1/subcard1 thru slot2/subcard2
- Filterband interface to filtergroup interface
filterband slot1/subcard1/port1 filtergroup slot2/subcard2/port2
- Filtergroup interface to filterband interface
filtergroup slot1/subcard1/port1 filterband slot2/subcard2/port2

You cannot preconfigure a patch connection. The interfaces must exist on the shelf before configuring them.

The order of the interfaces in the command does not affect the patch connect configuration. For example, configuring **patch wdm 0/1 thru 0/0** is equivalent to configuring **patch thru 0/0 wdm 0/1**.

When one interface in a patch connection is physically removed from the shelf, the patch connection configuration persists but does not appear in the **show running-config** output. A subsequent **patch** command that includes the remaining interface overwrites the previous patch connection configuration.

Examples

The following example shows how to describe the patch connection between two mux/demux modules in the same slot.

```
Switch# configure terminal
Switch(config)# patch wdm 1/0 thru 1/1
```

Related Commands

| Command | Description |
|---------------------------------------|--|
| debug ports | Enables debugging of optical port activity. |
| show optical filter | Displays the channels supported by the mux/demux modules. |
| show patch | Displays optical patch connection configuration. |
| snmp-server enable traps patch | Enables SNMP trap notifications for patch connection activity. |

show connect

To display the connection relationships between the interfaces in the shelf, use the **show connect** command.

```
show connect {edges | intermediate [sort-channel | interface interface]}
```

Syntax Description

| | |
|-----------------------------------|--|
| edges | Displays the connections between the client-side interfaces and trunk-side interfaces of the shelf. |
| intermediate | Displays the complete connections between the client-side interfaces and trunk-side interfaces of the shelf, including all the intermediate internal interfaces. |
| sort-channel | Sorts the display by channel number. |
| interface <i>interface</i> | Displays the intermediate connection information for a specific interface. |

Defaults

None

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command shows the relationships between the interfaces in the shelf. Use this command to trace a single channel from the client side interface to the trunk side mux/demux interface.

Examples

The following example shows how to display edge connection information. (See Table 3-2 for field descriptions.)

```
Switch# show connect edges
client/
wave      wdm  channel
-----  -  -
Trans3/0/0 1/0  26
Trans3/1/0 1/0  27
Trans3/2/0 1/0  28
Trans3/3/0 1/0  29
```

Table 3-2 *show connect edges Field Descriptions*

| Field | Description |
|-------------|---|
| client/wave | Shows the client side interface identifier. |
| wdm | Shows the wdm interface identifier. |
| channel | Shows the ITU wavelength number supported by this connection. |

The following example shows how to display intermediate connection information. (See Table 3-3 for field descriptions.)

```
Switch# show connect intermediate
client/      wave      wave      wdm
wave      client      patch  filter  trk  channel
-----  -  -  -  -  -
Trans3/0/0 Wave3/0    3/0/0*  0/0/4   0/0   5
              3/0/1
Trans3/1/0 Wave3/1    3/1/0*  0/0/5   0/0   6
              3/1/1
Trans3/2/0 Wave3/2    3/2/0*  0/0/6   0/0   7
              3/2/1
Trans3/3/0 Wave3/3    3/3/0*  0/0/7   0/0   8
              3/3/1
```

Table 3-3 *show connect intermediate Field Descriptions*

| Field | Description |
|-------------|--|
| client/wave | Shows the client side interface identifier. |
| wave client | Shows the wave interface identifier. |
| wave patch | Shows the wavepatch interface identifier. The interface with the asterisk (*) carries the active signal. |
| filter | Shows the filter interface identifier. |
| wdm trk | Shows the wdm interface identifier. |
| channel | Shows the channel number supported by this connection. |

The following example shows how to display interface connection information. (See Table 3-4 for field descriptions.)

```
Switch# show connect interface transparent 2/0/0
Client      :Transparent2/0/0
Wave        :Wave2/0
Wavepatch   :Wavepatch2/0/0 (active)  Wavepatch :Wavepatch2/1/0
```

```

Filter      :Filter0/0/0          Filter      :Filter1/0/0
Wdm         :Wdm0/0              Wdm         :Wdm1/0
Thru        :Thru0/1            Thru        :Thru1/1
Wdm         :Wdm0/1              Wdm         :Wdm1/1
Thru        :Thru0/2            Thru        :Thru1/2
Wdm (trnk) :Wdm0/2              Wdm         :Wdm1/2

```

Table 3-4 *show connect interface Field Descriptions*

| Field | Description |
|------------|--|
| Client | Shows the client side interface identifier. |
| Wave | Shows the wave interface identifier. |
| Wavepatch | Shows the wavepatch interface identifier. |
| Filter | Shows the filter interface identifier. |
| Wdm | Shows the wdm interface identifier. |
| Thru | Shows the thru interface identifier. |
| Wdm (trnk) | Shows the identifier of the wdm interface attached to the trunk fiber. |

Related Commands

| Command | Description |
|--|---|
| debug ports | Enables debugging of optical port activity. |
| show optical filter | Displays information about the channels supported by the mux/demux modules. |
| show optical wavelength mapping | Displays the mapping of the Cisco ONS 15540 ESP channels to the ITU grid wavelengths and frequencies. |

show controllers

To display hardware register information for an interface, use the **show controllers** command.

```
show controllers [type slot[/subcard[/port]]]
```

| Syntax Description | | |
|--------------------|--|---|
| type | | Specifies one of the interface types listed in Table 3-5. |
| slot | | Specifies a chassis slot. |
| subcard | | Specifies a subcard position in a motherboard. |
| port | | Specifies a port. |

Defaults Displays controller information for all interfaces on the system.

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines The **show controllers** command displays the contents of hardware registers for the interfaces. This information is useful for troubleshooting system problems.

Table 3-5 shows the interface types for the **show controller** command.

Table 3-5 Interface Types for the show controller Command

| Type | Description |
|---|--|
| fastethernet 0 | Shows the NME interface information. |
| filter <i>slot/subcard/port</i> | Shows the filter interface information. |
| filterband <i>slot/subcard/port</i> | Shows the filterband interface information. |
| filtergroup <i>slot/subcard/port</i> | Shows the filtergroup interface information. |
| oscfiler <i>slot/subcard</i> | Shows the OSC oscfilter interface information. |
| thru <i>slot/subcard</i> | Shows the thru interface information. |
| transparent <i>slot/subcard/0</i> | Shows the transparent interface information. |
| wave <i>slot[/subcard]</i> | Shows the wave interface information. |
| wavepatch <i>slot/subcard/port</i> | Shows the wavepatch interface information. |
| wdm <i>slot/subcard</i> | Shows the wdm interface information. |

Examples

The following example shows how to display hardware register information about a transparent interface. (See Table 3-6 for field descriptions.)

```
Switch# show controllers transparent 3/0/0
Controller info for Transparent interface Transparent3/0/0
  LRC start addr = 0x200000
  hardware port = 1
    RCIO monitor.....:enabled
    port 1 intr SRC/CPU.....:enabled
    CPU0 MSB MAC.....:0x0
    CPU0 LSB MAC.....:0x0
    CPU1 MSB MAC.....:0x0
    CPU1 LSB MAC.....:0x0
    port error register.....:0x10000
    port ctrl msg intf mask.....:0x0
    port APS port fail mask.....:0x0
  HuJr start addr = 0x240000
  Optics control and status:
    LSC indication.....:ok
    trunk laser failure alarm...:clear
    LSC indication enable.....:disabled
    trunk laser alarm enable...:disabled
    line transceiver mode.....:non pluggable
    loss of light.....:yes
    trunk laser deviation alarm.:clear
    LSC.....:disabled
    quick shutdown (FLC).....:disabled
    wavelength select.....:n-1 [lo wlen]
  CDR control and status:
    loss of lock.....:yes
    loss of lock enable.....:disabled
  SerDes control and status:
    diags loop back.....:disabled
    line loop back.....:disabled
  GE handler control and status:
    loss of sync.....:no
    loss of sync enable.....:disabled
  FC/ESCON handler control and status:
    loss of sync.....:no
    loss of sync enable.....:disabled
```

```

SONET handler control and status:
  loss of frame.....:yes
  severely errored frame.....:yes
  LOF enable.....:disabled
  SEF enable.....:disabled

```

Table 3-6 *show controllers Field Descriptions for transponder interfaces*

| Field | Description |
|--------------------------------------|---|
| Optics control and status: | Shows control and status information for the optical components in the interface. |
| LSC indication | Shows laser safety control status (valid only on wave interfaces). |
| trunk laser failure alarm | Shows the status of the trunk laser alarm. The values are: <ul style="list-style-type: none"> • clear—no failure • indicated—failure |
| LSC indication enable | Indicates whether laser safety control has been enabled (valid only on wave interfaces). |
| trunk laser alarm enable | Shows the status of the trunk laser alarm. If enabled, the system will signal when laser failure occurs. |
| loss of light | Indicate whether there is a loss of light condition. |
| trunk laser deviation alarm | Shows the status of the wavelength deviation alarm. If enabled, the system will signal when there is a deviation in the functioning of the laser. |
| LSC | Indicates whether laser safety control is enabled from the CLI (valid only on wave interfaces). |
| quick shutdown (FLC) | Indicates whether forward laser control is enabled on the interface (valid only on wave interfaces). |
| wavelength select | Indicates whether a transponder module is transmitting the lower wavelength (lo wlen) or the higher wavelength (hi wlen). |
| CDR control and status: | Shows the CDR (clock and data recovery) control and status information. |
| loss of lock | Indicated whether there is a loss of lock condition. |
| loss of lock enable | Indicates whether loss of lock monitoring is enabled on the interface via the monitor enable command. |
| SerDes control and status: | Shows the SerDes (serializer/deserializer) information. |
| GE handler control and status: | Shows Gigabit Ethernet control and status information. |
| loss of sync | Indicates whether there is a loss of synchronization for the signal. This field is only valid if protocol encapsulation is Gigabit Ethernet, and monitoring is enabled. |
| loss of sync enable | Indicates whether loss of synchronization monitoring is enabled via the monitor enable command. |
| FC/ESCON handler control and status: | Shows Fiber Channel and ESCON control and status information. |

Table 3-6 *show controllers Field Descriptions for transponder interfaces (continued)*

| Field | Description |
|-----------------------------------|---|
| loss of sync | Indicates whether there is a loss of synchronization for the signal. This field is only valid if protocol encapsulation is Fibre Channel or ESCON, and monitoring is enabled. |
| loss of sync enable | Indicates whether loss of synchronization monitoring is enabled via the monitor enable command. |
| SONET handler control and status: | Shows SONET control and status information. |
| loss of frame | Indicates whether there is a loss of frame for the signal. This field is only valid if protocol encapsulation is SONET, and monitoring is enabled. |
| severely errored frame | Indicates whether there is a severely errored frame in the signal. This field is only valid if protocol encapsulation is SONET, and monitoring is enabled. |
| LOF enable | Indicates whether loss of frame monitoring is enabled via the monitor enable command. |
| SEF enable | Indicates whether severely errored frame monitoring is enabled via the monitor enable command. |

The following example shows how to display hardware register information about a transponder wave interface. (See Table 3-6 for field descriptions.)

```
Switch# show controllers wave 3/1
Controller info for Wave interface Wave3/1
  LRC start addr = 0x200000
  hardware port = 2
    RC11 monitor.....:enabled
    port 2 intr SRC/CPU.....:enabled
    CPU0 MSB MAC.....:0x0
    CPU0 LSB MAC.....:0x0
    CPU1 MSB MAC.....:0x0
    CPU1 LSB MAC.....:0x0
    port error register.....:0x10000
    port ctrl msg intf mask.....:0xF00FC00A
    port APS port fail mask.....:0x0
  HuJr start addr = 0x250000
  Optics control and status:
    auto fail-over indication...:normal
    optical switch alarm.....:clear
    line laser degrade alarm....:clear
    optical switch position.....:Mux 1
    loss of light.....:no
    BLC and LAS.....:disabled
    LSC.....:disabled
    quick shutdown (FLC).....:disabled
  CDR control and status:
    loss of lock.....:yes
    loss of lock enable.....:enabled
  SerDes control and status:
    diags loop back.....:disabled
    line loop back.....:disabled
  GE handler control and status:
    loss of sync.....:no
    loss of sync enable.....:disabled
```

```

FC/ESCON handler control and status:
  loss of sync.....:no
  loss of sync enable.....:disabled
SONET handler control and status:
  loss of frame.....:yes
  severely errored frame.....:yes
  LOF enable.....:disabled
  SEF enable.....:disabled

```

The following example shows how to display hardware register information about an OSC wave interface. (See Table 3-6 for field descriptions.)

```

Switch# show controllers wave 0
Controller info for OSC wave interface Wave0
LRC start addr = 0x900000
hardware port = 0
  RCI0 monitor.....:enabled
  port 0 intr SRC/CPU.....:enabled
  CPU0 MSB MAC.....:0x0
  CPU0 LSB MAC.....:0x1060000
  CPU1 MSB MAC.....:0x0
  CPU1 LSB MAC.....:0x1070000
  port error register.....:0x8002
  port ctrl msg intf mask.....:0x0
  port APS port fail mask.....:0x0
HuJr start addr = 0x940000
CDL add/drop control and status:
  FIFO overflow indication....:clear
  HEC error threshold exceeded:indicate
  FIFO overflow enable.....:disabled
  HEC error threshold enable..:disabled
  CDL alarm status.....:true alarm
  CDL add enable.....:enabled
  CDL drop enable.....:enabled
Optics control and status:
  LSC indication.....:ok
  trunk laser failure alarm...:indicated
  LSC indication enable.....:disabled
  trunk laser alarm enable....:disabled
  loss of light.....:yes
  wavelength deviation alarm..:clear
  LSC.....:disabled
  wavelength select.....:n [hi wlen]
CDR control and status:
  loss of lock.....:yes
  loss of lock enable.....:disabled
SerDes control and status:
  diags loop back.....:disabled
  network loop back.....:disabled
GE handler control and status:
  loss of sync.....:yes
  loss of sync enable.....:disabled

```

Related Commands

| Command | Description |
|-------------------------------------|--|
| encapsulation | Specifies the protocol encapsulation for a transparent interface. |
| laser control forward enable | Configures forward laser control, which automatically shuts down transponder lasers. |
| laser control safety enable | Configures laser safety control on a wave interface. |

| Command | Description |
|------------------------|--|
| loopback | Configures signal loopback on an interface. |
| monitor enable | Enables signal monitoring for certain protocol encapsulations. |
| show interfaces | Displays interface information. |

show interfaces

To display interface information, use the **show interfaces** command.

```
show interfaces [type slot[/subcard[/port]]]
```

| Syntax Description | | |
|--------------------|---------|---|
| | type | Specifies one of the interface types listed in Table 3-7. |
| | slot | Specifies a chassis slot. |
| | subcard | Specifies a subcard position in a motherboard. |
| | port | Specifies a port. |

Defaults Displays information for all interfaces on the system.

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Table 3-7 shows the interface types for the **show interfaces** command.

Table 3-7 Interface Types for the `show interfaces` Command

| Type | Description |
|---|---|
| fastethernet 0 | Shows the NME interface information. |
| fastethernet-sby 0 | Shows the NME interface information for the standby processor card. |
| filter <i>slot/subcard/port</i> | Shows the filter interface information. |
| filterband <i>slot/subcard/port</i> | Shows the filterband interface information. |
| filtergroup <i>slot/subcard/port</i> | Shows the filtergroup interface information. |
| oscfiler <i>slot/subcard</i> | Shows the OSC oscfilter interface information. |
| thru <i>slot/subcard</i> | Shows the thru interface information. |
| transparent <i>slot/subcard/0</i> | Shows the transparent interface information. |
| wave <i>slot[/subcard]</i> | Shows the wave interface information. |
| wavepatch <i>slot/subcard/port</i> | Shows the wavepatch interface information. |
| wdm <i>slot/subcard</i> | Shows the wdm interface information. |

Examples

The following example shows how to display transparent interface information. (See Table 3-8 for field descriptions.)

```
Switch# show interfaces transparent 3/1/0
Transparent3/1/0 is administratively up, line protocol is up
  Signal quality: Loss of lock
  Encapsulation: Sonet      Rate: oc3
  Signal monitoring: on
  Forward laser control: Off
  Configured threshold Group: None
  Threshold monitored for: BIPl error
  Set threshold SF:10e-5  SD:10e-7
  Section code violation error count (bipl): 61286
  Number of errored seconds(es): 2
  Number of severely errored seconds(ses): 2
  Number of severely errored framing seconds(sefs): 273
  Number of times SEF alarm raised: 0
  Number of times SF threshold exceeded: 0
  Number of times SD threshold exceeded: 2
  Loopback not set
  Last clearing of "show interface" counters never
Hardware is transparent
```

Table 3-8 `show interfaces transparent` Field Descriptions

| Field | Description |
|---|--|
| Transparent3/1/0 is administratively up | Shows the interface state, either up or down. |
| line protocol is up | Shows the state of the line protocol, either up or down. |
| Signal quality | Shows signal quality. |
| Encapsulation | Shows the encapsulation for the interface. |

Table 3-8 *show interfaces transparent Field Descriptions (continued)*

| Field | Description |
|---|--|
| Rate | Shows the encapsulation rate—either the configured clock rate or the protocol clock rate, if the protocol supports multiple rates. |
| Signal monitoring | Shows whether signal monitoring is enabled. |
| Forward laser control | Shows whether forward laser control is enabled. |
| Configured threshold group | Shows whether a threshold group has been configured for the interface. |
| Threshold monitored for | Shows what the threshold group is monitored for. |
| Set threshold | Shows alarm thresholds. The output example shows the alarm thresholds for signal failure (SF) and signal degrade (SD). |
| Section code violation error count (bip1) | Shows the number of BIP1 errors. |
| Number of errored seconds (es) | Shows the number of errored seconds. |
| Number of severely errored seconds (ses) | Shows the number of severely errored seconds. |
| Number of severely errored framing seconds (sefs) | Shows the number of severely errored framing seconds. |
| Number of times SEF alarm raised | Shows the number of times the SEF alarm was raised. |
| Number of times SF threshold exceeded | Shows the number of times the signal failure (SF) threshold was exceeded. |
| Number of times SD threshold exceeded | Shows the number of times the signal degrade (SD) threshold was exceeded. |
| Loopback not set | Shows whether loopback is enabled. |
| Last clearing of “show interface” counters | Shows the last time “show interface” counters were cleared. |
| Hardware is transparent | Shows the hardware type. |

The following example shows how to display wave interface information. (See Table 3-9 for field descriptions.)

```
Switch# show interfaces wave 10/0
Wave10/0 is administratively up, line protocol is up
  Channel: 25   Frequency: 195.1 Thz   Wavelength: 1536.61 nm
  Splitter Protected: Yes
  Receiver power level: -37.30 dBm
  Laser safety control: Off
  Forward laser control: Off
  Osc physical port: No
  Wavelength used for inband management: No
  Configured threshold Group: None
  Section code violation error count(bip1): 0
  Number of errored seconds(es): 29
  Number of severely errored seconds(ses): 29
  Number of severely errored framing seconds(sefs): 0
  Number of times SEF alarm raised: 0
  Number of times SF threshold exceeded: 0
  Number of times SD threshold exceeded: 0
  Loopback not set
```

```
Last clearing of "show interface" counters 4d03h
Hardware is data_only_port
```

Table 3-9 *show interfaces wave Field Descriptions*

| Field | Description |
|---|--|
| Wave10/0 is administratively up | Shows the interface state, either up or down. |
| line protocol is up | Shows the state of the line protocol, either up or down. |
| Channel Frequency Wavelength | Shows the channel number, frequency, and wavelength of the wave interface. |
| Splitter Protected | Shows whether the interface is splitter protected. |
| Receiver power level | Shows the receiver power level. Note This field is not present in the OSC wave interface output. |
| Laser safety control | Shows whether laser safety control is enabled. |
| Forward laser control | Shows whether forward laser control is enabled. |
| Osc physical port | Shows whether the interface is an OSC physical port. |
| Wavelength used for inband management | Shows whether the interface is used for inband management. |
| Configured threshold group | Shows whether a threshold group has been configured for the interface. |
| Threshold monitored for | Shows what the threshold group is monitored for. In the output example, a configured threshold group would be monitored for BIP1 errors. |
| Set threshold | Shows alarm thresholds. The output example shows the alarm thresholds for signal failure (SF) and signal degrade (SD). |
| Section code violation error count (bip1) | Shows the number of BIP1 errors. |
| Number of errored seconds (es) | Shows the number of errored seconds. |
| Number of severely errored seconds (ses) | Shows the number of severely errored seconds. |
| Number of severely errored framing seconds (sefs) | Shows the number of severely errored framing seconds. |
| Number of times SEF alarm raised | Shows the number of times the SEF alarm was raised. |
| Number of times SF threshold exceeded | Shows the number of times the signal failure (SF) threshold was exceeded. |
| Number of times SD threshold exceeded | Shows the number of times the signal degrade (SD) threshold was exceeded. |
| Loopback not set | Shows whether loopback is enabled. |

Table 3-9 *show interfaces wave Field Descriptions (continued)*

| Field | Description |
|--|---|
| Last clearing of "show interface" counters | Shows the last time "show interface" counters were cleared. |
| Hardware is data_only_port | Shows the interface type. |

The following example shows how to display wave interface information. (See Table 3-9 for field descriptions.)

```
Switch# show interfaces wave 0
Wave0 is administratively up, line protocol is up
  Channel: 0      Frequency: 191.9 Thz      Wavelength: 1562.23 nm
  Splitter Protected: No
  Laser safety control: Off
  Forward laser control: Off
  Osc physical port: Yes
  Wavelength used for inband management: No
  Configured threshold Group: None
  Loopback not set
  Last clearing of "show interface" counters never
  Hardware is OSC_phy_port
  MTU 1492 bytes, BW 10000000 Kbit, DLY 0 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SNAP, loopback not set
    CDL receive header error count: 0
  Last input 00:00:02, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    3447 packets input, 269630 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

The following example shows how to display wdm interface information. (See Table 3-10 for field descriptions.)

```
Switch# show interfaces wdm 0/0
Wdm0/0 is up, line protocol is up
  Patched Interface: Thru0/1
  Wdm Hw capability: N/A
  Num of Wavelengths Add/Dropped: 8
  List of Wavelengths: 1, 2, 3, 4, 5, 6, 7, 8,
  Hardware is wavelength_add_drop
```

Table 3-10 *show interfaces wdm Field Descriptions*

| Field | Description |
|---------------------|--|
| Wdm0/0 is up | Shows the interface state, either up or down. |
| line protocol is up | Shows the state of the line protocol, either up or down. |
| Patched Interface: | Shows how the mux/demux modules is optically patched. |

Table 3-10 *show interfaces wdm Field Descriptions (continued)*

| Field | Description |
|---------------------------------|--|
| Num of wavelengths Add/Dropped: | Shows the number of wavelengths added and dropped. |
| List of Wavelengths: | Shows list of wavelength channel numbers. |
| Hardware is wavelength_add_drop | Shows the hardware type. |

Related Commands

| Command | Description |
|-------------------------------------|---|
| laser control forward enable | Configures forward laser control on an interface. |
| laser control safety enable | Configures laser safety control on wave interfaces. |
| loopback | Configures loopback on an interface. |
| show controllers | Displays interface controller information. |

show optical filter

To display information about the channels supported by the mux/demux modules, use the **show optical filter** command.

show optical filter [detail]

| | | |
|---------------------------|---------------|---|
| Syntax Description | detail | Shows optical patch connections between the mux/demux modules in addition to the channels supported. This information displays only if the patch connection have been configured with the patch command. |
|---------------------------|---------------|---|

Defaults Displays only the channels supported by the mux/demux modules.

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to verify the system configuration.

Examples The following example shows how to display optical filter information. (See Table 3-11 for field descriptions.)

```
Switch# show optical filter
```

show optical filter

```

aggregate          filtered
interface          channel (s)  interface
-----
Wdm0/0            0           Oscfilter0/0
Wdm0/0            1           Filter0/0/0
Wdm0/0            2           Filter0/0/1
Wdm0/0            3           Filter0/0/2
Wdm0/0            4           Filter0/0/3
Wdm0/0            5           Filter0/0/4
Wdm0/0            6           Filter0/0/5
Wdm0/0            7           Filter0/0/6
Wdm0/0            8           Filter0/0/7
Wdm0/2            17          Filter0/2/0
Wdm0/2            18          Filter0/2/1
Wdm0/2            19          Filter0/2/2
Wdm0/2            20          Filter0/2/3
Wdm0/2            21          Filter0/2/4
Wdm0/2            22          Filter0/2/5
Wdm0/2            23          Filter0/2/6
Wdm0/2            24          Filter0/2/7
Wdm1/0            0           Oscfilter1/0
Wdm1/0            1           Filter1/0/0
Wdm1/0            2           Filter1/0/1
Wdm1/0            3           Filter1/0/2
Wdm1/0            4           Filter1/0/3
Wdm1/0            5           Filter1/0/4
Wdm1/0            6           Filter1/0/5
Wdm1/0            7           Filter1/0/6
Wdm1/0            8           Filter1/0/7

```

Table 3-11 show optical filter Field Descriptions

| Field | Description |
|-----------------------------|---|
| aggregate interface | Shows the aggregate wdm interface. |
| channels | Shows the channels in the aggregate interface. In the output example, “remaining” indicates that whichever channels have not been dropped are passed to the thru interface. |
| filtered interface | Shows the filtered interface, which connects to the transponder through the backplane. |
| remaining | Indicates that the channels not supported on the mux/demux modules are passed thru to the next mux/demux module. |
| patched mux/demux interface | Shows the patch connection to another mux/demux module. |

The following example shows how to display optical filter information on a shelf with add/drop mux/demux modules. (See Table 3-12 for field descriptions.)

```

Swtich# show optical filter detail
aggregate          filtered          patched mux/demux
interface          channel (s)  interface          interface
-----
Wdm0/3            0           Oscfilter0/3
Wdm0/3            25          Filter0/3/0
Wdm0/3            26          Filter0/3/1
Wdm0/3            27          Filter0/3/2
Wdm0/3            28          Filter0/3/3
Wdm0/3            29          Filter0/3/4

```

```

Wdm0/3          30          Filter0/3/5
Wdm0/3          31          Filter0/3/6
Wdm0/3          32          Filter0/3/7
Wdm0/3          remaining    Thru0/3          Thru1/3
Wdm1/3          0          Oscfilter1/3
Wdm1/3          25         Filter1/3/0
Wdm1/3          26         Filter1/3/1
Wdm1/3          27         Filter1/3/2
Wdm1/3          28         Filter1/3/3
Wdm1/3          29         Filter1/3/4
Wdm1/3          30         Filter1/3/5
Wdm1/3          31         Filter1/3/6
Wdm1/3          32         Filter1/3/7
Wdm1/3          remaining    Thru1/3          Thru0/3

```

Table 3-12 show optical filter detail Field Descriptions

| Field | Description |
|-----------------------------|---|
| aggregate interface | Shows the aggregate wdm interface. |
| channels | Shows the channels in the aggregate interface. In the output example, “remaining” indicates that whichever channels have not been dropped are passed to the thru interface. |
| filtered interface | Shows the filtered interface, which connects to the transponder through the backplane. |
| remaining | Indicates that the channels not supported on the mux/demux modules are passed thru to the next mux/demux module. |
| patched mux/demux interface | Shows the patch connection to another mux/demux module. |

The following example shows how to display detailed optical filter information on shelf with terminal mux/demux modules. (See Table 3-13 for field descriptions.)

```

Switch# show optical filter detail
aggregate          filtered          patched mux/demux
interface          channel (s)      interface          interface
-----
Wdm0/0            0              Oscfilter0/0
Wdm0/0            1              Filter0/0/0
Wdm0/0            2              Filter0/0/1
Wdm0/0            3              Filter0/0/2
Wdm0/0            4              Filter0/0/3
Wdm0/0            5              Filter0/0/4
Wdm0/0            6              Filter0/0/5
Wdm0/0            7              Filter0/0/6
Wdm0/0            8              Filter0/0/7
Wdm0/0            9              Filter0/0/8
Wdm0/0            10             Filter0/0/9
Wdm0/0            11             Filter0/0/10
Wdm0/0            12             Filter0/0/11
Wdm0/0            13             Filter0/0/12
Wdm0/0            14             Filter0/0/13
Wdm0/0            15             Filter0/0/14
Wdm0/0            16             Filter0/0/15
Wdm0/0            band 0         Filterband0/0/0   Filtergroup0/2/0
Wdm0/0            band 1         Filterband0/0/1   Filtergroup0/2/1
Filtergroup0/2/0  17            Filter0/2/0
Filtergroup0/2/1  18            Filter0/2/1

```

show optical filter

```

Filtergroup0/2/0      19      Filter0/2/2
Filtergroup0/2/1      20      Filter0/2/3
Filtergroup0/2/1      21      Filter0/2/4
Filtergroup0/2/0      22      Filter0/2/5
Filtergroup0/2/1      23      Filter0/2/6
Filtergroup0/2/0      24      Filter0/2/7
Filtergroup0/2/0      25      Filter0/2/8
Filtergroup0/2/1      26      Filter0/2/9
Filtergroup0/2/0      27      Filter0/2/10
Filtergroup0/2/1      28      Filter0/2/11
Filtergroup0/2/1      29      Filter0/2/12
Filtergroup0/2/0      30      Filter0/2/13
Filtergroup0/2/1      31      Filter0/2/14
Filtergroup0/2/0      32      Filter0/2/15

band 0 :17 19 22 24 25 27 30 32
band 1 :18 20 21 23 26 28 29 31

```

Table 3-13 show optical filter detail Field Descriptions

| Field | Description |
|-----------------------------|---|
| aggregate interface | Shows the aggregate wdm interface. |
| channels | Shows the channels in the aggregate interface. In the output example, “remaining” indicates that whichever wavelengths have not been dropped are forwarded to the thru interface. |
| filtered interface | Shows the filtered interface, which connects to the transponder through the backplane. |
| patched mux/demux interface | Shows the patch connection to another mux/demux module. |
| band 0 | Shows the channels carried in band 0. |
| band 1 | Shows the channels carried in band 1. |

Related Commands

| Command | Description |
|--------------|--|
| patch | Configures patch connections for a shelf. |
| show connect | Displays optical connection information. |
| show patch | Displays optical patch connection configuration. |

show optical interface brief

To display the optical characteristics of all the transponders in the system, use the **show optical interface brief** command.

show optical filter brief

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EV-Release | Modification |
|--------------|--|
| 12.1(12c)EV2 | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to quickly verify the status of the optical signals on the transponder module interfaces. For more detailed information about the interface, use the **show interfaces** command.

Examples The following example shows how to display optical interface signal information. (See Table 3-11 for field descriptions.)

```
Switch# show optical interface brief
```

| I Interface | Status/Prot | Laser | Signal Quality | Rx Power | Speed/Encap |
|-------------|-------------|-------|----------------|--------------|----------------|
| Wave0 | down/down | on | Loss of light | n/a | SNAP |
| Wave1 | up/up | on | Good | n/a | SNAP |
| WdmS0/2/0* | down/down | n/a | Loss of light | < -32.00 dBm | n/a |
| WdmS0/2/1 | down/down | n/a | Loss of light | < -32.00 dBm | n/a |
| Trans2/2/0 | up/up | on | Good | n/a | GigbitEthernet |
| Wave2/2 | up/up | on | Good | -16.78 dBm | n/a |
| Wavep2/2/0 | admin/down | n/a | n/a | Unknown | n/a |
| Wavep2/2/1* | up/up | n/a | n/a | -16.76 dBm | n/a |

show optical interface brief

```

TenGE3/1      up/up      on      Good      n/a      10G Ethernet
Ether3/1/1    up/up      n/a     Good      n/a      SNAP
WaveE3/1      up/up      on      Good      -12.45 dBm n/a
Ether3/1/0    up/up      n/a     Good      n/a      SNAP
Wavep3/1/0*   up/up      n/a     n/a       -12.45 dBm n/a
Wavep3/1/1    up/up      n/a     n/a       Unknown   n/a
Trans4/0/0    down/down on      Loss of light n/a      916000 KHz
Wave4/0       down/down on      Loss of light < -33.00 dBm n/a
Wavep4/0/0*   down/down n/a     n/a       < -33.00 dBm n/a
Trans9/0/0    admin/down off     n/a      n/a      SONET oc48
Wave9/0       admin/down off     n/a      < -35.00 dBm n/a
Wavep9/0/0*   down/down n/a     n/a      < -35.00 dBm n/a
Wavep9/0/1    down/down n/a     n/a      Unknown  n/a

```

Table 3-14 show optical interface brief Field Descriptions

| Field | Description |
|----------------|---|
| Interface | Shows the interface identifier. |
| Status/Prot | Shows the interface status and the protocol status. |
| Laser | Shows the laser status. |
| Signal Quality | Shows the current signal quality. |
| Rx Power | Shows the receiver power. |
| Speed/Encap | Shows the signal speed or protocol encapsulation for the interface. |

Related Commands

| Command | Description |
|-----------------|-----------------------------|
| show interfaces | Displays system interfaces. |

show patch

To display the patch connections, use the **show patch** command.

show patch [detail]

| | | |
|---------------------------|--------|--|
| Syntax Description | detail | Displays both the user and automatic local path connections. |
|---------------------------|--------|--|

Defaults Displays summary patch connection information.

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display the patch connections on the mux/demux modules configured with the **patch** command. The automatic patch connections are those provided with the fixed backplane.

The error field in the **show patch** command output helps troubleshoot shelf misconfigurations. When there is a channel mismatch between a transponder module and a mux/demux module, “Channel Mismatch” appears for the patch connection. When more than one mux/demux module drops the same channels, “Channel Mismatch” appears for all patch connections.

Examples

The following example shows how to display patch connection information. (See Table 3-15 for field descriptions.)

```
Switch# show patch
Patch Interface    Patch Interface    Type    Error
-----
Wave0             Oscfilter0/0      USER
Wdm0/0           Thru0/1           USER
Wdm0/1           Thru0/2           USER
Wdm0/2           Thru0/3           USER
Thru0/0          Wdm0/3            USER
```

The following example shows how to display detailed patch connection information. (See Table 3-15 for field descriptions.)

```
Switch# show patch detail
Patch Interface    Patch Interface    Type    Error
-----
Wavepatch10/0/0   Filter0/3/0       AUTOMATIC
Wavepatch10/1/0   Filter0/3/1       AUTOMATIC
Wavepatch10/2/0   Filter0/3/2       AUTOMATIC
Wavepatch10/3/0   Filter0/3/3       AUTOMATIC
Wave0             Oscfilter0/0      USER
Wdm0/0           Thru0/1           USER
Wdm0/1           Thru0/2           USER
Wdm0/2           Thru0/3           USER
Thru0/0          Wdm0/3            USER
```

Table 3-15 *show patch detail* Field Descriptions

| Field | Description |
|-----------------|--|
| Patch Interface | Shows an interface identifier for the patch connection. |
| Type | Shows how the patch was configured, either by the system or by the user. |
| Error | Shows patch errors, such as channel mismatches. |

Related Commands

| Command | Description |
|--------------------|--|
| debug ports | Enables debugging of optical port activity. |
| patch | Configures patch connections within a shelf. |

show performance

To display the performance history counters, use the **show performance** command.

```
show performance { current | history | 24-hour } [interface] [interval number]
```

| Syntax Description | | |
|------------------------|--|--|
| current | | Displays the current counter. |
| history | | Displays the 15-minute history counter. |
| 24-hour | | Displays the 24-hour counter. |
| <i>interface</i> | | Displays the performance history counter for the specified interface. |
| <i>interval number</i> | | Displays the performance history counter with the specified interval number (1 to 96). |

Defaults Displays all performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15540 ESP interfaces.

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entry:

| SV-Release | Modification |
|------------|------------------------------|
| 12.2(29)SV | This command was introduced. |

Usage Guidelines Use this command to view the performance history counters for the Cisco ONS 15540 ESP interfaces.

Examples The following example shows how to display the current counter for a transparent interface. (See Table 3-16 for field descriptions.)

```
Switch# show performance current transparent 2/2/0
Current 15 minute performance register
-----
Interface      : Transparent2/2/0
Interval Number : 81

Elapsed Time(seconds) : 526
Valid Time(seconds)   : 526

Code violation and running disparity error count : 0
```

Table 3-16 *show performance current Field Descriptions*

| Field | Description |
|--|--|
| Interface | Shows the interface for which the current counter is displayed. |
| Interval Number | Shows the current counter's interval number. |
| Elapsed Time | Shows the elapsed time since the current counter was started. |
| Valid Time | Shows the time period during which the interface was administratively up. A current counter with zero valid time will not contain any valid data. |
| Code violation and running disparity error count | Shows the total number of code violation and running disparity (CVRD) errors in the frames that were received from the client device during the elapsed time of the current performance counter. |

The following example shows how to display the 15-minute history counter for a tengigethernetphy interface with CDL disabled. (See Table 3-17 for field descriptions.)

```
Switch# show performance history tengigEthernetPhy 10/0 20
15 minute performance history register
-----
Interface      : TenGigEthernetPhy10/0
Interval Number : 20

Total Time(seconds) : 900
Valid Time(seconds) : 900

Code violation and running disparity error count : 0
TenGige Non CDL Pkt count : 0
```

Table 3-17 *show performance history Field Descriptions*

| Field | Description |
|--|--|
| Interface | Shows the interface for which the 15-minute history counter is displayed. |
| Interval Number | Shows the 15-minute history counter's interval number. |
| Total Time | Shows the duration of the 15-minute history counter in seconds. |
| Valid Time | Shows the time period during which the 15-minute history counter was in the no shutdown state. A 15-minute history counter with zero valid time will not contain any valid data. |
| Code violation and running disparity error count | Shows the total number of CVRD errors in the GE frames that were received from the client interface during the 15 minute period. |
| TenGige Non CDL Pkt count | Shows the total number of non CDL type packets that were received from the client side during the 15 minute period. |

The following example shows how to display the 24-hour counter for a tengigethernetphy interface with CDL enabled. (See Table 3-18 for field descriptions.)

```
Switch# show performance 24-hour tenGigEthernetPhy 10/1
24 hour performance register
-----
Interface          : TenGigEthernetPhy10/1

Total Time(seconds)   : 86400
Valid Time(seconds)  : 86400

Code violation and running disparity error count : 0
TenGige Non CDL Pkt count : 0
CDL HEC error count      : 0
TenGige CDL idle Pkt count : 0
```

Table 3-18 *show performance 24-hour Field Descriptions*

| Field | Description |
|--|--|
| Interface | Shows the interface for which the 24-hour counter is displayed. |
| Total Time | Shows the duration of the 24-hour counter in seconds. |
| Valid Time | Shows the time period during which the 24-hour counter was in the no shutdown state. A 24-hour counter with zero valid time will not contain any valid data. |
| Code violation and running disparity error count | Shows the total number of CVRD errors in the GE frames that were received from the fabric during the 24 hour period. |
| TenGige Non CDL Pkt count | Shows the total number of non CDL type packets that were received from the client side during the 24 hour period. |
| CDL HEC error count | Shows the total number of GE frames that were received with CDL HEC errors during the 24 hour period. |
| TenGige CDL idle Pkt count | Shows the total number of CDL idle packets that were received from the client during the 24 hour period. |

Related Commands

| Command | Description |
|-------------------------------------|--|
| show interfaces | Displays interface information. |
| auto-sync counters interface | Enables the automatic synchronization of the performance history counters. |
| clear performance history | Clears the performance history counters. |

shutdown

To disable an interface, use the **shutdown** command. To restart a disabled interface, use the **no** form of this command.

shutdown

no shutdown

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Interface configuration

Usage Guidelines This command disables all functions on the specified interface.

This command also marks the interface as unavailable. To check whether an interface is disabled, use the **show interfaces** command. An interface that has been shut down is shown as administratively down in the **show interfaces** output.

On transparent and wave interfaces, use the **shutdown** command to turn off the transmit lasers. To turn the transmit lasers on, use the **no shutdown** command.

A **shutdown** command issued on a wave interface does not affect administrative status of the corresponding wavepatch interfaces. To administratively shut down the wavepatch interfaces, issue **shutdown** commands directly.

To use splitter protected line card motherboards for line card protection, you must shut down all the wavepatch interfaces connected to one of the mux/demux motherboards. (See the “Examples” section.)

Examples The following example shows how to shut down a wave interface, which also turns off the laser that transmits to the trunk fiber.

```
Switch# configure terminal
Switch(config)# interface wave0/3
Switch(config-if)# shutdown
```

The following example shows how to reenable a transparent interface and turn on the laser transmitting to the client equipment.

```
Switch# configure terminal
Switch(config)# interface transparent 8/0/0
Switch(config-if)# no shutdown
```

The following example shows how to disable the east (slot 1) side of the wavepatch interface pair on a splitter protected line card motherboard.

```
Switch# configure terminal
Switch(config)# interface wavepatch 3/0/1
Switch(config-if)# shutdown
```


Related Commands

| Command | Description |
|------------------------|-----------------------------|
| loopback | Turns lasers on and off. |
| show interfaces | Displays system interfaces. |

■ shutdown



Online Diagnostics Commands

Online diagnostics test the accessibility of the components on the Cisco ONS 15540 ESP. Use the following commands to configure and monitor online diagnostic operations.

diag online

To enable online diagnostics for the system, use the **diag online** command. To disable online diagnostics for the system, use the **no** form of this command.

diag online

no diag online

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable or disable online diagnostics for the system. Online diagnostics run in background mode or during OIR (online insertion and removal). Any slot level diagnostics previously configured with the **diag online slot** command or the **diag online subslot** command take precedence over the **diag online** command.

When online diagnostics are disabled, no further diagnostics can run.

Examples

The following example shows how to enable online diagnostics.

```
Switch# configure terminal  
Switch(config)# diag online
```

Related Commands

| Command | Description |
|--------------------------------|--|
| debug diag online | Enables debugging of the online diagnostics. |
| diag online slot | Enables online diagnostics for a specified slot number. |
| diag online subslot | Enables online diagnostics for a specified subslot number. |
| show diag online | Displays the configuration and status of the online diagnostics. |
| show diag online detail | Shows detailed online diagnostic test results for the shelf. |
| show diag online slot | Shows detailed online diagnostic test results for a specific slot. |

diag online slot

To enable online diagnostics for a specified slot number, use the **diag online slot** command. To disable online diagnostics for a specified slot number, use the **no** form of this command.

diag online slot *slot-number* [**timer** *seconds*]

no diag online slot *slot-number* [**timer** *seconds*]

Syntax Description

| | |
|-----------------------------|--|
| slot-number | Specifies the number of the slot on which to run online diagnostics. The range is 0 to 11. |
| timer <i>seconds</i> | Specifies a timer the background tests. The range is 30 to 600 seconds. The default value is 60 seconds. |

Defaults

Disabled
The timer default is 60 seconds.

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| 12.1(12c)EV | Added timer option. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to enable or disable online diagnostics for a specified slot number. It can be useful to disable online diagnostics on a particular slot when there is a spurious error that causes excessive console messages.

Examples

The following example shows how to enable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online subslot 2
```

The following example shows how to enable online diagnostics on all the slots and then disable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online
Switch(config)# no diag online subslot 10
```

Related Commands

| Command | Description |
|--------------------------------|--|
| debug diag online | Enables debugging of the online diagnostics. |
| diag online | Enables online diagnostics for the system. |
| diag online subslot | Enables online diagnostics for a specified subslot number. |
| show diag online | Displays the configuration and status of the online diagnostics. |
| show diag online detail | Shows detailed online diagnostic test results for the shelf. |
| show diag online slot | Shows detailed online diagnostic test results for a specific slot. |

diag online subslot

To enable online diagnostics for a specified subslot number, use the **diag online subslot** command. To disable online diagnostics for a specific slot number, use the **no** form of this command.

diag online subslot *slot/subcard* [**timer** *seconds*]

no diag online subslot *slot/subcard* [**timer** *seconds*]

| Syntax Description | slot | Specifies the number of the slot on which to run online diagnostics. The range is 0 to 11. |
|--------------------|-----------------------------|--|
| | subcard | Specifies the number of the subslot on which to run online diagnostics. The range is 0 to 1. |
| | timer <i>seconds</i> | Specifies a timer the background tests. The range is 30 to 600 seconds. The default value is 60 seconds. |

Defaults Disabled
The timer default is 60 seconds.

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EV-Release | Modification |
|------------|--|
| 12.1(10)EV | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable or disable online diagnostics for a specific subslot.

You can disable online diagnostics on a particular subslot when there is a spurious error that causes excessive console messages.

Examples The following example shows how to enable online diagnostics for a specific slot number.

```
Switch# configure terminal
```



```
Switch(config)# diag online subslot 0/0
```

The following example shows how to enable online diagnostics on all the slots and then disable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online
Switch(config)# no diag online subslot 0/1
```

Related Commands

| Command | Description |
|--------------------------------|--|
| debug diag online | Enables debugging of the online diagnostics. |
| diag online | Enables online diagnostics for the system. |
| diag online slot | Enables online diagnostics for specified slot number. |
| diag online subslot | Enables online diagnostics for a specified subslot number. |
| show diag online | Displays the configuration and status of the online diagnostics. |
| show diag online detail | Shows detailed online diagnostic test results for the shelf. |
| show diag online slot | Shows detailed online diagnostic test results for a specific slot. |

show diag online

To display current online diagnostic test results, use the **show diag online** command. Information displayed includes the cards installed, their current status, and the status of online tests performed on the cards.

show diag online

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command whenever a card is unavailable or is not coming up, to determine card status and the status of various background online tests performed on them.

Examples The following example shows how to display online diagnostic test results for the hardware components. (See Table 4-1 for field descriptions.)

```
Switch# show diag online
```

```

Online Diagnostics Current Summary Information
~~~~~
On ACTIVE CPU card Slot: 6
CPU Uptime:    21 hours, 52 minutes

Slot          CardType          Enabled    Bootup/
              ~~~~~          ~~~~~    Insertion
              ~~~~~          ~~~~~    tests
              ~~~~~          ~~~~~    ~~~~~
0/*/*        Mx-DMx-Mthrbd     Yes       Pass
0/ 3/*Mx-DMx-8Mod-Plus1-W  Yes       Pass
              ~~~~~          ~~~~~    ~~~~~
1/*/*        Mx-DMx-Mthrbd     Yes       Pass
1/ 3/*Mx-DMx-8Mod-Plus1-W  Yes       Pass
              ~~~~~          ~~~~~    ~~~~~
6/*/*        Queens CPU        Yes       Pass
7/*/*        Queens CPU        Yes       Pass
              ~~~~~          ~~~~~    ~~~~~
10/*/*       XpndrMotherboard  Yes       Pass
10/ 0/*      NPlugXpndrMonitor Yes       Pass
10/ 1/*      NPlugXpndrMonitor Yes       Pass
10/ 2/*      NPlugXpndrMonitor Yes       Pass
10/ 3/*      NPlugXpndrMonitor Yes       Pass

```

Table 4-1 *show diag online Field Descriptions*

| Field | Description |
|---------------------------|--|
| Slot | Shows the slot on which online diagnostics have been run. |
| CardType | Shows the card type on which online diagnostics have been run. Card types include: <ul style="list-style-type: none"> • Mx-DMx-Mthrbd (Mux/demux motherboard) • Mx-DMx-8Mod-Plus1-W (8-channel mux/demux module with OSC) • XpndrMotherboard (Line card motherboard) • NPlugXpndrMonitor (Transponder module) • Queens CPU (Processor card) |
| Enabled | Indicates whether online diagnostic tests are enabled on the slot. |
| Bootup/Insertion tests | Indicates whether the card passed the test run at system bootup or when the component is inserted in the chassis. |
| Periodic Background tests | Indicates whether the card passed the periodic background tests. |
| Previous Failures | Shows when the last failure occurred for the component. |

Related Commands

| Command | Description |
|--------------------------------|--|
| diag online | Enables online diagnostics for the system. |
| diag online slot | Enables online diagnostics for the specified slot. |
| show diag online detail | Shows detailed online diagnostic test results for the shelf. |
| show diag online slot | Shows detailed online diagnostic test results for a specific slot. |

show diag online detail

To display the cards currently installed on the system and the detailed results of online diagnostic tests performed on them, use the **show diag online detail** command.

show diag online detail

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display detailed status information about all the online diagnostic tests run on the hardware in the system. Information displayed includes the number of times background tests passed or failed, as well as the status of OIR tests.

Use this command to debug possible hardware problems on the cards or subcards installed.

Examples The following example shows how to display current, detailed online diagnostics for the system. (See Table 4-2 for field descriptions.)

```
Switch# show diag online detail
```

```
Online Diagnostics Detailed Information
```

```
~~~~~
On ACTIVE CPU card Slot: 6
CPU Uptime: 21 hours, 57 minutes
```

```
-----
Slot [0]:Mx-DMx-Mthrbd
Enabled: Yes
```

```
Online Insertion Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|--------|--------------------|--------------|--------|-------------|--------------|
| 0/*/* | Mx-DMx-Mthrbd | lrcAccess | Pass | 0 minutes | never |
| | | idpromAccess | Pass | | |
| 0/ 3/* | Mx-DMx-8Mod-Plus1- | idpromAccess | Pass | 0 minutes | never |

```
Online Background Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|--------|--------------------|--------------|--------|--------------|--------------|
| 0/*/* | Mx-DMx-Mthrbd | lrcAccess | Pass | 21 hours, 57 | never |
| | | idpromAccess | Pass | | |
| 0/ 3/* | Mx-DMx-8Mod-Plus1- | idpromAccess | Pass | 21 hours, 57 | never |

```
-----
Slot [1]:Mx-DMx-Mthrbd
Enabled: Yes
```

```
Online Insertion Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|--------|--------------------|--------------|--------|-------------|--------------|
| 1/*/* | Mx-DMx-Mthrbd | lrcAccess | Pass | 0 minutes | never |
| | | idpromAccess | Pass | | |
| 1/ 3/* | Mx-DMx-8Mod-Plus1- | idpromAccess | Pass | 0 minutes | never |

```
Online Background Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|--------|--------------------|--------------|--------|--------------|--------------|
| 1/*/* | Mx-DMx-Mthrbd | lrcAccess | Pass | 21 hours, 57 | never |
| | | idpromAccess | Pass | | |
| 1/ 3/* | Mx-DMx-8Mod-Plus1- | idpromAccess | Pass | 21 hours, 57 | never |

```
-----
Slot [6]:Queens CPU
Enabled: Yes
```

```
Online Insertion Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|-------|------------|--------------|--------|-------------|--------------|
| 6/*/* | Queens CPU | srcStatus | Pass | 0 minutes | never |
| | | PCIAccess | Pass | | |
| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
| | | PCMCIAAccess | Pass | | |

```
Online Background Tests
```

| Slot | CardType | TestType | Status | LastRunTime | LastFailTime |
|-------|------------|--------------|--------|--------------|--------------|
| 6/*/* | Queens CPU | srcStatus | Pass | 21 hours, 57 | never |
| | | PCIAccess | Pass | | |
| | | PCMCIAAccess | Pass | | |

```
-----
Slot [7]:Queens CPU
Enabled: Yes
```

show diag online detail

```

Online Insertion Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~
7/*/*      Queens CPU      srcStatus      Pass      0 minutes      never
              PCIAccess      Pass
              PCMCIAAccess      Pass

```

```

Online Background Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~
7/*/*      Queens CPU      srcStatus      Pass21 hours, 51      never
              PCIAccess      Pass
              PCMCIAAccess      Pass

```

Slot [10]:XpndrMotherboard

Enabled: Yes

```

Online Insertion Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~
10/*/*      XpndrMotherboard      lrcAccess      Pass      0 minutes      never
              idpromAccess      Pass
10/ 0/*      NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
              idpromAccess      Pass
10/ 1/*      NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
              idpromAccess      Pass
10/ 2/*      NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
              idpromAccess      Pass
10/ 3/*      NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
              idpromAccess      Pass

```

```

Online Background Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~
10/*/*      XpndrMotherboard      lrcAccess      Pass21 hours, 57      never
              idpromAccess      Pass
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~      ~~~~~
10/ 0/*      NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
              idpromAccess      Pass
10/ 1/*      NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
              idpromAccess      Pass
10/ 2/*      NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
              idpromAccess      Pass
10/ 3/*      NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
              idpromAccess      Pass

```

Table 4-2 show diag online detail Field Descriptions

| Field | Description |
|--------------------------|---|
| On ACTIVE CPU card Slot: | Shows the chassis slot that contains the active processor card. |
| CPU Uptime | Shows the amount of time since the system booted. |
| Slot | Shows the slot on which the online diagnostics are being run. |
| Enabled | Indicates whether online diagnostics are enabled on the slot. |

Table 4-2 *show diag online detail Field Descriptions (continued)*

| Field | Description |
|--------------|--|
| CardType | Shows the card type on which the online diagnostics are being run. Card types include: <ul style="list-style-type: none"> • Mx-DMx-Mthrbd (Mux/demux motherboard) • Mx-DMx-8Mod-Plus1-W (8-channel mux/demux module with OSC) • XpndrMotherboard (Line card motherboard) • NPlugXpndrMonitor (Transponder module) • Queens CPU (Processor card) |
| TestType | Shows the type of test run. Test types can be: <ul style="list-style-type: none"> • lrcAccess (Accesses the LRC) • idpromAccess (Accesses the IDPROM) • srcAccess (Accesses the SRC) • PCMCIAAccess (Accesses Flash PC Cards) • scAccess (Accesses transponder modules) |
| Status | Shows the result of the diagnostic test (Pass/Fail) |
| LastRunTime | Shows the amount of time since the test was last run. |
| LastFailTime | Shows the amount of time since the test failed. |

Related Commands

| Command | Description |
|------------------------------|--|
| diag online | Enables online diagnostics for the system. |
| diag online slot | Enables online diagnostics for the specified slot. |
| diag online subslot | Enables online diagnostics for a specified subslot number. |
| show diag online | Shows a summary of the online diagnostic test results for the shelf. |
| show diag online slot | Shows detailed online diagnostic test results for a specific slot. |

show diag online slot

To display the results of online diagnostic tests performed on a card in a specific slot, use the **show diag online slot** command.

show diag online slot *slot-number*

| | | |
|---------------------------|-------------|--|
| Syntax Description | slot-number | Specifies the slot number. The range is 0 to 11. |
|---------------------------|-------------|--|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|--------------------------|
| Command Modes | EXEC and privileged EXEC |
|----------------------|--------------------------|

| | |
|------------------------|--|
| Command History | This table includes the following release-specific history entries: <ul style="list-style-type: none"> EY-Release E-Release EV-Release SV-Release S-Release |
|------------------------|--|

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| | |
|-------------------------|--|
| Usage Guidelines | Use this command to display the status of online diagnostics performed on components installed in a specific slot. |
|-------------------------|--|

| | |
|-----------------|--|
| Examples | The following example shows how to display the results of online diagnostic tests performed on slot 0. (See Table 4-3 for field descriptions.) |
|-----------------|--|

```
Switch# show diag online slot 0
Online Diagnostics Information Per Slot
```



```

~~~~~
Slot [0]:Mx-DMx-Mthrbd
Enabled: Yes
CPU Uptime:    21 hours, 59 minutes

Online Insertion Tests
Slot          CardType          TestType          Status   LastRunTime   LastFailTime
~~~~~
0/*/*        Mx-DMx-Mthrbd    lrcAccess        Pass    0 minutes     never
              idpromAccess     Pass
0/ 3/* Mx-DMx-8Mod-Plus1- idpromAccess     Pass    0 minutes     never

Online Background Tests
Slot          CardType          TestType          Status   LastRunTime   LastFailTime
~~~~~
0/*/*        Mx-DMx-Mthrbd    lrcAccess        Pass21 hours, 58   never
              idpromAccess     Pass
0/ 3/* Mx-DMx-8Mod-Plus1- idpromAccess     Pass21 hours, 58   never

```

Table 4-3 show diag online slot Field Descriptions

| Field | Description |
|--------------|---|
| Slot | Shows the slot on which online diagnostics were performed. |
| Enabled | Indicates whether online diagnostics are enabled on the slot. |
| CPU Uptime | Shows the amount of time since the system booted. |
| CardType | Shows the card type on which the online diagnostics are being run. Card types include: <ul style="list-style-type: none"> • Mx-DMx-Mthrbd (Mux/demux motherboard) • Mx-DMx-8Mod-Plus1-W (8-channel mux/demux module with OSC) • XpndrMotherboard (Line card motherboard) • NPlugXpndrMonitor (Transponder module) Queens CPU (Processor card) |
| TestType | Shows the type of test run. Test types can be: <ul style="list-style-type: none"> • lrcAccess (Accesses the LRC) • idpromAccess (Accesses the IDPROM) • srcAccess (Accesses the SRC) • PCMCIAAccess (Accesses Flash PC Cards) • scAccess (Accesses transponder modules) |
| Status | Shows the result of the diagnostic test (Pass/Fail). |
| LastRunTime | Shows the amount of time since the test was last run. |
| LastFailTime | Shows the amount of time since the test failed. |

Related Commands

| Command | Description |
|----------------------------|--|
| diag online | Enables online diagnostics for the system. |
| diag online slot | Enables online diagnostics for the specified slot. |
| diag online subslot | Enables online diagnostics for a specified subslot number. |

| Command | Description |
|--------------------------------|--|
| show diag online | Shows a summary of the online diagnostic test results for the shelf. |
| show diag online detail | Shows detailed online diagnostic test results for the shelf. |



OSCP Commands

OSCP (Optical Supervisory Channel Protocol) provides out-of-band network management over a 33rd channel. Use the following commands to configure and monitor OSCP operations.

clear oscp

To clear OSCP statistics or traffic counters, use the **clear oscp** command.

```
clear oscp {statistics | traffic}
```

| Syntax Description | statistics | Clears OSCP statistics that can be used to debug the protocol, for example: |
|--------------------|------------|--|
| | | <ul style="list-style-type: none"> The hold-down count statistic specifies how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets. The Hello Tx and Rx statistics indicate the number of Hello packets that have been transmitted and received at an interface. The OSCP go-down statistic indicates the number of times an interface has gone out of the two-way state. |
| | traffic | Clears OSCP control-traffic counters that indicate the number of different protocol packets that were transmitted over the optical supervisory channel. |

| Defaults | None |
|----------|------|
|----------|------|

| Command Modes | Privileged EXEC |
|---------------|-----------------|
|---------------|-----------------|

| Command History | This table includes the following release-specific history entries: |
|-----------------|---|
|-----------------|---|

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to perform a one-time clear of the specified OSCP statistics or traffic tables. This command is useful for debugging or monitoring OSCP performance.

Examples

The following example shows how to clear OSCP statistics and traffic tables.

```
Switch# clear oscp statistics  
Switch# clear oscp traffic
```

Related Commands

| Command | Description |
|-----------------------------------|---|
| <code>show oscp statistics</code> | Displays OSCP Hello statistics information. |
| <code>show oscp traffic</code> | Display OSCP Hello traffic information. |

oscp timer hello holddown

To modify the OSCP timer Hello hold-down interval, use the **oscp timer hello holddown** command. To return the Hello hold-down interval to its default value, use the **no** form of the command.

oscp timer hello holddown *milliseconds*

no oscp timer hello holddown

| | | |
|---------------------------|---------------------|--|
| Syntax Description | <i>milliseconds</i> | Specifies, in milliseconds, the interval in which no more than one Hello packet can be generated. If more than one Hello packet is generated during the hold-down period, the extra packets are delayed. The range is 150 to 30000 milliseconds. |
|---------------------------|---------------------|--|

| | |
|-----------------|-------------------|
| Defaults | 3000 milliseconds |
|-----------------|-------------------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to control the amount of OSCP Hello activity that is generated on the network. The Hello hold-down timer specifies the interval during which no more than one Hello packet can be sent. If more than one Hello packet is generated during the hold-down period, the extra packets are delayed. Increasing the hold-down timer limits the number of Hello packets triggered in response to Hello packets received from a neighboring node and reduces the likelihood of Hello packets flooding the OSC.

To ensure proper functioning of the OSCP, the Hello hold-down timer value can be no more than 75% of the OSCP Hello interface timer.

**Note**

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to configure the OSCP timer Hello hold-down interval.

```
Switch# configure terminal
Switch(config)# osp timer hello holddown 300
```

Related Commands

| Command | Description |
|--|--|
| <code>debug osp</code> | Enables debugging of OSCP activity. |
| <code>osp timer hello interval</code> | Modifies the OSCP timer Hello interval. |
| <code>osp timer inactivity-factor</code> | Modifies the OSCP timer inactivity factor. |
| <code>show osp info</code> | Displays OSCP configuration information. |

oscp timer hello interval

To modify the OSCP timer Hello interval, use the **oscp timer hello interval** command. To return the Hello interval to its default value, use the **no** form of the command.

oscp timer hello interval *milliseconds*

no oscp timer hello interval

| | | |
|---------------------------|---------------------|--|
| Syntax Description | <i>milliseconds</i> | Specifies, in milliseconds, the periodic generation of OSCP Hello packets. The range is 100 to 10000 milliseconds. |
|---------------------------|---------------------|--|

| | |
|-----------------|------------------|
| Defaults | 100 milliseconds |
|-----------------|------------------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to control how often OSCP Hello messages are sent. The OSCP sends Hello packets to adjacent nodes at a configured interval. When five packets fail to get a response from the receiving node, that node is declared “down.” By decreasing the interval at which Hello packets are sent, reaction time to a failed node can be lessened. Increasing the interval reduces the amount of Hello packet traffic.

**Note**

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to configure the OSCP timer Hello interval.

```
Switch# configure terminal  
Switch(config)# osp timer hello interval 200
```

Related Commands

| Command | Description |
|------------------------------------|---|
| debug osp | Enables debugging of OSCP activity. |
| osp timer hello holddown | Modifies the OSCP timer Hello hold-down interval. |
| osp timer inactivity-factor | Modifies the OSCP timer Hello inactivity factor. |
| show osp info | Displays OSCP configuration information. |

oosp timer inactivity-factor

To modify the OSCP timer Hello inactivity factor, use the **oosp timer inactivity-factor** command. To return the Hello inactivity factor to its default value, use the **no** form of the command.

oosp timer inactivity-factor *factor*

no oosp timer inactivity-factor

| | | |
|---------------------------|---------------|--|
| Syntax Description | <i>factor</i> | Specifies a value used to calculate an inactivity interval. The specified interval of time is equal to the inactivity factor multiplied by the neighbor's advertised Hello interval. The range is 1 to 50. |
|---------------------------|---------------|--|

| | |
|-----------------|-----------|
| Defaults | 5 seconds |
|-----------------|-----------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines The system uses this attribute to determine when a neighbor node, or the link to it, has gone down. The link to a neighbor node is considered inactive if an OSCP Hello packet is not received for a time interval determined by the inactivity factor. The time interval is calculated by multiplying the inactivity factor

by the advertised hold-down interval. For example, if the neighbor node's advertised hold-down interval is 5 seconds and the local node's inactivity factor is 5, the time interval that the local node will wait until declaring the neighbor node down is 25 seconds.

**Note**

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to set the OSCP timer Hello inactivity factor to 3.

```
Switch# configure terminal
Switch(config)# osp timer inactivity-interval 3
```

Related Commands

| Command | Description |
|---------------------------------|---|
| debug osp | Enables debugging of OSCP activity. |
| osp timer hello holddown | Modifies the OSCP timer Hello hold-down interval. |
| osp timer hello interval | Modifies the OSCP timer Hello interval. |
| show osp info | Displays OSCP configuration information. |

show oscp info

To display OSCP (Optical Supervisory Channel Protocol) configuration information, use the **show oscp info** command.

```
show oscp info
```

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display OSCP configuration information for the system.

Examples The following example shows how to display OSCP configuration information for the system. (See Table 5-1 for field descriptions.)

```
Switch# show oscp info
OSCP protocol version 1, Node ID          0000.1644.28fb
No. of interfaces 1, No. of neighbors 1
Hello interval 50 tenth of sec, inactivity factor 5,
```

```
Hello hold-down 1 tenth of sec
Supported OSCP versions: newest 1, oldest 1
```

Table 5-1 *show oscp info* Field Descriptions

| Field | Description |
|-------------------------|---|
| OSCP protocol version | Shows the OSCP version. |
| Node ID | Shows the node ID. |
| No. of interfaces | Shows the number of interfaces. |
| No. of neighbors | Shows the number of neighbors. |
| Hello interval | Shows the Hello interval in milliseconds. |
| inactivity factor | Shows the inactivity factor. The system uses the inactivity factor to determine when a link has gone down. A link is returned to the “attempt” state if the system has not received an OSCP Hello packet for a certain time interval. That time interval is equal to the Hello inactivity factor multiplied by the Hello interval from the Hello packet most recently received from the remote system. The range of inactivity factors is from 2 to 50. The default inactivity factor is 5. |
| Hello hold-down | Shows, in milliseconds, how long to wait before sending another OSCP Hello packet. This avoids excessive generation of OSCP Hello packets. |
| Supported OSCP versions | Shows the OSCP versions supported. |

Related Commands

| Command | Description |
|-------------------------------------|---|
| oscp timer hello holddown | Modifies the OSCP timer Hello hold-down interval. |
| oscp timer hello interval | Modifies the OSCP timer Hello interval. |
| oscp timer inactivity-factor | Modifies the OSCP timer inactivity factor. |

show oscp interface

To display OSCP (Optical Supervisory Channel Protocol) status information for the OSC interfaces, use the **show oscp interface** command.

```
show oscp interface [wave slot]
```

Syntax Description

| | |
|------------------|----------------------------------|
| wave slot | Specifies an OSC wave interface. |
|------------------|----------------------------------|

Defaults

Displays OSCP status information for all OSC wave interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display status information for the local and remote interfaces running OSCP.

Examples

The following example shows how to display status information for the local and remote interfaces running OSCP. (See Table 5-2 for field descriptions.)

```
Switch# show oscp interface
Codes: OSC - dedicated wavelength channel, CDL - in-band wavelength channel

OSCP Interface(s)
```

```

Local Port          Port ID   Type   OSCP St   Rem Port ID   Rem Node Id
~~~~~
Wave0              02000000  OSC   down     00000000     0000.0000.0000
Wave1              02020000  OSC   down     00000000     0000.0000.0000

```

Table 5-2 *show oscp interface Field Descriptions*

| Field | Description |
|-------------|--|
| Local Port | Shows the local port for the OSCP interface. |
| Port ID | Shows the port ID for the local port. |
| Type | Shows the channel link type, either OSCP or CDL. CDL is not currently supported. |
| OSCP St | Shows the OSCP Hello state. Valid values are: <ul style="list-style-type: none"> • down—the physical layer is down • attempt—the physical layer is up, but no Hello messages have been received from the neighbor • 1-way—Hello messages have been received from the neighbor, but their content indicates that the neighbor has not yet received Hellos from this node. • 2-way—Hello messages have been received from the neighbor indicating that the neighbor has received Hello packets from this node. |
| Rem Port ID | Shows the port ID for the remote port. |
| Rem Node Id | Shows the node ID for the remote port. |

Related Commands

| Command | Description |
|-----------------------------|--|
| show oscp neighbor | Displays OSCP neighbor information. |
| show oscp statistics | Displays OSCP activity statistics. |
| show oscp traffic | Displays OSCP message traffic information. |

show oscp neighbor

To display OSCP (Optical Supervisory Channel Protocol) neighbor information, use the **show oscp neighbor** command.

show oscp neighbor

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display information about the identity of the neighbors communicating with the system through OSCP.

Examples The following example shows how to display information about the identity of the neighbors communicating with the system through OSCP. (See Table 5-3 for field descriptions.)

```
Switch# show oscp neighbor
OSCP Neighbors
  Neighbor Node Id: 0000.1644.28ff  Port list:
```



```

Local Port      Port ID  Rem Port ID  OSCP state
~~~~~
Wave0          1000000  1000000     2way

```

Table 5-3 *show oscp neighbor Field Descriptions*

| Field | Description |
|------------------|--|
| Neighbor Node Id | Shows the node ID for the OSCP neighbor. |
| Port list | Shows ports and port IDs for local and remote ports. |
| Local Port | Shows the local port. |
| Port Id | Shows the port ID of the local port. |
| Rem Port ID | Shows the port ID of the remote port. |
| OSCP St | Shows the OSCP Hello state. Valid values are: <ul style="list-style-type: none"> • down—the physical layer is down • attempt—the physical layer is up, but no Hello messages have been received from the neighbor • 1-way—Hello messages have been received from the neighbor, but their content indicates that the neighbor has not yet received Hellos from this node. • 2-way—Hello messages have been received from the neighbor indicating that the neighbor has received Hello packets from this node. |

Related Commands

| Command | Description |
|-----------------------------|---|
| show oscp interface | Displays OSCP information for an interface. |
| show oscp statistics | Displays OSCP activity statistics. |
| show oscp traffic | Displays OSCP message traffic information. |

show oscp statistics

To display OSCP (Optical Supervisory Channel Protocol) Hello statistics, use the **show oscp statistics** command.

```
show oscp statistics [wave slot]
```

Syntax Description

| | |
|------------------|----------------------------------|
| wave slot | Specifies an OSC wave interface. |
|------------------|----------------------------------|

Defaults

Displays OSCP statistics for all OSC wave interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display OSCP Hello statistics for an OSC interface.

This command displays the following OSCP statistics, which can be used to debug the OSCP.

- hold down—Shows how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets.
- Hello Tx pkts and Hello Rx pkts—Shows the number of OSCP Hello packets that have been transmitted to and received at an interface.
- OSCP go down—Shows the number of times an OSC interface has gone out of two-way state.

Examples

The following example shows how to display OSCP control statistics for an OSC interface. (See Table 5-4 for field descriptions.)

```
Switch# show oscp statistics wave 0
OSCP Hello Statistics:

interface Wave0
  Event                      Count
  ~~~~~
hold down                    3
Hello Tx pkts                2262
Hello Rx pkts                2259
Hello discards in           0
Hello discards out          0
OSCP go down events         2

  Event                      Time (seconds)
  ~~~~~
Next Tx Hello due           2
Last Hello sent             2
Last Hello received         4
Inactivity interval        25.0
Time until port dropped    20
```

Table 5-4 *show oscp statistics Field Descriptions*

| Field | Description |
|-------------------------|--|
| hold down | Shows how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets. |
| Hello Tx pkts | Shows the number of Hello transmissions that have been sent. |
| Hello Rx pkts | Shows the number of Hello transmissions that have been received. |
| Hello discards in | Shows the number of incoming Hello transmissions that have been discarded. |
| Hello discards out | Shows the number of outgoing Hello transmissions that have been discarded. |
| OSCP go down events | Shows the number of times that the OSCP (Optical Supervisory Channel Protocol) has gone down. |
| Next Tx Hello due | Shows the number of seconds before the next transmit Hello packet is due. |
| Last Hello sent | Shows the number of seconds since a Hello packet was sent. |
| Last Hello received | Shows the number of seconds since a Hello packet was received. |
| Inactivity interval | Shows the number of seconds for the inactivity interval. |
| Time until port dropped | Shows the number of seconds allowed until the port is dropped. |

Related Commands

| Command | Description |
|----------------------------------|---|
| oscp timer hello holddown | Modifies the OSCP timer Hello hold-down interval. |
| oscp timer hello interval | Modifies the OSCP timer Hello interval. |

show oscp traffic

To display OSCP (Optical Supervisory Channel Protocol) Hello message traffic information, use the **show oscp traffic** command.

```
show oscp traffic [wave slot]
```

Syntax Description

| | |
|------------------|----------------------------------|
| wave slot | Specifies an OSC wave interface. |
|------------------|----------------------------------|

Defaults

Displays OSCP Hello message traffic information for all OSC wave interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display OSCP control traffic statistics, which show the count of different protocol packets that have been transmitted over the optical supervisory channel.

Examples

The following example shows how to display OSCP control traffic statistics, which show the count of different protocol packets that have been transmitted over the optical supervisory channel. (See Table 5-5 for field descriptions.)

```
Switch# show oscp traffic wave 0
```

OSC Traffic Statistics:

```
interface Wave0
Description          Count
~~~~~
Tx IP pkt           0
Rx IP pkt           0
Tx CDP pkt          198
Rx CDP pkt          195
Rx pkt dropped      0
```

Table 5-5 *show oscp traffic Field Descriptions*

| Field | Description |
|----------------|--|
| Tx IP pkt | Shows number of IP packets that have been transmitted over the optical supervisory channel. |
| Rx IP pkt | Shows number of IP packets that have been received over the optical supervisory channel. |
| Tx CDP pkt | Shows number of CDP packets that have been transmitted over the optical supervisory channel. |
| Rx CDP pkt | Shows number of CDP packets that have been received over the optical supervisory channel. |
| Rx pkt dropped | Shows the number of receive packets that were dropped. |

Related Commands

| Command | Description |
|------------|---|
| clear oscp | Clears OSCP statistics or traffic counters. |

■ `show oscp traffic`



Processor Card Redundancy Commands

Processor card redundancy provides protection against processor card failure. Use the following commands to configure and monitor processor card redundancy operations.

auto-sync counters interface

To enable automatic synchronizing of traffic statistics and performance monitoring counters, and performance history counters on the active processor card to the standby processor card, use the **auto-sync counters interface** command. To disable automatic synchronizing of traffic statistics and performance counters, use the **no** form of this command.

auto-sync counters interface

no auto-sync counters interface

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

Command History This table includes the following release-specific history entries:

| SV-Release | Modification |
|------------|--|
| 12.2(29)SV | Added support for the automatic syncing of performance history counters. |
| 12.2(24)SV | This command was introduced. |

Usage Guidelines Use this command to enable or disable automatic synchronizing of the traffic statistics, performance monitoring counters, and performance history counters without affecting the following types of synchronization:

- Startup configuration
- Dynamic database synchronizing
- Running configuration

Examples The following example shows how to disable automatic synchronizing of the traffic statistics and performance counters.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# no auto-sync counters interface
```

Related Commands

| Command | Description |
|---------------------------------|---|
| auto-sync startup-config | Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module. |
| maintenance-mode | Disables all CPU switch module redundancy synchronization. |
| redundancy | Enters redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time database update. |
| show redundancy summary | Displays CPU switch module redundancy status and configuration information. |

auto-sync running-config

To selectively enable only automatic synchronizing of the running configuration on the active processor to the standby processor card, use the **auto-sync running-config** command. To disable automatic synchronizing of the running configuration, use the **no** form of this command.

auto-sync running-config

no auto-sync running-config

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable or disable automatic synchronizing of the running configuration without affecting the following types of synchronization:

- Startup configuration
- Dynamic database synchronizing

When a processor card switchover occurs, the standby processor card normally uses the running configuration rather than the startup configuration. However, if **auto-sync running-config** is disabled when a processor card switchover occurs, the standby processor card uses the startup configuration.

In maintenance mode, all database synchronizing to the standby processor card is disabled even if **auto-sync running-config** is enabled.

Examples

The following example shows how to disable automatic synchronizing of the running configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# no auto-sync running-config
```

Related Commands

| Command | Description |
|---------------------------------|--|
| auto-sync startup-config | Selectively enables only automatic synchronizing of the startup configuration to the standby processor card. |
| maintenance-mode | Disables all processor card redundancy synchronization. |
| redundancy | Enters redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time database update. |
| show bootvar | Displays boot and other environmental variables. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

auto-sync startup-config

To selectively enable only automatic synchronizing of the startup configuration to the standby processor card, use the **auto-sync startup-config** command. To disable automatic synchronizing of the startup configuration, use the **no** form of this command.

auto-sync startup-config

no auto-sync startup-config

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable or disable only automatic synchronizing of the startup configuration without affecting the following synchronization:

- Running configuration
- Dynamic database synchronizing

In maintenance mode, all database synchronizing to the standby processor card is disabled even if **auto-sync startup-config** is enabled.

Examples

The following example shows how to disable automatic synchronizing of the startup configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# no auto-sync startup-config
```

Related Commands

| Command | Description |
|---------------------------------|--|
| auto-sync running-config | Selectively enables only automatic synchronizing of the running configuration to the standby processor card. |
| maintenance-mode | Disables all processor card redundancy synchronization. |
| redundancy | Enters redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time database update. |
| show bootvar | Displays boot and other environmental variables. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

clear redundancy

To clear redundancy history or counters, use the **clear redundancy** command.

clear redundancy {history | counters}

Syntax Description

| | |
|----------|--|
| history | Clears the redundancy event history log. |
| counters | Clears the redundancy internal operational counters. |

Defaults

None

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to perform a one-time clear of the specified redundancy history or statistics database. This command may be useful for debugging or monitoring redundancy performance.

Examples

The following example shows how to clear the redundancy history log.

```
Switch# clear redundancy history
```

Related Commands

| Command | Description |
|---------------------------------|---|
| show redundancy counters | Displays redundancy software counter information. |
| show redundancy history | Displays redundancy software history information. |

maintenance-mode

To disable all processor card redundancy synchronization, use the **maintenance-mode** redundancy command. To reenable redundancy synchronization, use the **no** form of this command.

maintenance-mode

no maintenance-mode

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Redundancy configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines In maintenance mode, the active processor card does not automatically synchronize information to the standby processor card. No standby processor card errors and alarms are reported to the active processor card. The standby processor card leaves the hot-standby mode, enters the negotiation state, and transitions to the cold-standby state.

When maintenance mode is disabled, the standby processor card reloads until it reaches the hot-standby state.

Maintenance mode is useful for processor card maintenance operations and system image troubleshooting.

**Note**

We do not recommend leaving the active and standby processor cards in maintenance mode for extended periods because any added configuration is lost unless the startup configuration on the active processor card is manually updated and manually synchronized with the standby processor card.

Examples

The following example shows how to enable maintenance mode redundancy.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# maintenance-mode
This command will place the system in SIMPLEX mode [confirm] y
```

Related Commands

| Command | Description |
|--------------------------------|--|
| redundancy | Enters redundancy configuration mode. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

redundancy

To switch to redundancy configuration mode, use the **redundancy** command.

redundancy

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to gain access to both processor card redundancy configuration commands and APS configuration commands.

Examples The following example shows how to switch to redundancy configuration mode.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)#
```

Related Commands

| Command | Description |
|---------------------------------|--|
| associate group | Associates wavepatch interfaces for APS splitter protection. |
| associate interface | Associates two interfaces for APS protection. |
| auto-sync running-config | Selectively enables only automatic synchronizing of the running configuration to the standby processor card. |
| auto-sync startup-config | Selectively enables only automatic synchronizing of the startup configuration to the standby processor card. |
| maintenance-mode | Enables or disables processor card redundancy synchronization. |

redundancy manual-sync

To cause an immediate one-time database update of the specified database information, use the **redundancy manual-sync** command.

redundancy manual-sync { **running-config** | **startup-config** | **both** }

Syntax Description

| | |
|----------------|---|
| running-config | Causes an immediate one-time update of the running configuration to the standby processor card. |
| startup-config | Causes an immediate one-time update of the startup configuration to the standby processor card. |
| both | Causes an immediate one-time update of the running configuration and the startup configuration to the standby processor card. |

Defaults

None

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command is not usually required because automatic synchronization is enabled by default and, upon exiting global configuration mode, the running configuration is updated on the standby processor card. (Exit global configuration mode by entering **Ctrl-Z** or **end**.) The startup configuration is updated when the **copy** command is issued.

If auto-synchronizing is disabled, the **redundancy manual-sync** command updates the standby processor database information to be identical with the active processor card.

If the system is unable to complete the update, an error message is displayed.

This command is only allowed on the active processor card.

Examples

The following example shows how to make the active processor card send an update for both the running configuration and the startup configuration to the standby processor card.

```
Switch# redundancy manual-sync both
```

Related Commands

| Command | Description |
|---------------------------------|--|
| auto-sync running-config | Selectively enables only automatic synchronizing of the running configuration to the standby processor card. |
| auto-sync startup-config | Selectively enables only automatic synchronizing of the startup configuration to the standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

redundancy reload peer

To reload the standby processor card, use the **redundancy reload peer** command.

redundancy reload peer

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to reload the standby (or peer) processor card.

The active processor card is allowed to reload a standby processor card that is fully running the Cisco IOS software by using an NMI (non-maskable interrupt).

This command will not succeed on the active processor card if the standby processor card has not fully loaded its system IOS image and reached the hot-standby state.

This command cannot be entered on the standby processor card.

Examples

The following example shows how to reload the standby processor card.

```
Switch# redundancy reload peer
Reload peer [confirm] y
Preparing to reload peer
```

Related Commands

| Command | Description |
|-----------------------------------|--|
| maintenance-mode | Enables or disables processor card redundancy synchronization. |
| redundancy reload shelf | Reloads both processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the standby processor card. |
| reload | Reloads the active processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

redundancy reload shelf

To reload both redundant processor cards, use the **redundancy reload shelf** command.

redundancy reload shelf

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines This command causes both processor cards to reload.

Examples The following example shows how to reload the entire shelf.

```
Switch# redundancy reload shelf
Reload the entire shelf [confirm] y
Preparing to reload shelf
```


Related Commands

| Command | Description |
|-----------------------------------|--|
| maintenance-mode | Enables or disables processor card redundancy synchronization. |
| redundancy reload peer | Reloads the standby processor card. |
| redundancy switch-activity | Manually switches activity from the active processor card to the standby processor card. |
| reload | Reloads the active processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

redundancy switch-activity

To manually switch activity from the active processor card to the standby processor card, use the **redundancy switch-activity** command.

redundancy switch-activity [force]

Syntax Description

| | |
|-------|---|
| force | Forces a switch of activity even when the standby processor card has not reached the hot-standby state, or if some other software condition is preventing a normal switchover from occurring. |
|-------|---|

Defaults

The active processor card switches over only if the standby processor card has reached hot-standby mode.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command must be issued on the active processor card. It takes effect if the processor card is in a state to allow switchover; that is, the standby processor card is in the “Standby Hot” state and platform software is not temporarily disallowing the switchover.

Examples

The following example shows how to switch activity to the standby processor card.

```
Switch# redundancy switch-activity  
Preparing to switch activity  
This will reload the active unit and force a switch of activity [confirm] y  
  
01:40:35: %SYS-5-RELOAD: Reload requested
```

Related Commands

| Command | Description |
|--------------------------------|--|
| maintenance-mode | Enables or disables processor card redundancy synchronization. |
| redundancy reload peer | Reloads the standby processor card. |
| redundancy reload shelf | Reloads both processor cards in the shelf. |
| reload | Reloads the active processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy capability

To display capabilities of the active and standby processor cards, use the **show redundancy capability** command.

show redundancy capability

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display hardware and functional versions of the various components. If the capabilities do not match, the system is running in a degraded redundancy mode.

Examples The following example shows how to display capabilities for the active and standby processor cards. (See Table 6-1 for field descriptions.)

```
Switch# show redundancy capability
CPU capability support
```

| Active CPU | Sby CPU | Sby Compat | CPU capability description |
|------------|---------|------------|------------------------------------|
| 96 MB | 96 MB | OK | CPU DRAM size |
| 32 MB | 32 MB | OK | CPU PMEM size |
| 512 KB | 512 KB | OK | CPU NVRAM size |
| 16 MB | 16 MB | OK | CPU Bootflash size |
| 3.5 | 3.5 | OK | CPU hardware major.minor version |
| 1.20 | 1.18 | OK | CPU functional major.minor version |

Linecard driver major.minor versions, (counts: Active=18, Standby=18)

| Active CPU | Sby CPU | Sby Compat | Drv ID | Driver description |
|------------|---------|------------|--------|------------------------------------|
| 1.1 | 1.1 | OK | 0x1000 | CPU w/o Switch Fabric |
| 1.1 | 1.1 | OK | 0x1001 | Fixed Transponder, w/monitor |
| 1.1 | 1.1 | OK | 0x1002 | Fixed Transponder, no monitor |
| 1.1 | 1.1 | OK | 0x1003 | Pluggable Transponder, w/monitor |
| 1.1 | 1.1 | OK | 0x1004 | Pluggable Transponder, no monitor |
| 1.1 | 1.1 | OK | 0x1005 | Line Card Motherboard |
| 1.1 | 1.1 | OK | 0x1006 | Backplane |
| 1.1 | 1.1 | OK | 0x1007 | 32-ch Mux/Demux |
| 1.1 | 1.1 | OK | 0x1008 | Fixed 4-ch Mux/Demux, no OSC |
| 1.1 | 1.1 | OK | 0x1009 | Fixed 8-ch Mux/Demux, no OSC |
| 1.1 | 1.1 | OK | 0x100A | Modular 4-ch Mux/Demux, no OSC |
| 1.1 | 1.1 | OK | 0x100B | Modular 8-ch Mux/Demux, no OSC |
| 1.1 | 1.1 | OK | 0x100C | 32-ch Array Wave Guide |
| 1.1 | 1.1 | OK | 0x100D | Mux/Demux Motherboard |
| 1.1 | 1.1 | OK | 0x100E | Modular 4-ch Mux/Demux plus OSC |
| 1.1 | 1.1 | OK | 0x100F | Modular 8-ch Mux/Demux plus OSC |
| 1.1 | 1.1 | OK | 0x1010 | Mux-Demux Motherboard, no OSC |
| 1.1 | 1.1 | OK | 0x1011 | Line Card Motherboard, no splitter |

Software sync client versions, listed as version range X-Y.

X indicates the oldest peer version it can communicate with.

Y indicates the current sync client version.

Sync client counts: Active=2, Standby=2

| Active CPU | Sby CPU | Sby Compat | Cl ID | Redundancy Client description |
|------------|---------|------------|-------|-------------------------------|
| ver 1-1 | ver 1-1 | OK | 17 | CPU Redundancy |
| ver 1-1 | ver 1-1 | OK | 6 | OIR Client |

Backplane IDPROM comparison

| Backplane IDPROM field | Match | Local CPU | Peer CPU |
|-------------------------|-------|-----------------------------|-----------------------------|
| idversion | YES | 1 | 1 |
| magic | YES | 153 | 153 |
| card_type | YES | 4102 | 4102 |
| order_part_num_str | YES | N/A | N/A |
| description_str | YES | Manhattan_Backplane_PHASE_0 | Manhattan_Backplane_PHASE_0 |
| board_part_num_str | YES | 73-5655-03 | 73-5655-03 |
| board_revision_str | YES | 02 | 02 |
| serial_number_str | YES | TBC05031572 | TBC05031572 |
| date_of_manufacture_str | YES | 02/16/2001 | 02/16/2001 |
| deviation_numbers_str | YES | 0 | 0 |
| manufacturing_use | YES | 0 | 0 |
| rma_number_str | YES | 0x00 | 0x00 |
| rma_failure_code_str | YES | 0x00 | 0x00 |
| oem_str | YES | Cisco_Systems | Cisco_Systems |
| clei_str | YES | | |
| snmp_oid_substr | NO | 0 | |

show redundancy capability

```

schematic_num_str      YES  92-4113-03      92-4113-03
hardware_major_version YES  3                3
hardware_minor_version YES  0                0
engineering_use_str    YES  1                1
crcl6                  OK   5913             24184
user_track_string      NO   lab
diagst                 YES  ^A               ^A
board_specific_revision YES  1                1
board_specific_magic_number YES  153              153
board_specific_length  YES  56               56
mac_address_block_size YES  16               16
mac_address_base_str   YES  0000164428fb0   0000164428fb0
cpu_number              OK   1                1
optical_backplane_type YES  255              255

```

Table 6-1 show redundancy capability Field Descriptions

| Field | Description |
|--------------------------------------|---|
| Active CPU | Shows the following information for the active processor card: <ul style="list-style-type: none"> processor DRAM size—the size of dynamic random access memory processor PMEM size—the amount of dynamic RAM reserved for packet I/O usage processor NVRAM size—the size of nonvolatile RAM processor Bootflash size—the size of bootflash memory processor hardware major.minor version—the processor card hardware version processor functional major.minor version—the processor card functional version |
| Sby CPU | Shows information for the standby processor card. See the “Active CPU” description above. |
| Sby Compat | Indicates whether the standby processor card is compatible with the active processor card. |
| CPU capability description | Shows the capability descriptions for the active and standby processor cards. See the “Active CPU” description above. |
| Linecard driver major.minor versions | Shows the number of line card drivers. |
| Drv ID | Shows the driver ID. |
| Driver description | Shows the driver description. |
| Software sync client versions | Shows the redundancy client version in the range X-Y, where: <ul style="list-style-type: none"> X indicates the oldest peer version it can communicate with. Y indicates the current sync client version. Also shows the sync client counts. |
| Cl ID | Shows the client ID. |
| Redundancy Client description | Shows the redundancy client descriptions. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the redundant peer processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy clients

To display a list of internal redundancy clients, use the **show redundancy clients** command.

show redundancy clients

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display information about the software subsystems that are clients of the platform-independent RF (Redundancy Facility) subsystem. Subsystems that need to synchronize information from the active processor card to the standby processor card (or vice versa) are registered as clients of the RF.

This client information can be used to debug redundancy software.

Examples The following example shows how to display a list of internal redundancy clients. (See Table 6-2 for field descriptions.)


```
Switch# show redundancy clients
clientID = 0      clientSeq = 0      RF_INTERNAL_MSG
clientID = 6      clientSeq = 16     OIR Client
clientID = 17     clientSeq = 40     CPU Redundancy
clientID = 19     clientSeq = 9999   RF_LAST_CLIENT
```

Table 6-2 *show redundancy clients Field Descriptions*

| Field | Description |
|-----------------|--|
| clientID | Shows the ID of the redundant client. |
| clientSeq | Shows the client notification sequence number. Client sequence numbers determine the order in which a client is notified of RF events, relative to other clients. There are cases where one client must be notified before another. This should be noted when the sequence number is defined. The lower sequence numbers are notified first. |
| RF_INTERNAL_MSG | Shows the RF first client, which is part of the RF subsystem and is necessary for its operation. |
| OIR Client | Shows the OIR (online insertion and removal) client, which updates the standby processor card when line cards are inserted and removed. |
| CPU Redundancy | Shows the processor card redundancy client, which sends running or startup configuration changes to the standby processor card. This client also reports hardware/software compatibility and version numbers between the processor cards. It also ensures that processor card arbitration changes and peer processor card communication losses are reported to the RF and to other subsystems. |
| RF_LAST_CLIENT | Shows the RF last client, which is part of the RF subsystem and is necessary for its operation. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the redundant peer processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy counters

To display internal redundancy software counters, use the **show redundancy counters** command.

show redundancy counters

Syntax Description This command has no other arguments or keywords

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display internal redundancy software counter information, which can be used to debug redundancy software.

Examples The following example shows how to display internal redundancy software counter information. (See Table 6-3 for field descriptions.)

```
Switch# show redundancy counters
Redundancy Facility OMs
      comm link up = 1
      comm link down down = 0
```

```

invalid client tx = 0
null tx by client = 0
tx failures = 0
tx msg length invalid = 0

client not rxing msgs = 0
rx peer msg routing errors = 0
null peer msg rx = 0
errored peer msg rx = 0

buffers tx = 656
tx buffers unavailable = 0
buffers rx = 1302
buffer release errors = 0

duplicate client registers = 0
failed to register client = 0
Invalid client syncs = 0

```

Table 6-3 *show redundancy counters Field Descriptions*

| Field | Description |
|----------------------------|---|
| comm link up | Shows how many communications links are up. |
| comm link down down | Shows how many communications links are down. |
| invalid client tx | Shows the number of invalid client transmissions. |
| null tx by client | Shows the number of null transmissions by the client. |
| tx failures | Shows the number of transmission failures. |
| tx msg length invalid | Shows the number of transmission messages with invalid lengths. |
| client not rxing msgs | Shows that the client is not receiving event messages. |
| rx peer msg routing errors | Shows errors occurring in the RF application. This usually indicates a software problem. |
| null peer msg rx | Shows that the interprocess communication (IPC) has sent an empty message to the RF application. This usually indicates a software problem. |
| errored peer msg rx | Shows an IPC error when an RF message was received. This usually indicates a software problem. |
| buffers tx | Shows the number of internal buffers acquired for sending RF messages. |
| tx buffers unavailable | Shows the number of times internal buffers for sending RF messages were not available due to the high volume of messages being sent. This usually indicates a software problem. |
| buffers rx | Shows the number of buffers released back to the internal buffer pool. |
| buffer release errors | Shows errors in releasing internal buffers. |
| duplicate client registers | Shows that an application has been registered with the RF more than once. This usually indicates a software problem. |
| failed to register client | Shows that the system was unable to register an RF client application due to low memory or due to a software problem. |
| Invalid client syncs | Shows an internal software problem in the RF. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the standby processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy history

To display internal redundancy software history, use the **show redundancy history** command.

show redundancy history

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| | |
|-------------------|--|
| EY-Release | Modification |
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display the internal redundancy software history log, which can be used to debug redundancy software.

Examples The following example shows how to display the internal redundancy software history log, which can be useful for debugging redundancy software. (See Table 6-4 for field descriptions.)

```
Switch# show redundancy history
Redundancy Facility Event Log:
00:00:00 client added: RF_INTERNAL_MSG(0) seq=0
00:00:00 client added: RF_LAST_CLIENT(19) seq=9999
```

show redundancy history

```

00:00:16 client added: CPU Redundancy(17) seq=40
00:00:16 *my state = INITIALIZATION(2) *peer state = DISABLED(1)
00:00:16 RF_PROG_INITIALIZATION(0) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(0) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(0) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = NEGOTIATION(3) peer state = DISABLED(1)
00:00:16 RF_STATUS_PEER_PRESENCE(12) op=0
00:00:16 RF_EVENT_GO_ACTIVE(28) op=0
00:00:16 *my state = ACTIVE-FAST(9) peer state = DISABLED(1)
00:00:16 RF_STATUS_SPLIT_ENABLE(15) CPU Redundancy(17) op=0
00:00:16 RF_PROG_ACTIVE_FAST(6) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(6) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(6) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE-DRAIN(10) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_DRAIN(7) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(7) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(7) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE_PRECONFIG(11) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE_POSTCONFIG(12) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE(13) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE(10) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE(10) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE(10) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 client added: OIR Client(6) seq=16
00:00:19 RF_STATUS_PEER_PRESENCE(12) op=0
00:00:36 Configuration parsing complete
00:00:36 System initialization complete

```

Table 6-4 show redundancy history Field Descriptions

| Field | Description |
|--------------------------------|--|
| client added | Shows the RF subsystem client added. |
| *my state = INITIALIZATION | Shows that the processor card has been initialized. |
| *peer state = DISABLED | Shows that the peer (or standby) processor card is disabled. |
| Configuration parsing complete | Shows that the configuration has been read either from NVRAM or, on a switchover, from the stored running-config file. |
| System initialization complete | Shows that the system initialization is complete. |

Related Commands

| Command | Description |
|--------------------------------|--|
| clear redundancy | Clears the redundancy history buffer in processor memory. |
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the standby processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |

| Command | Description |
|-----------------------------------|--|
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy running-config-file

To display the running configuration on the standby processor card, use the **show redundancy running-config-file** command.

show redundancy running-config-file

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| | |
|-------------------|--|
| EY-Release | Modification |
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines This command is only available on the standby processor card. It shows the stored running-config file that has been synchronized from the active processor card, which will be applied as the system configuration during the next standby to active transition.

If auto-synchronization is disabled for the running-config-file on the active processor card, or if the IPC (interprocessor communications) is down, this command displays the message `running-config-file is not currently valid` and does not show the running-config-file.

**Note**

While the standby processor card remains in the hot-standby state, the running configuration, as shown by the **show running-config** command, is not expected to match the synchronized running-config file. Instead, it contains mostly default configuration values.

Examples

The following example displays the running-config file on the standby processor card.

```
sby-Switch# show redundancy running-config-file
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch
!
boot system flash bootflash:ons15540-i-mz
boot bootldr slot0:ons15540-i-mz

<Information deleted>
```

Table 6-5 *show redundancy running-config-file Field Descriptions*

| Field | Description |
|--------------------------------|---|
| version | Shows the software version. |
| no service pad | Shows service pad configuration. In the output example, “no” indicates that incoming and outgoing packet assembler/disassembler (PAD) connections are not accepted. |
| service timestamps | Shows that logging appears with timestamps. |
| no service password-encryption | Shows that password encryption has been disabled. |
| hostname | Shows the system name. |
| boot system flash | Shows the boot system flash version. |
| boot bootldr | Shows the bootldr version. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the redundant peer processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy states

To display internal redundancy software state information, use the **show redundancy states** command.

show redundancy states

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display internal redundancy software state information, which may be used to debug redundancy software.

Examples The following example shows how to display internal redundancy software state information. (See Table 6-6 for field descriptions.)

```
Switch> show redundancy states
    my state = 13 -ACTIVE
    peer state = 8  -STANDBY HOT
    Mode = Duplex
```

```

Unit ID = 6

Split Mode = Disabled
Manual Swact = Enabled
Communications = Up

client count = 5
client_notification_TMR = 30000 milliseconds
  keep_alive TMR = 5000 milliseconds
  keep_alive count = 1
  keep_alive threshold = 10
  RF debug mask = 0x0

```

Table 6-6 *show redundancy states Field Descriptions*

| Field | Description |
|-------------------------|--|
| my state | Shows the state of the active processor card. |
| peer state | Shows the state of the peer (or standby) processor card. |
| Mode | Shows either simplex (single processor card) or duplex (two processor cards) mode. |
| Unit | Shows either primary (or active) processor card or peer (or standby) processor card. |
| Unit ID | Shows the unit ID of the processor card. |
| Split Mode | Indicates whether split mode is enabled or disabled. |
| Manual Swact | Indicates whether manual switchovers have been enabled without the force option. |
| Communications | Indicates whether communications are up or down between the two processor cards. |
| client count | Shows the number of redundancy subsystems that are registered as RF clients. |
| client_notification_TMR | Shows, in milliseconds, the time that an internal RF timer has for notifying RF client subsystems. |
| keep_alive TMR | Shows, in milliseconds, the time interval the RF manager has for sending keep-alive messages to its peer on the standby processor card. |
| keep_alive count | Shows the number of keep-alive messages sent without receiving a response from the standby processor card. |
| keep_alive threshold | Shows the threshold for declaring that interprocessor communications are down when keep-alive messages have been enabled (which is the default). |
| RF debug mask | Shows an internal mask used by the RF to keep track of which debug modes are on. |

Related Commands

| Command | Description |
|--------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the redundant standby processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |

| Command | Description |
|-----------------------------------|--|
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy summary | Displays processor card redundancy status and configuration information. |

show redundancy summary

To display a summary of active and standby processor card redundancy information, use the **show redundancy summary** command.

show redundancy summary

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| | |
|-------------------|---|
| EY-Release | Modification |
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release and added the required keyword summary . |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display a summary of redundancy-related information, including active and standby slots, uptimes, images, and current alarms. This information is useful for troubleshooting processor card redundancy problems.

Examples The following example shows how to display a summary of redundancy-related information for the system. (See Table 6-7 for field descriptions.)

```
Switch# show redundancy summary
```

```
Redundant system information
```

```
-----
Available Uptime:          12 minutes
Time since last switchover: 6 minutes
Switchover Count:         2
```

```
Inter-CPU Communication State:UP
Last Restart Reason:       Switch over
Reported Switchover Reason: User initiated
Software state at switchover: STANDBY HOT
```

```
Last Running Config sync:  2 minutes
Running Config sync status: In Sync
Last Startup Config sync:  2 minutes
Startup Config sync status: In Sync
```

```
This CPU is the Active CPU.
```

```
-----
Slot:                      6
Time since CPU Initialized: 8 minutes
Image Version:             ONS-15540 Software (ONS15540-I-M), Experimental Version
12.1(20010824:021324) [ffrazer-lh2 106]
Image File:                tftp://171.69.1.129/ffrazer/ons15540-i-mz
Software Redundancy State: ACTIVE
Hardware State:            ACTIVE
Hardware Severity:         0
```

```
Peer CPU is the Standby CPU.
```

```
-----
Slot:                      7
Time since CPU Initialized: 2 minutes
Image Version:             ONS-15540 Software (ONS15540-I-M), Experimental Version
12.1(20010824:021324) [ffrazer-lh2 106]
Image File (on sby-CPU):  tftp://171.69.1.129/ffrazer/ons15540-i-mz
Software Redundancy State: STANDBY HOT
Hardware State:            STANDBY
Hardware Severity:         0
```

Table 6-7 *show redundancy summary* Field Descriptions

| Field | Description |
|-------------------------------|---|
| Available Uptime | Shows the elapsed time since the system began providing uninterrupted operation, including the time when either processor card is active. |
| Time since last switchover | Shows the amount of time since the last switchover. |
| Switchover Count | Shows the number of times switchover has occurred during the Available Uptime. |
| Inter-CPU Communication State | Shows the status of IPC (interprocess communications). |
| Last Restart Reason | Shows the reason for the last restart. Valid reasons include normal boot and switchover. |

Table 6-7 *show redundancy summary Field Descriptions (continued)*

| Field | Description |
|------------------------------|---|
| Last Switchover Reason | Shows the reason for the last switchover when the Last Restart Reason field shows “Switch over.” Valid reasons are: <ul style="list-style-type: none"> • Not known • User initiated • User forced • User forced (reload) • Active unit failed • Active unit removed |
| Software state at switchover | Shows the software redundancy state of the processor at the time of the last switchover. |
| Last Running Config sync | Shows the amount of time since the processor card was synchronized with the last running configuration. |
| Running Config sync status | Indicates whether the processor card is in sync with the running configuration. |
| Last Startup Config sync | Shows the amount of time since the processor card was synchronized with the last startup configuration. |
| Startup Config sync status | Indicates whether the processor card is in sync with the startup configuration. |
| Slot | Shows the slot number on the active or standby system. |
| Time since CPU Initialized | Shows the amount of time since the active or standby processor card was last initialized. |
| Image | Shows the active or standby processor card system image and version. |
| Software Redundancy State | Indicates whether software redundancy is enable for the active and standby processor card. |
| Hardware State | Shows the hardware state of the active or standby processor card. |
| Hardware Severity | Shows the severity of hardware faults. Valid values are: <ul style="list-style-type: none"> • 0 = good processor card hardware (no hardware faults) • 1 = processor card hardware fault that does not affect traffic • 2 = fault that partially affects traffic • 3 = fault that may affect all user data traffic |

Related Commands

| Command | Description |
|-----------------------------------|--|
| redundancy | Switches to redundancy configuration mode. |
| redundancy manual-sync | Causes an immediate one-time update of the specified database. |
| redundancy reload peer | Reloads the redundant peer processor card. |
| redundancy reload shelf | Reloads both redundant processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the current standby processor card. |
| show redundancy capability | Displays processor card redundancy capability information. |

standby privilege-mode enable

To enable access to privileged EXEC mode from the standby CPU switch module CLI, use the **standby privilege-mode enable** command. To revert to the default state, use the **no** form of the command.

standby privilege-mode enable

no standby privilege-mode enable

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Redundancy configuration

Command History

| Release | Modification |
|-------------|------------------------------|
| 12.1(10)EV2 | This command was introduced. |

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EV-Release | Modification |
|-------------|--|
| 12.1(10)EV2 | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command must be entered on the active CPU switch module CLI before you can access privileged EXEC mode on the standby CPU switch module CLI.

Examples

The following example shows how to enable access to privileged EXEC mode on the standby CPU switch processor module.

```
Switch(config-red)# standby privilege-mode enable
```


| Related Commands | Command | Description |
|------------------|----------------------------|---|
| | show redundancy summary | Displays CPU switch module redundancy status and configuration information. |

■ standby privilege-mode enable



SNMP Commands

This chapter contains the Cisco ONS 15540 ESP-specific SNMP commands. For the complete list of SNMP commands supported on the Cisco ONS 15540 ESP, and their descriptions, refer to *Cisco IOS Configuration Fundamentals Command Reference* publication.

snmp-server enable traps aps

To enable SNMP trap notifications for APS activity, use the **snmp-server enable traps aps** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps aps

no snmp-server enable traps aps

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable the SNMP trap notifications defined in the APS MIB (CISCO-APS-MIB). The **snmp-server enable traps aps** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for APS activity, the **snmp-server enable traps aps** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for APS activity.

```
Switch# configure terminal  
Switch(config)# snmp-server enable traps aps
```

Related Commands

| Command | Description |
|----------------------------|--|
| associate group | Specifies interfaces to be associated and enters APS configuration mode. |
| show aps | Displays APS configuration information and status. |
| show running-config | Displays the configuration information currently running on the system. |
| traceroute | Specifies the recipient for SNMP notification messages. |

snmp-server enable traps optical monitor min-severity

To enable SNMP trap notifications defined in optical monitor MIB with the minimum severity threshold, use the **snmp-server enable traps optical monitor min-severity** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps optical monitor min-severity { critical | major | minor | not-alarmed }

no snmp-server enable traps optical monitor min-severity { critical | major | minor | not-alarmed }

Syntax Description

| | |
|--------------------|---|
| critical | Enables trap notifications for critical optical monitor alarms. |
| major | Enables trap notifications for major optical monitor alarms. |
| minor | Enables trap notifications for minor optical monitor alarms. |
| not-alarmed | Enables trap notifications for optical monitor events. |

Defaults

Disabled

Command Modes

Global configuration

Command History

| Release | Modification |
|-------------|------------------------------|
| 12.1(10)EV2 | This command was introduced. |

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EV-Release | Modification |
|-------------|--|
| 12.1(10)EV2 | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to enable the SNMP trap notifications defined in the optical monitor MIB (CISCO-OPTICAL-MONITOR-MIB).

The **snmp-server enable traps optical monitor min-severity** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps optical monitor min-severity** command and the **snmp-server host** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for major and critical optical monitor trap activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps optical monitor min-severity major
```

Related Commands

| Command | Description |
|----------------------------|---|
| patch | Configures patch connections. |
| show patch | Displays patch connection information. |
| show running-config | Displays the configuration information currently running on the system. |
| snmp-server host | Specifies the recipient for SNMP notification messages. |

snmp-server enable traps patch

To enable SNMP trap notifications for patch connection activity, use the **snmp-server enable traps patch** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps patch

no snmp-server enable traps patch

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable the SNMP trap notifications defined in the OSCP MIB (CISCO-OPTICAL-PATCH-MIB). SNMP trap notifications are sent when a patch connection is created, modified, or deleted.

The **snmp-server enable traps patch** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps patch** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for patch connection activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps patch
```

Related Commands

| Command | Description |
|----------------------------|---|
| patch | Configures patch connections. |
| show patch | Displays patch connection information. |
| show running-config | Displays the configuration information currently running on the system. |
| traceroute | Specifies the recipient for SNMP notification messages |

snmp-server enable traps oscp

To enable SNMP trap notifications for OSCP activity, use the **snmp-server enable traps oscp** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps oscp

no snmp-server enable traps oscp

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable the SNMP trap notifications defined in the OSCP MIB (CISCO-OSCP-MIB).

The **snmp-server enable traps oscp** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for OSCP activity, the **snmp-server enable traps oscp** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for OSCP activity.

```
Switch# configure terminal  
Switch(config)# snmp-server enable traps oscp
```

Related Commands

| Command | Description |
|----------------------------|---|
| show oscp info | Displays OSCP configuration information. |
| show oscp neighbor | Displays OSCP neighbor information. |
| show running-config | Displays the configuration information currently running on the system. |
| traceroute | Specifies the recipient for SNMP notification messages |

snmp-server enable traps rf

To enable SNMP trap notification for processor card redundancy activity, use the **snmp-server enable traps rf** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps rf

no snmp-server enable traps rf

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable the SNMP trap notifications defined in the Redundancy Facility MIB (CISCO-RF-MIB).

The **snmp-server enable traps patch** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps patch** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for processor card redundancy activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps rf
```

Related Commands

| Command | Description |
|--------------------------------|---|
| redundancy | Enters redundancy configuration mode. |
| show redundancy summary | Displays redundancy configuration information and status. |
| show running-config | Displays the configuration information currently running on the system. |
| traceroute | Specifies the recipient for SNMP notification messages. |

snmp-server enable traps threshold min-severity

To enable SNMP trap notifications for alarm thresholds, use the **snmp-server enable traps threshold min-severity** command. To disable this feature, use the **no** form of this command.

```
snmp-server enable traps threshold min-severity {degrade | failure}
```

```
no snmp-server enable traps threshold min-severity
```

| Syntax Description | degrade | Specifies signal degrade as the minimum severity for SNMP trap notifications. |
|--------------------|---------|---|
| | failure | Specifies signal failure as the minimum severity for SNMP trap notifications. |

| Defaults | Disabled |
|----------|----------|
|----------|----------|

| Command Modes | Global configuration |
|---------------|----------------------|
|---------------|----------------------|

| Command History | This table includes the following release-specific history entries: |
|-----------------|---|
|-----------------|---|

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| Usage Guidelines | Use this command to enable the SNMP trap notifications defined in the alarm threshold MIB (CISCO-IF-THRESHOLD-MIB). |
|------------------|---|
|------------------|---|

The **snmp-server enable traps threshold min-severity** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for alarm threshold activity, the **snmp-server enable traps threshold min-severity** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for alarm threshold activity and set the minimum severity to failure.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps threshold min-severity failure
```

Related Commands

| Command | Description |
|----------------------------|--|
| show running-config | Displays the configuration information currently running on the system. |
| show threshold-list | Displays the contents of a threshold list. |
| traceroute | Specifies the recipient for SNMP notification messages |
| threshold-list | Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode. |

snmp-server enable traps topology

To enable SNMP trap notifications for the network topology activity, use the **snmp-server enable traps topology** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps topology [**throttle-interval** *seconds*]

no snmp-server enable traps topology [**throttle-interval** *seconds*]

| | |
|---------------------------|--|
| Syntax Description | throttle-interval <i>seconds</i> Specifies the number of seconds for the throttle timer interval. Valid values are 5 through 3600 seconds. If this keyword is omitted, the command to 60 seconds at bootup time, or to the previous value configured. |
|---------------------------|--|

| | |
|-----------------|----------|
| Defaults | Disabled |
|-----------------|----------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to enable the SNMP trap notifications defined in the physical topology MIB (PTOPO-MIB).

The network topology trap throttle timer prevents the system from flooding the network with messages. We recommend a 60-second interval value.

The **snmp-server enable traps topology** command is used in conjunction with the **traceroute** command. For a host to receive SNMP trap notifications for physical topology activity, the **snmp-server enable traps topology** command and the **traceroute** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for network topology activity and set the throttle timer interval to 30 seconds.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps topology throttle-interval 30
```

The following example shows how to enable SNMP trap notifications for network topology activity and set the throttle timer interval to the default value.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps topology
```

Related Commands

| Command | Description |
|------------------------------|---|
| show running-config | Displays the configuration information currently running on the system. |
| traceroute | Specifies the recipient for SNMP notification messages. |
| show topology | Displays global physical topology configuration. |
| topology neighbor cdp | Enables CDP on the interface. |

snmp-server host

To specify the recipient for SNMP notification messages, use the **snmp-server host** command. To remove the specified host, use the **no** form of the command.

```
snmp-server host host-addr [traps | informs] [version [1 | 2c | 3 {auth | noauth}] ]
    community-string [udp-port port] [notification-type]
```

```
no snmp-server host host-addr {traps | informs}
```

Syntax Description

| | |
|-------------------------|--|
| <i>host-addr</i> | Specifies the name or IP address of the targeted recipient host. |
| traps | Sends SNMP trap notifications to this host. This is the default. (Optional) |
| informs | Sends SNMP inform notifications to this host. (Optional) |
| version | <p>Specifies the version of the SNMP used to send the traps. (Optional)</p> <p>Version 3 is the most secure model, as it allows packet encryption with the priv keyword. If you use the version keyword, one of the following must be specified:</p> <ul style="list-style-type: none"> • 1—SNMPv1. This option is not available with informs. • 2c—SNMPv2C. • 3—SNMPv3. The following three optional keywords can follow the version 3 keyword: <ul style="list-style-type: none"> – auth—Enables MD5 (Message Digest 5) and SHA (Secure Hash Algorithm) packet authentication – noauth—Gives the noAuthNoPriv security level. This is the default if no keyword is specified. |
| <i>community-string</i> | Specifies the password-like community string sent with the notification operation. Though you can set this string using the snmp-server host command by itself, we recommend you define this string using the snmp-server community command prior to using the snmp-server host command. |

| | |
|-----------------------------|---|
| udp-port <i>port</i> | Specifies the UDP port of the host to use. The range is 0 to 65535. The default is 162. (Optional) |
| <i>notification-type</i> | <p>Specifies the type of notification to be sent to the host. (Optional)</p> <p>If no type is specified, all notifications are sent. The notification type can be one or more of the following keywords:</p> <ul style="list-style-type: none"> • alarms—Sends alarm state change notifications (CISCO-ENTITY-ALARM-MIB). • aps—Sends APS MIB (CISCO-APS-MIB) modification notifications. • bgp—Sends BGP (Border Gateway Protocol) state change notifications. • config—Sends configuration notifications. • entity—Sends entity MIB (ENTITY-MIB) modification notifications. • fru-ctrl—Sends entity FRU (field replaceable unit) control MIB (CISCO-ENTITY-FRU-CONTROL-MIB) modification notifications. • optical—Sends optical power modification (CISCO-OPTICAL-MONITOR-MIB) notifications. • oscp—Sends OSCP MIB (CISCO-OSCP-MIB) modification notifications. • patch—Sends optical patch MIB (CISCO-OPTICAL-PATCH-MIB) modification notifications. • rf—Sends redundancy facility MIB (CISCO-RF-MIB) modification notifications. • snmp—Sends SNMP notifications (as defined in RFC 1157). • syslog—Sends error message notifications (CISCO-SYSLOG-MIB). Specify the level of messages to be sent with the logging history level command. • threshold—Sends interface alarm threshold MIB (CISCO-IF-THRESHOLD-MIB) modification notifications. • topology—Sends physical topology MIB (PTOPO-MIB) modification notifications. • tty—Sends Cisco enterprise-specific notifications when a TCP connection closes. |

Defaults

This command is disabled by default. No notifications are sent.

If you enter this command with no keywords, the default is to send all trap types to the host. No informs are sent to this host.

If no **version** keyword is present, the default is version 1.

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

SNMP notifications can be sent as traps or inform requests. Traps are unreliable because the receiver does not send acknowledgments when it receives traps. The sender cannot determine if the traps were received. However, an SNMP entity that receives an inform request acknowledges the message with an SNMP response PDU. If the sender never receives the response, the inform request can be sent again. Thus, informs are more likely to reach their intended destination.

However, informs consume more resources in the agent and in the network. Unlike a trap, which is discarded as soon as it is sent, an inform request is held in memory until a response is received or the request times out. Also, traps are sent only once, while an inform might be retried several times. The retries increase traffic and contribute to a higher overhead on the network.

If you do not enter an **snmp-server host** command, no notifications are sent. To configure the system to send SNMP notifications, you must enter at least one **snmp-server host** command. If you enter the command with no keywords, all trap types are enabled for the host.

To enable multiple hosts, you must 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 kind 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** command to enable informs for a host and then enter another **snmp-server host** command to enable informs for the same host, the second command will replace the first.

The **snmp-server host** command is used in conjunction 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.

Some notification types cannot be controlled with the **snmp-server enable** command. Certain notification types are always enabled. Other notification types are enabled by a different command. For example, the linkUpDown notifications are controlled by the **snmp trap link-status** command. These notification types do not require an **snmp-server enable** command.

Examples

The following example shows how to enable SNMP trap notifications for APS activity.

```
Switch# configure terminal
Switch(config)# snmp-server host node1 traps
```

Related Commands

| Command | Description |
|--|---|
| show running-config | Displays the configuration information currently running on the system. |
| show snmp | Displays the status of SNMP communications. |
| snmp-server enable traps aps | Enables SNMP trap notification for APS activity. |
| snmp-server enable traps patch | Enables SNMP trap notification for patch activity. |
| snmp-server enable traps oscp | Enables SNMP trap notifications for OSCP activity. |
| snmp-server enable traps oscp | Enables SNMP trap notifications for OSCP activity. |
| snmp-server enable traps patch | Enables SNMP trap notifications for patch connection activity. |
| snmp-server enable traps rf | Enables SNMP trap notifications for redundancy facility activity. |
| snmp-server enable traps threshold min-severity | Enables SNMP trap notifications for alarm threshold activity. |
| snmp-server enable traps topology | Enables SNMP trap notifications for physical topology activity. |



System Management Commands

Use the following commands to manage your Cisco ONS 15540 ESP.

clear facility-alarm

To clear the external indications for the facility alarms, use the **clear facility-alarm** command.

clear facility-alarm [**critical** | **major** | **minor**]

Syntax Description

| | |
|-----------------|--|
| critical | Specifies that all external critical alarm indications be cleared. |
| major | Specifies that all external major alarm indications be cleared. |
| minor | Specifies that all external minor alarm indications be cleared. |

Defaults

Clears all external alarm indications and LEDs.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to perform a one-time clear of the specified LEDS and external audible and visual alarm relays.

The facility alarm conditions and alarm threshold error conditions are still posted in the processor memory and can be seen by using the **show facility-alarm status** command. You can clear the alarm threshold error conditions in memory by disabling protocol monitoring using the **no monitor enable** command. Online removal of a component or disabling an interface with the **shutdown** command also clears an alarm from processor memory.

Examples

The following examples shows how to clear critical external facility alarm indications.

```
Switch# clear facility-alarm critical
```

Related Commands

| Command | Description |
|-----------------------------------|--|
| monitor enable | Enables signal monitoring for certain protocol encapsulations. |
| show facility-alarm status | Shows the facility alarm status information. |
| shutdown | Disables an interface. |

environment-monitor shutdown fan

To enable the fan failure shutdown feature, use the **environment-monitor shutdown fan** command. To disable fan failure shutdown, use the **no** form of the command.

environment-monitor shutdown fan

no environment-monitor shutdown fan

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

Command History This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EV-Release | Modification |
|--------------|--|
| 12.1(12c)EV3 | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines If a single fan fails on the Cisco ONS 15540 ESP, a minor alarm is reported to the processor card. However, the chassis will never reach critical high temperature when only one fan fails.

If two or more fans fail, a major alarm is reported to the processor card.

If all eight fans in the fan tray fail, the chassis will reach critical temperature after 14 minutes.

To prevent damage to the cards and modules in the shelf when two or more fans fail, use the **environment-monitor shutdown fan** command to configure the system to automatically reset or power off the transponder modules. The transponder modules power off if the hardware version of the line card motherboard is 5.1 or later; otherwise, the transponder modules reset. Use the **show hardware** command to determine the hardware version of the 2.5-Gbps line card motherboards.

To recover from fan failure shutdown, you must power-cycle the shelf.

**Caution**

Do not save the startup configuration file after the line modules shutdown. This action would result in losing the previous startup configuration.

**Caution**

The fan failure shutdown feature disrupts traffic on the shelf when two or more fans fail.

Examples

The following example shows how to enable fan failure shutdown.

```
Switch# configure terminal
Switch(config)# environment-monitor shutdown fan
```

Related Commands

| Command | Description |
|-------------------------------|---|
| <code>show environment</code> | Displays the temperature sensor and fan status. |
| <code>show hardware</code> | Displays information about the hardware on the shelf. |

environment-monitor shutdown temperature

To enable the automatic shutdown of the system if the operating temperature exceeds the critical threshold, use the **environment-monitor shutdown temperature** command. To disable this feature, use the **no** form of the command.

environment-monitor shutdown temperature *slot /subslot/module*

no environment-monitor shutdown temperature

Syntax Description

| | |
|----------------|--|
| <i>slot</i> | Specifies a chassis slot. |
| <i>subslot</i> | Specifies a chassis sub slot. |
| <i>module</i> | Specifies a temperature sensor module. |

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entry:

| SV-Release | Modification |
|------------|------------------------------|
| 12.2(29)SV | This command was introduced. |

Usage Guidelines

The Cisco ONS 15540 ESP system automatically shuts down the 2.5-Gbps transponder cards if the operating temperature exceeds the critical threshold. Though possible, Cisco does not recommend that you disable this feature.

To recover from a shutdown, you must power-cycle the shelf.



Caution

Do not save the startup configuration file after the line cards shut down. This action would result in losing the previous startup configuration.



Caution

The shutdown feature disrupts traffic on the shelf when the operating temperature exceeds the critical temperature.

Examples

The following example shows how to enable the automatic shutdown of the system if the operating temperature exceeds the critical threshold:

```
Switch# configure terminal
Switch(config)# environment-monitor shutdown temperature 6/0/0
```

Related Commands

| Command | Description |
|--|---|
| show environment | Displays the temperature sensor and fan status. |
| environment-monitor temperature-threshold | Changes the default threshold temperatures. |

environment-monitor temperature-threshold

To change the default threshold temperatures, use the **environment-monitor temperature-threshold** command. To reset all the thresholds to the default values for all temperature sensor modules, use the **no** form of the command.

environment-monitor temperature-threshold {critical | major | minor | low} slot/subslot/module
<threshold value>

no environment-monitor temperature-threshold

Syntax Description

| | |
|------------------------|--|
| critical | Specifies the critical alarm. |
| major | Specifies the major alarm. |
| minor | Specifies the minor alarm. |
| low | Specifies the low alarm. |
| <i>slot</i> | Specifies a chassis slot. |
| <i>subslot</i> | Specifies a chassis sub slot. |
| <i>module</i> | Specifies a temperature sensor module. |
| <i>threshold value</i> | Specifies the new threshold temperature. |

Defaults

The following table provides the default threshold temperatures for the alarms:

| Alarm | Threshold Temperature in degree Celsius (° C) |
|----------|---|
| Minor | 50 |
| Major | 60 |
| Critical | 70 |
| Low | -15 |

Command Modes

Global configuration

Command History

This table includes the following release-specific history entry:

| SV-Release | Modification |
|------------|------------------------------|
| 12.2(29)SV | This command was introduced. |

Usage Guidelines

If you do not specify the threshold temperature for an alarm (critical, major, minor, or low), the threshold will be reset to the default value. If you do not specify the module as well, the threshold temperature will be reset for all the temperature sensor modules.

Examples

The following example shows how to configure the critical threshold temperature:

```
Switch# configure terminal  
Switch(config)# environment-monitor temperature-threshold critical 6/0/0 65
```

Related Commands

| Command | Description |
|---|--|
| show environment | Displays the temperature sensor and fan status. |
| environment-monitor shutdown temperature | Enables the automatic shutdown of the system if the operating temperature exceeds the critical threshold |

hw-module subslot power

To turn off the power to a 2.5-Gbps transponder module in a line card motherboard before removing it, use the **hw-module subslot power** command.

hw-module subslot *slot/subcard* power off

| Syntax Description | <i>slot/subcard</i> | Specifies a transponder module in a line card motherboard. |
|--------------------|---------------------|--|
| | off | Turns off the power to the transponder module. |

Defaults The power to the 2.5-Gbps transponder module is on.

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|--------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| 12.1(12c)EV2 | Removed the on keyword. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines When removing a 2.5-Gbps transponder module from the Cisco ONS 15540 ESP, bit rate errors occur on the transponder modules in the same line card motherboard. These errors do not affect system traffic but they can cause the system to issue alarms if an alarm threshold is exceeded. You can avoid these errors and alarms by turning off the power to the online module with the **hw-module subslot power** command before removing it.

Use the **show hardware linecard** command to display the status of the power to a 2.5-Gbps transponder module.

**Note**

The **hw-module subslot power** command is only supported on 2.5-Gbps transponder modules installed in line card motherboards with hardware version 5.1, or later, and with LRC (line card redundancy controller) functional image version 2.72, or later.

To determine the functional image and hardware versions on your system, use the **show hardware detail** command.

To power up the transponder module, you must remove it from the line card motherboard and reinsert it.

Examples

The following examples shows how to turn the power off to a 2.5-Gbps transponder module before removing it.

```
Switch# hw-module subslot 8/1 power off
Warning: Power OFF subcard 8/1. Continue? [confirm]y
Switch#
```

The following examples shows how to turn the power on to a 2.5-Gbps transponder module after reinserting it.

```
Switch# hw-module subslot 8/1 power on
Warning: Power ON subcard 8/1. Continue? [confirm]y
Switch#
```

Related Commands

| Command | Description |
|----------------------|-----------------------------|
| show hardware | Shows hardware information. |

reload

To reload the active processor card, use the **reload** command.

reload [*text* | **in** [*hh:mm*] [*text*] | **at** *hh:mm* [*month day* | *day month*] [*text*] | **cancel**]

Syntax Description

| | |
|----------------------------|--|
| text | Specifies a reason for reloading the active processor card (maximum of 255 characters). |
| in [<i>hh:mm</i>] | Schedules a reload of the software to occur in the specified hours and minutes. The reload must occur within approximately 24 days. |
| at <i>hh:mm</i> | <p>Note The at keyword can only be used if the system clock has been set (either through NTP, the hardware calendar, or manually). The time is relative to the configured time zone on the system.</p> <p>Schedules a reload of the software to occur at the specified time (using a 24-hour clock).</p> <p>If you specify the month and day, the reload is scheduled to occur at that specified time and date. If you do not specify the month and day, the reload occurs at the specified time on the current day (if the specified time is later than the current time), or on the next day (if the specified time is earlier than the current time).</p> <p>Specifying 00:00 schedules the reload for midnight.</p> <p>The reload must occur within approximately 24 days.</p> |
| month | Specifies the name of the month the reload is to occur, any number of characters in a unique string. |
| day | Specifies the number of the day the reload is to occur, in the range 1 to 31. |
| cancel | Cancels a scheduled reload. |

Defaults

Immediate active processor card reload

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|------------------------------|
| 12.1(7a)EY2 | This command was introduced. |

| E-Release | Modification |
|-------------------|--|
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command halts the active processor card. If the processor card is set to restart on error, it reboots itself.

Use this command after configuration information is entered into a file and saved to the startup configuration. You cannot reload from a virtual terminal if the processor card is not set up for automatic booting. This prevents the processor card from dropping to the ROM monitor and thereby taking the processor card out of the remote user's control.

If you modify your configuration file, the system prompts you to save the configuration. During a save operation, the system asks you if you want to proceed with the save if the CONFIG_FILE environment variable points to a startup configuration file that no longer exists. If you enter **yes** in this situation, the processor card goes to setup mode upon reload.

When you schedule a reload to occur at a later time, it must occur within approximately 24 days.

This command can be entered on either the active or standby processor card console and only a reload of the processor card on which the command was entered occurs.

When entered on the active processor card, this command synchronizes the running-config to the standby processor card just before the reload is executed, and causes a switchover to the standby processor card only if the standby processor card is in the hot-standby state.

By default the system is configured to reboot automatically, so the active processor card reboots as the standby processor card after the reload.

To display information about a scheduled reload, use the **show reload** command.

Examples

The following example shows how to reload the software on the processor card.

```
Switch# reload
```

The following example reloads the software on the processor card in 10 minutes.

```
Switch# reload in 10
Reload scheduled for 11:57:08 PDT Mon Feb 26 2001 (in 10 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example reloads the software on the processor card at 1:00 p.m. today.

```
Switch# reload at 13:00
Reload scheduled for 13:00:00 PPDT Mon Feb 26 2001 (in 1 hour and 2 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example reloads the software on the processor card on 2/27 at 2:00 a.m.

```
Switch# reload at 02:00 feb 27
Reload scheduled for 02:00:00 PDT Tues Feb 26 2001 (in 38 hours and 9 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example cancels a pending reload.

```
Switch# reload cancel
%Reload cancelled.
```

Related Commands

| Command | Description |
|-----------------------------------|--|
| config-register | Changes the configuration register settings. |
| maintenance-mode | Enables or disables processor card redundancy synchronization. |
| redundancy reload peer | Reloads the standby processor card. |
| redundancy reload shelf | Reloads both processor cards in the shelf. |
| redundancy switch-activity | Manually switches activity from the active processor card to the standby processor card. |
| show reload | Displays reload status information. |

reprogram

To upgrade the ROMMON or functional image on a selected card from a flash file, use the **reprogram** privileged EXEC command.

```
reprogram flash-file-name {slot | rommon} [subcard]
```

| Syntax Description | |
|------------------------|---|
| <i>flash-file-name</i> | Specifies the name of the image to download, which can be in the CompactFlash Card or bootflash. |
| <i>slot</i> | Specifies the physical slot number of the controller you want to reprogram. The slot number ranges from 0 to 11. |
| rommon | Specify reprogramming the ROMMON (ROM monitor) image of the designated CPU switch card. |
| <i>subcard</i> | Indicate a subcard in a slot for half-width modules or daughter cards in full width cards. The subcard number ranges from 0 to 1. |

Defaults None.

Command Modes EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command the image to the controller you select. It also resets the selected controller, which causes active connections and configurations to be lost.

**Caution**

Do not power cycle the system during a reprogram operation because damage can occur to the controller you are reprogramming. If you power-cycle the system while reprogramming is in progress, you also might be unable to boot the system.

Examples

The following example shows how to reprogram the image on the processor card in slot 3.

```
Switch# reprogram bootflash:fi-ons15540-muxdemux.A.2-36.exo 3
```

Related Commands

| Command | Description |
|---|--|
| <code>show hardware</code> | Displays information about the programmable device images for a given module in the system. |
| <code>show upgrade-info</code> <code>functional-image</code> | Displays information from a version diagnostics data file about the versions of the ROMMON and functional images on the shelf. |

show bootvar

To display boot and related environmental variables for both the active and standby processor cards, use the **show bootvar** command.

show bootvar

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

This command shows boot and related information for the active and standby processor cards.

Examples

The following example shows how to display boot information for the system. (See Table 8-1 for field descriptions.)

```
Switch# show bootvar
BOOT variable = bootflash:<imagename>;
CONFIG_FILE variable =
BOOTLDR variable =
```

```

Configuration register is 0x2

Standby auto-sync startup config mode is on

Standby auto-sync running config mode is on

Standby is up.
Standby BOOT variable = bootflash:<imagename>;
Standby CONFIG_FILE variable =
Standby BOOTLDR variable =
Standby Configuration register is 0x2

```

Table 8-1 *show bootvar* Field Descriptions

| Field | Description |
|---------------------------------------|---|
| BOOT variable | Shows a list of bootable images on various devices. |
| CONFIG_FILE variable | Shows the configuration file used during system initialization. |
| BOOTLDR variable | Shows the configuration file used during system initialization. |
| Configuration register | Shows the stored configuration information. |
| Standby auto-sync startup config mode | Indicates whether startup-config file autosynchronization is enabled or disabled on the standby processor card. |
| Standby auto-sync running config mode | Indicates whether running-config file autosynchronization is enabled or disabled on the standby processor card. |
| Standby | Indicates whether the standby processor card is up or down. |
| Standby BOOT variable | Shows a list of bootable images on various devices for the standby processor card. |
| Standby CONFIG_FILE variable | Shows the configuration file used during system initialization for the standby processor card. |
| Standby BOOTLDR variable | Shows the configuration file used during system initialization for the standby processor card. |
| Standby Configuration register | Shows the stored configuration information for the standby processor card. |

Related Commands

| Command | Description |
|---------------------------------|--|
| auto-sync running-config | Selectively enables only automatic synchronizing of the running configuration to the standby processor card. |
| auto-sync startup-config | Selectively enables only automatic synchronizing of the startup configuration to the standby processor card. |

show ciscoview package

To display Embedded CiscoView package information, use the **show ciscoview package** command.

show ciscoview package

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display Embedded CiscoView package file information or for troubleshooting.

Examples The following example shows how to display Embedded CiscoView package information. (See Table 8-2 for field descriptions.)

```
Switch# show ciscoview package

File source:slot1:
CVFILE                               SIZE(in bytes)
-----
```

show ciscoview package

```

ONS15540-1.0.html           8861
ONS15540-1.0.sgz           1183238
ONS15540-1.0_ace.html      3704
ONS15540-1.0_error.html    401
ONS15540-1.0_jks.jar       17003
ONS15540-1.0_nos.jar       17497
applet.html                 8861
cisco.x509                   529
identitydb.obj              2523

```

Table 8-2 *show ciscoview package* Field Descriptions

| Field | Description |
|-----------------|---|
| File source | Identifies the slot. |
| CVFILE | Identifies the Embedded CiscoView files in the package. |
| SIZE (in bytes) | Shows the file size in bytes. |

Related Commands

| Command | Description |
|-------------------------------|--|
| show ciscoview version | Displays Embedded CiscoView version information. |

show ciscoview version

To display Embedded CiscoView version information, use the **show ciscoview version** command.

show ciscoview version

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display Embedded CiscoView version information.

Examples The following example shows how to display Embedded CiscoView version information. (See Table 8-3 for field descriptions.)

```
Switch# show ciscoview version
```

```
Engine Version: 5.3 ADP Device: ONS15540 ADP Version: 1.0 ADK: 39
```

Table 8-3 *show ciscoview version Field Descriptions*

| Field | Description |
|----------------|--|
| Engine Version | Identifies the Embedded CiscoView version. |
| ADP Device | Identifies the ADP (Autonomous Device Package) device. |
| ADP Version | Identifies the ADP version. |

Related Commands

| Command | Description |
|-------------------------------|--|
| show ciscoview package | Displays Embedded CiscoView package information. |

show environment

To display the temperature sensor and fan status, use the **show environment** command.

show environment

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC

Command History This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|--------------|--|
| 12.1(12c)EV3 | This command was introduced. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Examples

The following example shows how to display the fan tray failure shutdown feature configuration:

```
Switch# show environment
Fan
---
Status:                Total Failure

Line card shutdown on fan failure:enabled

      Sensor                Temperature                Thresholds
      (degree C)           Minor           Major           Critical           Low
-----
Inlet Sensor                28              65              75              80              -15
Outlet Sensor                28              75              85              90              -15

      Sensor                Alarms
      Min
-----
Critical
-----
Inlet Sensor                0              0              0
Outlet Sensor                0              0              0
```

■ show environment

```
Power Entry Module 0 type DC status:          OK
```

Related Commands

| Command | Description |
|---|---|
| environment-monitor shutdown fan | Enables system shutdown when the fans fail. |

show facility-alarm status

To display the facility alarm status, use the **show facility-alarm status** command.

```
show facility-alarm status [critical | info | major | minor]
```

| Syntax Description | | |
|--------------------|-----------------|---|
| | critical | Shows the status information for critical facility alarms. |
| | info | Shows the status information for information facility alarms. |
| | major | Shows the status information for major facility alarms. |
| | minor | Shows the status information for minor facility alarms. |

Defaults Displays all facility alarm status information. This information includes external alarms and protocol monitoring alarms.

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display the facility alarm and alarm threshold error status information.

Examples The following example shows how to display the facility alarm status information. (See Table 8-4 for field descriptions.)

```

Switch# show facility-alarm status
System Totals Critical: 1 Major: 2 Minor: 1
Source: Chassis Severity: CRITICAL Description: 0 Chassis fan tray missing
Source: Transponder SC Severity: MAJOR Description: 0 Access to Tsp card failed
Source: Transponder SC Severity: MINOR Description: 1 Access to IDPROM failed
Source: Transponder SC Severity: MAJOR Description: 2 Line laser failure detected

```

Table 8-4 show facility-alarm status Field Descriptions

| Field | Description |
|---------------|---|
| System Totals | Shows the number of alarms in the output display by severity. |
| Source | Shows the system component that is the source of the alarm. |
| Severity | Shows the severity of the alarm. |
| Description | Shows a description of the alarm. |

Related Commands

| Command | Description |
|-----------------------------|--|
| clear facility-alarm | Clears external facility alarm indications. |
| monitor enable | Enables signal monitoring for certain protocol encapsulations. |

show hardware

To display hardware information, use the **show hardware** command.

show hardware [**detail** | **linecard** *slot*]

| Syntax Description | detail | Shows detailed hardware information for the entire shelf. |
|--------------------|-----------------------------|---|
| | linecard <i>slot</i> | Shows detailed hardware information for the motherboard or processor card in a specific slot. The range is 0 to 11. |

Defaults Displays summary hardware information for the entire shelf.

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display hardware information for debugging and tracking.

Examples The following example shows how to display hardware information for the shelf. (See Table 8-5 for field descriptions.)

```
Switch# show hardware
-----
```

```

Manhattan_Backplane_PHASE_0 named Switch, Date: 10:25:38 UTC Tue Jul 3 2001
-----
-----
Back-Plane Information
-----
-----
Model      Ver Serial No.  MAC-Address      MAC-Size RMA No.  RMA Code MFG-Date
-----
Manhattan 3.0 TBC0503157 00-00-16-44-28-fb 16      0x00    0x00    02/16/2001
-----
-----
Slot Controller Type      Part No.  Rev Serial No.  Mfg. Date  RMA No.  H/W Ver.
-----
0/* Mx-DMx-Mthrbd         73-5656-03 6   CAB0516HK31 05/30/2001 0x00    3.1
0/2 FILTER_8+1_CHANNEL 30-1321-01 2   401370      06/21/2001 0x00    1.0
1/* Mx-DMx-Mthrbd         73-5656-02 02  SAK0502000H 02/15/2001 0x00    2.3
1/2 FILTER_8+1_CHANNEL 30-1321-01 2   401231      06/21/2001 0x00    1.0
6/* Queens CPU           73-5621-02 02  CAB0515HJHD 02/15/2001 0x00    3.5
7/* Queens CPU           73-5621-06 02  CAB0517HL4Q 02/15/2001 0x00    3.5
10/* XpndrMotherboard    73-5813-05 05  CAB0517HLSF 03/30/2001 0x00    5.1
10/0 TRANSPONDER_Type_I 73-5757-02 02  CAB0431BCUH 04/10/2001 0x00    2.3
10/1 TRANSPONDER_Type_I 73-5757-02 02  CAB0431BCUP 02/23/2001 0x00    2.3
10/2 TRANSPONDER_Type_I 73-5757-02 02  CAB0512HGPK 02/23/2001 0x00    2.3
10/3 TRANSPONDER_Type_I 68-1425-01 02  CAB0522HWL4 02/23/200@ 0x00    2.3
-----
-----
Power-Supply Module
-----
-----
Power-Supply A is : OK
Power-Supply B is : OK

```

Table 8-5 show hardware Field Descriptions

| Field | Description |
|-----------------|---|
| Slot | Shows the slot or slot and subcard position for the hardware component. |
| Controller Type | Shows the hardware component controller type. Controller types include: <ul style="list-style-type: none"> Mx-DMx-Mthrbd (Mux/demux motherboard) Mx-DMx-8Mod-Plus1-W (8-channel mux/demux module with OSC) XpndrMotherboard (Line card motherboard) NPlugXpndrMonitor (Transponder module) Queens CPU (Processor card) |
| Part No. | Shows the part number. |
| Rev | Shows the revision number. |
| Serial No. | Shows the serial number. |
| Mfg. Date | Shows the date the component was manufactured. |
| RMA No. | Shows the RMA number. |
| H/W Ver. | Shows the hardware version number. |

The following example shows how to display detailed hardware information for a specific slot. (See Table 8-6 for field descriptions.)

```
Switch# show hardware linecard 8
```

```

-----
Slot Number           : 8/*
Controller Type       : XpndrMotherboard
On-Board Description  : TRANSPONDER_MOTHER_PHASE_0
Orderable Product Number: N/A
Board Part Number     : 73-5813-05
Board Revision        : 05
Serial Number         : CAB0517HLRV
Manufacturing Date    : 03/30/2001
Hardware Version      : 5.1
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 2.55
Subcard Power Control : 0:ON, 1:ON, 2:ON, 3:ON
-----

Slot Number           : 8/0
Controller Type       : NPlugXpndrMonitor
On-Board Description  : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number     : 73-5757-02
Board Revision        : 02
Serial Number         : CAB0520HRPE
Manufacturing Date    : prog
Hardware Version      : 2.3
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 1.59
-----

Slot Number           : 8/1
Controller Type       : NPlugXpndrMonitor
On-Board Description  : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number     : 73-5757-02
Board Revision        : 02
Serial Number         : CAB0521HSBS
Manufacturing Date    : 02/23/2001
Hardware Version      : 2.1
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 1.59

```

Table 8-6 *show hardware linecard Field Descriptions*

| Field | Description |
|--------------------------|---|
| Slot Number | Shows the slot or slot and subcard position for the hardware component. |
| Controller Type | Shows the hardware component controller type. |
| On-Board Description | Shows the description stored on the component. |
| Orderable Product Number | Shows the component product order number. |
| Board Part Number | Shows the part number. |
| Board Revision | Shows the revision number. |
| Serial Number | Shows the serial number. |
| Manufacturing Date | Shows the date the component was manufactured. |
| Hardware Version | Shows the hardware version number. |
| RMA Number | Shows the RMA number. |

Table 8-6 *show hardware linecard Field Descriptions (continued)*

| Field | Description |
|--------------------------|--|
| RMA Failure Code | Shows the RMA failure code. |
| Functional Image Version | Shows the version of the component functional image. |
| Subcard Power Control | Shows the status of the power to the subcard positions in the linecard mother board. |

Related Commands

| Command | Description |
|--------------------------------|--|
| hw-module subslot power | Controls the power to transponder modules. |

show optical wavelength mapping

To display the mapping of Cisco ONS 15540 ESP channels to ITU grid frequencies and wavelengths, use the **show optical wavelength mapping** command.

show optical wavelength mapping

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| | |
|-------------------|--|
| EY-Release | Modification |
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display how the Cisco ONS 15540 ESP channels map to the ITU G.692 grid wavelengths. Channel 0 is the OSC. Channels 1 through 32 are the client data channels. The last two digits of the frequency correspond to the ITU number (for example, the frequency for channel 1 is 192.1 so the ITU grid number is 21).

The frequencies ending in 0 and 5 are missing from the output because they are used as buffers between the 4-channel bands.

Examples

The following example shows how to display wavelength mapping information for the system. (See Table 8-7 for field descriptions.)

```
Switch# show optical wavelength mapping
      Frequency      Wavelength
Channel (THz)      (nm)
-----
  0      191.9      1562.23
  1      192.1      1560.61
  2      192.2      1559.79
  3      192.3      1558.98
  4      192.4      1558.17
  5      192.6      1556.55
  6      192.7      1555.75
  7      192.8      1554.94
  8      192.9      1554.13
  9      193.1      1552.52
 10      193.2      1551.72
 11      193.3      1550.92
 12      193.4      1550.12
 13      193.6      1548.51
 14      193.7      1547.72
 15      193.8      1546.92
 16      193.9      1546.12
 17      194.1      1544.53
 18      194.2      1543.73
 19      194.3      1542.94
 20      194.4      1542.14
 21      194.6      1540.56
 22      194.7      1539.77
 23      194.8      1538.98
 24      194.9      1538.19
 25      195.1      1536.61
 26      195.2      1535.82
 27      195.3      1535.04
 28      195.4      1534.25
 29      195.6      1532.68
 30      195.7      1531.90
 31      195.8      1531.12
 32      195.9      1530.33
```

Table 8-7 *show optical wavelength mapping Field Descriptions*

| Field | Description |
|-----------------|--|
| Channel | Identifies the channel. |
| Frequency (THz) | Shows the frequency for the channel in THz. The last two digits correspond to the ITU grid number. |
| Wavelength (nm) | Shows the wavelength for the channel in nm. |

show temperature

To display shelf temperature information, use the **show temperature** command.

show temperature

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display the current shelf temperature and the alarm threshold temperatures.

Examples The following example shows how to display internal redundancy software state information. (See Table 8-8 for field descriptions.)

```
Switch> show temperature
  Sensor                Temperature          Thresholds
                   (degree C)      Minor      Major      Critical  Low
-----
Inlet Sensor          31              65         75         80         -15
```

■ **show temperature**

```

Outlet Sensor          33          75          85          90          -15

  Sensor                Alarms
                        Minor   Major   Critical
-----
Inlet Sensor           0           0           0
Outlet Sensor          0           0           0

```

Table 8-8 *show temperature Field Descriptions*

| Field | Description |
|------------------------|--|
| Sensor | Shows the type of sensor. |
| Temperature (degree C) | Shows the current temperature in degrees Celsius. |
| Minor | Shows temperature threshold that generates a minor alarm. |
| Major | Shows temperature threshold that generates a major alarm. |
| Critical | Shows temperature threshold that generates a critical alarm. |
| Low | Shows temperature threshold that generates a low alarm. |
| Alarms | Shows the number of minor, major, and critical alarms on the inlet and outlet sensors. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| show facility-alarm status | Shows the facility alarm status information. |

show upgrade-info functional-image

To display functional image version diagnostics, use the **show upgrade-info functional-image** command.

```
show upgrade-info functional-image {all | latest-version [software-compatible]}
dat-file device:filename [detail]
```

| Syntax Description | all | Displays information about all the functional images found in the data file. |
|--------------------|--|--|
| | latest-version | Displays information about the latest functional images on the system. |
| | software-compatible | Displays information about the latest functional images which are compatible with the currently running system image. |
| | dat-file <i>device:filename</i> | Specifies the name of the data file containing the version diagnostics for the ROMMON and functional images on the system. |
| | detail | Displays detailed ROMMON and functional image upgrade information. |

Defaults None

Command Modes Privileged EXEC

Command History This table includes the following release-specific history entries:

- SV-Release
- S-Release

| SV-Release | Modification |
|------------|--|
| 12.2(18)SV | This command was introduced. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display the version diagnostics for ROMMON and functional images. The data file to use in conjunction with this command can be downloaded from the following URL:

<http://www.cisco.com/cgi-bin/tablebuild.pl/ons15540-fpga>

The following example shows how to display detailed APS information for all APS groups. (See Table 8-9 for field descriptions.)

```
Switch# show upgrade-info functional-image all dat-file
bootflash:fi-ons15540-index.008.dat
Validating CRC...100%
```

Generating Functional Image Upgrade Information for the currently running IOS

show upgrade-info functional-image

using DAT file bootflash:fi-ons15540-index.008.dat, created on Tues Aug 19 00:20:15 PST 2003.

Please ensure that you are using the latest DAT file from Cisco Connection Online (CCO) Webpage

Abbr: Cur.FV = Functional Image Version of the Card.

Lis.FV = List of Func. Image Versions found in the DAT-file for the corresponding card.

(U) = IOS Software upgrade is required, to upgrade to the recommended functional image version.

| Slot | Product No | Cur.FV | Lis.FV | Listed Functional Image |
|------|--------------------|--------|--------|---------------------------------|
| 0/* | 15540-LCMB-UNKNOWN | 2.66 | 2.66 | No Func. Image Upgrade Required |
| 1/* | 15540-LCMB-UNKNOWN | 2.67 | 2.67 | No Func. Image Upgrade Required |
| 3/* | 15540-LCMB-1100 | 2.72 | 2.72 | No Func. Image Upgrade Required |
| 3/0 | 15540-TSP2-0100= | 1.F1 | 1.F1 | No Func. Image Upgrade Required |
| 3/1 | 15540-TSP2-0100= | 1.F1 | 1.F1 | No Func. Image Upgrade Required |
| 3/3 | 15540-TSP1-13B3= | 1.F1 | 1.F1 | No Func. Image Upgrade Required |
| 4/0 | 15540-LCMB-1100 | 1.A0 | 1.A1 | fi-ons15540-tlcmdb.A.1-A1.exo |
| 6/* | 15540-CPU= | 1.25 | 1.27 | fi-ons15540-ph0cpu.A.1-27.exo |
| 7/* | 15540-CPU= | 1.27 | 1.27 | No Func. Image Upgrade Required |

Table 8-9 show upgrade-info functional-image Field Descriptions

| Field | Description |
|-----------------------|---|
| Slot | Indicate the slot for a card and the slot and subcard for a module. |
| Product No | Indicates the product number for the card or module. |
| Cur. FV | Indicates the current ROMMON or functional image version on the card or module. |
| Lis. FV | Indicates the ROMMON or functional image version listed in the data file. |
| Listed Function Image | Indicates the name of the ROMMON or functional image file to use to upgrade the card or module. |

Related Commands

| Command | Description |
|---------------|---|
| reprogram | Updates the ROMMON or functional image on a card or module. |
| show hardware | Displays information about the hardware on the shelf. |

show version

To display the system hardware configuration, software version, and names and sources of configuration files and boot images, use the **show version** command.

show version

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display the system hardware configuration, software version, and names and sources of configuration files and boot images.



Note

Always specify the complete software version number when reporting a possible software problem.

Examples

The following example shows how to display version information for the system. Table 8-10 describes the output from the **show version** command.

```
Switch# show version

Cisco Internetwork Operating System Software
IOS (tm) ONS-15540 Software (manopt-M0-M), Experimental Version 12.1(20001031:221042)
[ffrazer-man_cosmos 252]
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 23-Feb-01 15:23 by ffrazer
Image text-base:0x60010950, data-base:0x604E8000

ROM:System Bootstrap, Version 12.1(20001031:194138) [ffrazer-man_cosmos 233],
DEVELOPMENT SOFTWARE
BOOTFLASH:ONS-15540 Software (manopt-M0-M), Experimental Version 12.1(20001031:221042)
[ffrazer-man_cosmos 246]

Switch uptime is 30 minutes
System returned to ROM by power-on
System image file is "tftp://171.69.1.129/ffrazer/manopt-m0-mz.010223.6"

cisco (QUEENS-CPU) processor with 98304K/32768K bytes of memory.
R7000 CPU at 234Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache

Last reset from power-on
2 Ethernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
16384K bytes of Flash internal SIMM (Sector size 64K).
Configuration register is 0x102
```

Table 8-10 *show version Field Descriptions*

| Field | Description |
|------------------------------------|---|
| Software version | Shows the software version. |
| Compiled | Shows the date and time the software was compiled. |
| System Bootstrap, Version | Shows the system bootstrap version number. |
| BOOTFLASH, Version | Shows the bootflash version number. |
| Switch uptime | Shows the number of days, hours, minutes, and seconds the system has been up and running. |
| System returned to ROM by power-on | Shows how the system was last booted—as a result of a normal system startup or because of system error. |
| System image file | Shows the name and location of the system image file. |
| bytes of memory | Shows the amount of system memory. |
| Last reset from power-on | Shows how the system was last reset. |
| 2 Ethernet/IEEE 802.3 interface(s) | Shows the number, type, and encapsulation of interfaces available. |
| non-volatile configuration memory | Shows the amount of nonvolatile configuration memory available. |
| Flash PCMCIA | Shows the amount of Flash memory and location of the card. |

Table 8-10 *show version Field Descriptions (continued)*

| Field | Description |
|------------------------|---|
| Flash internal SIMM | Shows the amount of Flash internal SIMM memory. |
| Configuration register | Shows the location of the configuration register. |

tracert

To trace the IP routes the packets actually take when traveling from the Cisco ONS 15540 ESP NME (network management Ethernet) port to their destination, use the **tracert** EXEC command.

EXEC Mode

tracert *protocol destination*

Privileged EXEC Mode

tracert [*protocol*] [*destination*]

| Syntax Description | |
|--------------------|--|
| <i>protocol</i> | Protocols that can be used are appletalk , clns , ip , ipx , and vines . In privileged EXEC mode, the default protocol is assumed for the destination address format. |
| <i>destination</i> | Destination address or host name on the command line. In privileged EXEC mode, the default parameters for the appropriate protocol are assumed. |

Defaults

The *protocol* argument is based on the format of the *destination* argument. For example, if the system finds a destination in IP format, the protocol defaults to **ip**.

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

The **traceroute** command works by taking advantage of the error messages generated by the system when a datagram exceeds its TTL (Time To Live) value. The **traceroute** command starts by sending probe datagrams with a TTL value of 1. This causes the first system to discard the probe datagram and send back an error message. The **traceroute** command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A `time exceeded` error message indicates that an intermediate system detected and discarded the probe. A `destination unreachable` error message indicates that the destination node received and discarded the probe because it could not deliver the packet. If the timer goes off before a response comes in, **traceroute** prints an asterisk(*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, enter **^X**.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and switches, the IP **traceroute** command may behave in unexpected ways.

Not all destinations respond correctly to a probe message by sending back an `ICMP port unreachable` message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL is reached, may indicate this problem.

There is a known problem with the way some hosts handle an `ICMP TTL exceeded` message. Some hosts generate an ICMP message, but they reuse the TTL of the incoming packet. Because this is zero, the ICMP packets do not make it back. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually, the TTL gets high enough that the ICMP message can get back. For example, if the host is 6 hops away, **traceroute** times out in responses 6 through 11.

Examples

The following example displays sample IP **traceroute** output in EXEC mode when a destination host name is specified. (See Table 8-11 for field descriptions.)

```
Switch> traceroute ip ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
 0 DEBRIS.CISCO.COM (131.108.1.6) 1000 msec 8 msec 4 msec
 1 BARRNET-GW.CISCO.COM (131.108.16.2) 8 msec 8 msec 8 msec
 2 EXTERNAL-A-GATEWAY.STANFORD.EDU (192.42.110.225) 8 msec 4 msec 4 msec
 3 BB2.SU.BARRNET.NET (131.119.254.6) 8 msec 8 msec 8 msec
 4 SU.ARC.BARRNET.NET (131.119.3.8) 12 msec 12 msec 8 msec
 5 MOFFETT-FLD-MB.in.MIL (192.52.195.1) 216 msec 120 msec 132 msec
 6 ABA.NYC.mil (26.0.0.73) 412 msec 628 msec 664 msec
```

Table 8-11 *traceroute command Field Descriptions*

| Field | Description |
|-------------------------|---|
| 1 | Indicates the sequence number of the system in the path to the host. |
| DEBRIS.CISCO.COM | Shows the host name of this system. |
| 131.108.1.61 | Shows the IP address of this system. |
| 1000 msec 8 msec 4 msec | Shows the round-trip time for each of the three probes that are sent. |

Table 8-12 describes the characters that can appear in **tracert** output.

Table 8-12 IP Trace Text Characters

| Character | Description |
|----------------|---|
| <i>nn</i> msec | Indicates for each node the round-trip time in milliseconds for the specified number of probes. |
| * | Indicates that the probe timed out. |
| ? | Indicates an unknown packet type. |
| Q | Indicates a source quench. |
| P | Indicates that the protocol is unreachable. |
| N | Indicates that the network is unreachable. |
| U | Indicates that the port is unreachable. |
| H | Indicates that the host is unreachable. |

The following example displays sample IP **tracert** output in privileged EXEC mode when a destination IP address is specified. (See Table 8-13 for prompt descriptions and Table 8-11 for field descriptions.)

```
Switch# tracert
Protocol [ip]:
Target IP address: 10.0.0.1
Source address:
Numeric display [n]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose [none]:
Type escape sequence to abort.
Tracing the route to 10.0.0.1

  1 10.0.0.2 msec 0 msec 4 msec
  2 10.0.1.9 0 msec 0 msec 0 msec
  3 10.0.0.1 0 msec 0 msec 4 msec
```

Table 8-13 tracert Command Prompt Descriptions

| Prompt | Description |
|-------------------------|--|
| Protocol [ip]: | Specifies the protocol. The default is IP. |
| Target IP address: | Specifies the host name or an IP address. There is no default. |
| Source address: | Specifies one of the interface addresses of the router to use as a source address for the probes. The system will normally pick what it feels is the best source address to use. |
| Numeric display [n]: | Specifies the tracert display format. The default is to have both a symbolic and numeric display; however, you can suppress the symbolic display. |
| Timeout in seconds [3]: | Specifies the number of seconds to wait for a response to a probe packet. The default is 3 seconds. |

Table 8-13 *traceroute Command Prompt Descriptions (continued)*

| Prompt | Description |
|---|---|
| Probe count [3]: | Specifies the number of probes to be sent at each TTL level. The default count is 3. |
| Minimum Time to Live [1]: | Specifies the TTL value for the first probes. The default is 1, but it can be set to a higher value to suppress the display of known hops. |
| Maximum Time to Live [30]: | Specifies the largest TTL value that can be used. The default is 30. The traceroute command terminates when the destination is reached or when this value is reached. |
| Port Number [33434]: | Specifies the destination port used by the UDP probe messages. The default is 33434. |
| Loose, Strict, Record, Timestamp, Verbose [none]: | <p>Specifies the IP header options. You can specify any combination. The traceroute command issues prompts for the required fields. Note that trace will place the requested options in each probe; however, there is no guarantee that all routers (or end nodes) will process the options. The default is no header options.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Loose—Allows you to specify a list of nodes that must be traversed when going to the destination. • Strict—Allows you to specify a list of nodes that must be the only nodes traversed when going to the destination. • Record—Allows you to specify the number of hops to leave room for. • Timestamp—Allows you to specify the number of time stamps to leave room for. • Verbose—If you select any of the above options, the verbose mode is automatically selected and the traceroute command prints the contents of the option field in any incoming packets. You can prevent verbose mode by selecting it again, toggling its current setting. |



Threshold Commands

Interface alarm thresholds provide a way to monitor the quality of the client signal. Use the following commands to configure and monitor interface alarm threshold operations.

aps trigger

To enable y-cable line card protection signal switchover when the alarm thresholds are exceeded, use the **aps trigger** command. To disable y-cable protection signal switchover, use the **no** form of this command.

aps trigger

no aps trigger

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Threshold configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command in a y-cable protection configuration to cause a signal switchover when the active signal error rates exceed the alarm thresholds. The signal switchover occurs only if the standby signal is acceptable.



Note

The threshold list must be applied to both interfaces in the associated pair.

Examples

The following example shows how to configure an APS switchover trigger for an alarm threshold.

```
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 6
Switch(config-threshold)# aps trigger
Switch(config-threshold)# exit
Switch(config-t-list)# exit
Switch(config)# redundancy
Switch(config-red)# associate group chicago
Switch(config-red-aps)# aps working transparent 3/0/0
Switch(config-red-aps)# aps protection transparent 5/0/0
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps revertive
Switch(config-red-aps)# aps enable
Switch(config-red-aps)# exit
Switch(config-red)# exit
Switch(config)# interface transparent 3/0/0
Switch(config-if)# encaps sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms
Switch(config-if)# exit
Switch(config)# interface transparent 5/0/0
Switch(config-if)# encaps sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms
```

Related Commands

| Command | Description |
|----------------------------|--|
| monitor enable | Enables protocol performance monitoring. |
| show threshold-list | Displays the contents of a threshold list. |
| threshold | Selects alarm threshold to modify and enters threshold configuration mode. |
| threshold-group | Associates a threshold list to an interface. |
| threshold-list | creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode. |

description

To configure a alarm threshold description, use the **description** command. To remove a threshold description, use the **no** form of the command.

description *text*

no description

| | | |
|---------------------------|------|------------------------------------|
| Syntax Description | text | Threshold description for the MIB. |
|---------------------------|------|------------------------------------|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|-------------------------|
| Command Modes | Threshold configuration |
|----------------------|-------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines First use the **threshold-list** command to enter threshold list configuration mode and create a threshold list. Then use the **threshold** command to specify a threshold to modify and enter threshold configuration mode. This description can be accessed and displayed by network management systems that support SNMP.

Examples The following example shows how to create a description for a threshold in a threshold list named temp.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# description This threshold is for SONET and SDH BIP1 errors
```

Related Commands

| Command | Description |
|------------------------|---|
| threshold | Selects alarm threshold to modify and enters threshold configuration mode. |
| threshold-group | Associates a threshold list with an interface. |
| threshold-list | Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode. |

notification-throttle timer

To modify the alarm threshold notification throttle timer, use the **notification-throttle timer** command. To return the notification throttle timer interval to its default value, use the **no** form of the command.

notification-throttle timer *seconds*

no notification-throttle timer

| | | |
|---------------------------|----------------|--|
| Syntax Description | <i>seconds</i> | Specifies, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed. The range is 5 to 500 seconds. |
|---------------------------|----------------|--|

| | |
|-----------------|-----------|
| Defaults | 5 seconds |
|-----------------|-----------|

| | |
|----------------------|------------------------------|
| Command Modes | Threshold list configuration |
|----------------------|------------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| | |
|-------------------------|--|
| Usage Guidelines | Use this command to control the amount of alarm threshold notification activity that is generated on the system. |
|-------------------------|--|

Examples

The following example shows how to set an alarm threshold list notification throttle timer to 10 seconds.

```
Switch# configure terminal
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# notification-throttle timer 10
```

Related Commands

| Command | Description |
|----------------------------------|--|
| <code>show threshold-list</code> | Displays the contents of a threshold list. |
| <code>threshold-list</code> | Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode. |

show threshold-list

To display information about alarm threshold lists, use the **show threshold-list** command.

```
show threshold-list [name]
```

Syntax Description

| | |
|-------------|--|
| <i>name</i> | Specifies the name of an alarm threshold list. |
|-------------|--|

Defaults

Displays information about all threshold lists in the system.

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to display the threshold values configured for all alarm threshold lists or for a specific alarm threshold list.

Examples

The following example shows how to display information for alarm threshold list named sonet-counters. (See Table 9-1 for field descriptions.)

```
Switch# show threshold-list

Threshold List Name: sonet-counters
Notification throttle timer : 5 (in secs)
```

```

Threshold name : sonet-sdh section cv          Severity : Degrade
Value : 10e-9
APS Trigger : Not set
Description : SONET BIP1 counter
Threshold name : sonet-sdh section cv          Severity : Failure
Value : 10e-6
APS Trigger : Set
Description : SONET BIP1 counter

```

Table 9-1 show threshold-list Field Descriptions

| Field | Description |
|-----------------------------|---|
| Threshold List Name | Shows the name of the threshold list. |
| Notification throttle timer | Shows, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed. |
| Threshold name | Shows the name of the threshold counter. See the threshold command for a list of threshold names. |
| Severity | Shows the threshold severity (Degrade or Failure). |
| Value | Shows the threshold rate value for the system to issue an alarm. |
| APS Trigger | Indicates whether the APS switchover trigger is set. |
| Description | Shows the description text for the counter. |

Related Commands

| Command | Description |
|--|--|
| aps trigger | Enables APS switchover trigger for threshold alarms. |
| description | Configures MIB description for threshold alarms. |
| notification-throttle timer | Modifies the alarms threshold notification throttle timer. |
| snmp-server enable traps threshold min-severity | Enables SNMP trap notification for threshold alarms. |
| threshold | Selects alarm threshold to modify and enters threshold configuration mode. |
| threshold-group | Associates a threshold list to an interface. |
| threshold-list | Creates a list of thresholds. |
| value | Configures the value for threshold alarms. |

threshold

To configure an alarm threshold in a threshold list, use the **threshold** command. To remove a threshold from a threshold list, use the **no** form of the command.

```
threshold name { cvrd | cdl hec | crc | sonet-sdh section cv | tx-crc } { degrade | failure } [index value]
```

```
no threshold name { cvrd | cdl hec | crc | sonet-sdh section cv | tx-crc } { degrade | failure } [index value]
```

Syntax Description

| | |
|-----------------------------|--|
| cvrd | Specifies the coding violation and running disparity counter. This counter is monitored for interfaces with the following encapsulation: <ul style="list-style-type: none"> • Gigabit Ethernet • ESCON • Fibre Channel • FICON |
| cdl hec | Specifies the CDL (converged data link) HEC (header error control) error counter. This counter is monitored for wave interfaces that insert and delete CDL headers. |
| crc | Specifies the cyclic redundancy error counter. |
| sonet-sdh section cv | Specifies the bit interleaved parity error. This counter is monitored for interfaces with either SONET or SDH encapsulation. |
| tx-crc | Specifies the transmit cyclic redundancy error counter. |
| degrade | Specifies that a signal degrade threshold alarm is generated. |
| failure | Specifies that a signal failure threshold alarm is generated. |
| index value | Specifies a MIB index. The range is 0 to 63. |

Defaults

None

Command Modes

Threshold-list configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| | |
|-------------------|---|
| EY-Release | Modification |
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| 12.1(10)EV2 | Added support the crc keyword to support CRC error thresholds. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to enter threshold configuration mode for the specific threshold. In threshold configuration mode, you can modify the threshold attribute values.

Interfaces have no default alarm threshold values. When monitoring is enabled, alarm thresholds are only in effect when a threshold list is associated with the interface.

By default, the **threshold** command uses the next available threshold index number in the threshold list MIB. The **index** keyword and value allow you to explicitly assign an index for the threshold. This is particularly useful as index numbers become available when thresholds are deleted.

Examples

The following example shows how to configure an alarm threshold in a threshold list and enter threshold configuration mode.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name cvrd degrade
Switch(config-threshold)#
```

Related Commands

| Command | Description |
|--|--|
| aps trigger | Enables APS switchover when the alarm threshold is crossed. |
| description | Specifies a threshold description for the SNMP MIB. |
| notification-throttle timer | Modifies the alarm threshold notification throttle timer. |
| show threshold-list | Displays the contents of a threshold list. |
| snmp-server enable traps threshold min-severity | Enables SNMP trap notifications for alarm threshold activity. |
| threshold-group | Associates a threshold list to an interface. |
| threshold-list | Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode. |
| value | Specifies the threshold value. |

threshold-group

To associate a threshold list to an interface, use the **threshold-group** command. To remove a threshold list from an interface, use the **no** form of this command.

threshold-group *name*

no threshold-group *name*

| | | |
|---------------------------|------|--|
| Syntax Description | name | Specifies the name of a threshold list and associates it with a specified interface. |
|---------------------------|------|--|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|-------------------------|
| Command Modes | Interface configuration |
|----------------------|-------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to associate a threshold list to a specified interface.

Even though a threshold list might contain the thresholds for all error counters, not all of these thresholds are applicable to the interface. Thresholds are recognized by the interface based on the interface type (for example, wave) and the encapsulation type (in the case of transparent interfaces).

You can associate more than one threshold list with an interface. The lists cannot contain overlapping thresholds. The system will not allow you to associate a threshold list if it contains a counter the interface already monitors for another threshold list.

If the interface is not associated with any threshold list, the threshold counters that are monitored on that interface are set to their default values.

**Note**

For y-cable protected transparent and wave interfaces, disable monitoring on the interface with the **no monitor** command before removing an alarm threshold. Use the **show aps** command to determine the protection configuration for the interface.

Examples

The following example shows how to associate a threshold list to a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# threshold-group temp
```

Related Commands

| Command | Description |
|----------------------------|--|
| show threshold-list | Displays the contents of a threshold list. |
| threshold | Creates failure and degrade thresholds for different error counters that are monitored on the interface. |
| threshold-list | Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode. |

threshold-list

To create a list of thresholds, or modify an existing threshold list, use the **threshold-list** command. To delete the threshold list, use the **no** form of this command.

threshold-list *name*

no threshold-list *name*

| | | |
|---------------------------|------|--|
| Syntax Description | name | Specifies the name of the threshold list to be created and associated with a specified interface. The list name cannot begin with the text string “default”. |
|---------------------------|------|--|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to create a list, or modify an existing list, of signal degrade and signal failure alarm thresholds for monitored error counters. After entering the command, the CLI enters threshold configuration mode where you can specify the threshold list attributes or threshold counters to add or modify.

Before deleting or modifying a threshold list, remove it from all the interfaces that use it.

Examples

The following example shows how to create a threshold list called temp.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)#
```

Related Commands

| Command | Description |
|--|--|
| aps trigger | Enables APS switchover when the alarm threshold is crossed. |
| description | Specifies a threshold description for the SNMP MIB. |
| notification-throttle timer | Modifies the alarm threshold notification throttle timer. |
| show threshold-list | Displays the contents of a threshold list. |
| snmp-server enable traps threshold min-severity | Enables SNMP trap notifications for alarm threshold activity. |
| threshold | Creates failure and degrade thresholds for different error counters that are monitored on the interface. |
| threshold-group | Associates a threshold list to an interface. |
| value | Specifies the threshold value. |

value

To configure the values of failure and degrade alarm threshold rates, use the **value** command. To remove an threshold rate, use the **no value** form of the command.

value rate *value*

no value

| | | |
|---------------------------|--------------------------|---|
| Syntax Description | rate <i>value</i> | Enters the threshold value as 10^{-x} , where <i>value</i> is x in 10^{-x} . The range is 3 to 9. |
|---------------------------|--------------------------|---|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|-------------------------|
| Command Modes | Threshold configuration |
|----------------------|-------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to specify a threshold to modify and enter threshold configuration mode.

The degrade rate value for a threshold must always be less than the failure rate value. For example, if the failure rate for a threshold is 7, or 10^{-7} , then the degrade value must be 8 or 9.

Table 9-2 lists the errors per second for the threshold rates for each of the protocol encapsulations.

Table 9-2 Thresholds for Monitored Protocols (Errors Per Second)

| Rate | 10 Gigabit Ethernet CVRD | 10 Gigabit Ethernet CDL HEC | SONET OC-3 or SDH STM-1 | SONET OC-12 or SDH STM-4 | SONET OC-48 or SDH STM-16 | Gigabit Ethernet | ESCON | FICON | Fibre Channel ¹ | ISC ² |
|------|--------------------------|-----------------------------|-------------------------|--------------------------|---------------------------|------------------|---------|-----------|----------------------------|------------------|
| 3 | 12,443,900 | 6512 | 31,753 | 32,000 | 32,000 | 1,244,390 | 199,102 | 1,057,731 | 1,057,731 | 1,057,731 |
| 4 | 1,249,438 | 665 | 12,318 | 27,421 | 31,987 | 124,944 | 19,991 | 106,202 | 106,202 | 106,202 |
| 5 | 124,944 | 67 | 1518 | 56,54 | 17,296 | 12,499 | 2000 | 10,625 | 10,625 | 10,625 |
| 6 | 10,312 | 7 | 155 | 616 | 2394 | 1250 | 200 | 1062 | 1062 | 1062 |
| 7 | 1031 | 0.7 | 15.5 | 62 | 248 | 125 | 20 | 106 | 106 | 106 |
| 8 | 103 | 0.07 | 1.55 | 6.2 | 24.8 | 12.5 | 2 | 10.6 | 10.6 | 10.6 |
| 9 | 10 | 0.007 | 0.155 | 0.62 | 2.48 | 1.25 | 0.2 | 1.06 | 1.06 | 1.06 |

1. Only 1 Gbps rate is supported.

2. Compatibility mode only.

Examples

The following example shows how to create thresholds within a threshold list (temp) with the SONET and SDH section code violation error threshold signal degrade rate of 9 and signal failure rate of 7.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# value rate 9
Switch(config-threshold)# exit
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 7
Switch(config-threshold)# end
Switch#
```

Related Commands

| Command | Description |
|------------------------|--|
| threshold | Selects alarm threshold to modify and enters threshold configuration mode. |
| threshold-group | Associates a threshold list with an interface. |
| threshold-list | Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode. |

■ value



Topology Neighbor Commands

Use the following commands to configure and monitor network topology neighbors.

show topology

To display information about the global physical network topology configuration, use the **show topology** command.

show topology

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC and privileged EXEC

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display the global physical network topology configuration information.

Examples The following example shows how to display the topology hold-time interval. (See Table 10-1 for field descriptions.)

```
Switch# show topology
Global Physical Topology configuration:
  Maximum Hold Time = 300 secs
  Trap interval = 60 secs
```

Table 10-1 *show topology hold-time Field Descriptions*

| Field | Description |
|-------------------|---|
| Maximum Hold Time | Shows the maximum number of seconds a dynamically generated topology entry will remain before it times out. |
| Trap interval | Shows the number of seconds for the topology SNMP trap notification throttle interval. |

Related Commands

| Command | Description |
|--|---|
| show topology neighbor | Displays network topology information. |
| snmp-server enable traps topology | Configures the network topology SNMP trap notification throttle interval. |
| topology hold-time | Modifies the interval to hold a nonstatic topology node entry. |

show topology neighbor

To display the network topology neighbors for the shelf, use the **show topology neighbor** command.

show topology neighbor [detail]

| | | |
|---------------------------|---------------|--|
| Syntax Description | detail | Shows the agent IP address and how the topology entry was created. |
|---------------------------|---------------|--|

| | |
|-----------------|-------------------------------|
| Defaults | Displays summary information. |
|-----------------|-------------------------------|

| | |
|----------------------|-----------------|
| Command Modes | Privileged EXEC |
|----------------------|-----------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to display the network topology neighbors for the shelf.

Examples The following example shows how to display network topology neighbor information for the shelf. (See Table 10-2 for field descriptions.)

```
Switch# show topology neighbor
Physical Topology:
```

```
Local Port      Neighbor Node      Neighbor Port
-----
```



```
Wd0/3          Switch2          Wd0/0
```

Table 10-2 *show topology neighbor Field Descriptions*

| Field | Description |
|---------------|--|
| Local Port | Identifies the local port. |
| Neighbor Node | Identifies the neighbor node. |
| Neighbor Port | Identifies the port or wdm interface on the neighbor node. |

The following example shows how to display detailed network topology neighbor information for the shelf. (See Table 10-3 for field descriptions.)

```
Switch# show topology neighbor detail
Physical Topology:

Local Port: Wdm0/3
Neighbor Node      : Switch2
Neighbor Port      :
Neighbor Agent Address: 172.20.54.159
Neighbor Discovery : Via CDP (Proxy Port: Wave0)
```

Table 10-3 *show topology neighbor detail Field Descriptions*

| Field | Description |
|------------------------|---|
| Local Port | Identifies the local port. |
| Neighbor Node | Identifies the neighbor node. |
| Neighbor Port | Identifies the port on the neighbor node. |
| Neighbor Agent Address | Identifies the IP address of the topology agent on the neighbor node. |
| Neighbor Discovery | Indicates how the topology neighbor was discovered, either automatically via CDP or manually via the CLI. |

Related Commands

| Command | Description |
|---|---|
| show topology | Displays global physical topology configuration. |
| snmp-server enable traps topology | Configures the network topology SNMP trap notification throttle interval. |
| topology neighbor | Adds a static entry for an interface to the network topology. |
| topology neighbor agent ip-address | Specifies the network management agent address on a remote node. |
| topology neighbor cdp | Enables CDP on wdm interfaces. |
| topology neighbor disable | Removes an interface from the network topology. |
| topology hold-time | Modifies the interval to hold a nonstatic topology node entry. |

topology hold-time

To modify the interval to hold nonstatic topology node entries, use the **topology hold-time** command. To return the hold-time interval to its default value, use the **no** form of the command.

topology hold-time *seconds*

no topology hold-time

| | | |
|---------------------------|----------------|--|
| Syntax Description | <i>seconds</i> | Specifies the number of seconds. The range is 1 to 2147483647 seconds. |
|---------------------------|----------------|--|

| | |
|-----------------|-------------|
| Defaults | 300 seconds |
|-----------------|-------------|

| | |
|----------------------|----------------------|
| Command Modes | Global configuration |
|----------------------|----------------------|

| | |
|------------------------|---|
| Command History | This table includes the following release-specific history entries: |
|------------------------|---|

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

| | |
|-------------------------|--|
| Usage Guidelines | Use this command to modify the network topology hold-time timer interval. This timer helps avoid reconstructing a nonstatic topology entry when a node leaves the network for only a brief time. |
|-------------------------|--|

| | |
|-----------------|---|
| Examples | The following example shows how to modify the network topology hold time. |
|-----------------|---|

```
Switch# configure terminal
```

```
Switch(config)# topology hold-time 60
```

| Related Commands | Command | Description |
|------------------|--|---|
| | show topology | Displays global physical topology configuration. |
| | snmp-server enable traps topology | Configures the network topology SNMP trap notification throttle interval. |
| | topology neighbor cdp | Enables CDP on wdm interfaces. |

topology neighbor

To manually add a static entry for a filterband, filtergroup, thru, OSC wave, oscfilter, transparent, or wdm interface to the network topology, use the **topology neighbor** command. To remove the interface from the network topology, use the **no** form of the command or the **topology neighbor disable** command.

```
topology neighbor { name node-name | ip-address ip-address |
                    mac-address mac-address } { port name port-name | port ip-address port-ip-address |
                    port mac-address port-mac-address }
```

```
no topology neighbor
```

Syntax Description

| | |
|---|---|
| name <i>node-name</i> | Specifies the name of the neighbor node. |
| ip-address <i>ip-address</i> | Specifies the IP address of the neighbor node. |
| mac-address <i>mac-address</i> | Specifies the MAC address of the neighbor node. |
| port name <i>port-name</i> | Specifies the name of the port on the neighbor node. |
| port ip-address <i>port-ip-address</i> | Specifies the IP address of the port on the neighbor node. |
| port mac-address <i>port-mac-address</i> | Specifies the MAC address of the port on the neighbor node. |

Defaults

CDP (Cisco Discovery Protocol) is enabled on wdm interfaces.
No topology is configured on transparent interfaces.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |

| S-Release | Modification |
|-----------|--|
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines

Use this command to manually add wdm, thru, oscfilter, OSC wave, filterband, filtergroup, and transparent interfaces to the network topology. You must also configure the network management agent IP address with the **topology neighbor agent ip-address** command. By default, CDP is enabled on all these interface types.

For transparent interfaces, you must use the **topology neighbor** command to add the interface to the network topology because the transparent interfaces do not support CDP. For wdm interfaces, use either the **topology neighbor** command or the **topology neighbor cdp** command to populate the network topology.

For y-cable protected configurations, add both associated transparent interfaces to the network topology.

You can also use the **topology neighbor disable** command to remove an interface from the network topology.

Examples

The following example shows how to connect a mux/demux module to a mux/demux module in another node.

```
Switch# configure terminal
Switch(config)# interface wdm 0/2
Switch(config-if)# topology neighbor name NodeA port name wdm0/0
Switch(config-if)# topology neighbor agent ip-address 10.1.1.1
```

The following example shows how to connect a mux/demux module to an interface on client equipment.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/2
Switch(config-if)# topology neighbor name Router1 port name gigabitethernet2/1
Switch(config-if)# topology neighbor agent ip-address 10.2.2.2
```

Related Commands

| Command | Description |
|---|---|
| show topology neighbor | Displays network topology information. |
| snmp-server enable traps topology | Enables SNMP trap notifications for the network topology. |
| topology neighbor agent ip-address | Specifies the network management agent IP address. |
| topology neighbor cdp | Enables CDP on wdm interfaces. |
| topology neighbor disable | Removes the interface from the network topology. |

topology neighbor agent ip-address

To specify the network management agent address on a remote node, use the **topology neighbor agent ip-address** command. To remove the network management agent address from an interface, use the **no** form of the command.

topology neighbor agent ip-address *ip-address*

no topology neighbor agent ip-address

| | | |
|---------------------------|------------|---|
| Syntax Description | ip-address | Specifies the IP address of the network management agent on the neighbor node. This address is usually the IP address configured on the NME interface on the neighbor node. |
|---------------------------|------------|---|

| | |
|-----------------|------|
| Defaults | None |
|-----------------|------|

| | |
|----------------------|-------------------------|
| Command Modes | Interface configuration |
|----------------------|-------------------------|

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command if you have configured a network topology manually with the **topology neighbor** command. Use this command on wdm and transparent interfaces.

The network management agent IP address is usually the IP address of the NME on the node.

**Note**

Do not use this command if you have enabled CDP on the interface with the **topology neighbor cdp** command.

Examples

The following example shows how to configure a network management agent on a wdm interface.

```
Switch# configure terminal
Switch(config)# interface wdm 0/2
Switch(config-if)# topology neighbor name NodeA port name wdm0/0
Switch(config-if)# topology neighbor agent ip-address 209.165.202.129
```

The following example shows how to configure a network management agent on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/3/0
Switch(config-if)# topology neighbor name Router2 port name gigabitethernet 2/2
Switch(config-if)# topology neighbor agent ip-address 209.165.202.130
```

Related Commands

| Command | Description |
|-------------------------------|---|
| show topology neighbor | Displays the topology configuration. |
| topology neighbor | Adds a static entry for an interface to the network topology. |

topology neighbor cdp

To enable CDP on a wdm interface, use the **topology neighbor cdp** command. To disable CDP on the interface, use the **no** form of the command or the **topology neighbor disable** command.

topology neighbor cdp

no topology neighbor cdp

Syntax Description This command has no other arguments or keywords.

Defaults Enabled
The default proxy for WDM interfaces is the OSC wave interface patched to the OSC filter interface on the mux/demux module

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines CDP dynamically adds wdm interfaces to and removes them from the network topology. CDP is not supported on transparent interfaces. For this command to function properly, the OSC and CDP must be present and configured on the system.

You can use the **topology neighbor** command to statically add a wdm interface to the network topology, but you must first disable CDP on the interface. To configure a transparent interface as part of the network topology, use the **topology neighbor** command.

**Note**

You must correctly configure the patch connection between the mux/demux modules using the **patch** command. Otherwise, CDP cannot locate the wdm interfaces that connect to the trunk fiber and discover the topology neighbors.

Examples

The following example shows how to enable CDP on a wdm interface.

```
Switch# configure terminal
Switch(config)# interface wdm 0/3
Switch(config-if)# topology neighbor cdp
```

Related Commands

| Command | Description |
|--|---|
| patch | Configures the patch connections between the mux/demux modules. |
| show topology neighbor | Displays the topology configuration. |
| snmp-server enable traps topology | Enables SNMP trap notifications for the network topology. |
| topology neighbor | Adds a static entry for an interface to the network topology. |
| topology neighbor disable | Removes the interface from the network topology. |

topology neighbor disable

To remove an interface from the network topology, use the **topology neighbor disable** command.

topology neighbor disable

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

| EY-Release | Modification |
|-------------|--|
| 12.1(7a)EY2 | This command was introduced. |
| E-Release | Modification |
| 12.1(11b)E | This command was integrated in this release. |
| EV-Release | Modification |
| 12.1(10)EV | This command was integrated in this release. |
| SV-Release | Modification |
| 12.2(18)SV | This command was integrated in this release. |
| S-Release | Modification |
| 12.2(22)S | This command was integrated in this release from release 12.2(22)SV. |

Usage Guidelines Use this command to remove an interface from the network topology, whether it was added with the **topology neighbor** command or the **topology neighbor cdp** command.

Examples The following example shows how to remove an interface from the network topology.

```
Switch# configure terminal
Switch(config)# interface wdm 0/2
Switch(config-if)# topology neighbor disable
```

Related Commands

| Command | Description |
|-------------------------------|---|
| show topology neighbor | Displays the system connections. |
| topology neighbor | Adds a static entry for an interface to the network topology. |
| topology neighbor cdp | Enables CDP on the interface. |

■ topology neighbor disable



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