



System Management Command Reference, Cisco IOS Release 15.2(2)E (Catalyst 2960-XR Switch)

First Published: August 08, 2013

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CONTENTS

Preface

Preface vii

Document Conventions vii

Related Documentation ix

Obtaining Documentation and Submitting a Service Request ix

CHAPTER 1

Using the Command-Line Interface 1

Information About Using the Command-Line Interface 1

Command Modes 1

Using the Help System 3

Understanding Abbreviated Commands 4

No and Default Forms of Commands 5

CLI Error Messages 5

Configuration Logging 5

How to Use the CLI to Configure Features 6

Configuring the Command History 6

Changing the Command History Buffer Size 6

Recalling Commands 6

Disabling the Command History Feature 7

Enabling and Disabling Editing Features 7

Editing Commands Through Keystrokes 8

Editing Command Lines That Wrap 10

Searching and Filtering Output of show and more Commands 11

Accessing the CLI on a Switch Stack 12

Accessing the CLI Through a Console Connection or Through Telnet 12

CHAPTER 2

System Management Commands 15

archive download-sw 18

archive tar	22
archive upload-sw	26
banner config-save	28
boot	29
boot buffersize	31
boot enable-break	32
boot host dhcp	33
boot host retry timeout	34
boot manual	35
boot system	36
cat	37
clear logging onboard	38
clear logging smartlog statistics interface	39
clear mac address-table	40
clear mac address-table move update	41
cluster commander-address	42
cluster discovery hop-count	44
cluster enable	45
cluster holdtime	47
cluster member	48
cluster outside-interface	50
cluster run	51
cluster timer	52
copy	53
debug cluster	54
debug matm move update	56
delete	57
dir	58
help	60
hw-module	61
logging	63
logging buffered	64
logging console	65
logging file flash	66
logging history	67

logging history size **68**
logging monitor **69**
logging smartlog **70**
logging trap **72**
mac address-table aging-time **73**
mac address-table learning vlan **74**
mac address-table move update **76**
mac address-table notification **78**
mac address-table notification change **80**
mac address-table static **81**
mkdir **82**
more **83**
rcommand **84**
rename **86**
reset **87**
rmdir **88**
service sequence-numbers **89**
set **90**
show boot **93**
show cable-diagnostics prbs **95**
show cable-diagnostics tdr **98**
show cluster **101**
show cluster candidates **103**
show cluster members **105**
show logging onboard **107**
show logging smartlog **112**
show mac address-table **115**
show mac address-table address **116**
show mac address-table aging-time **117**
show mac address-table count **118**
show mac address-table dynamic **119**
show mac address-table interface **120**
show mac address-table learning **121**
show mac address-table move update **122**
show mac address-table multicast **124**

show mac address-table notification 125
show mac address-table secure 127
show mac address-table static 128
show mac address-table vlan 129
show nmsp 130
shutdown 132
test cable-diagnostics prbs 133
test cable-diagnostics tdr 134
traceroute mac 135
traceroute mac ip 138
type 141
unset 142
version 144



Preface

- [Document Conventions](#), page vii
- [Related Documentation](#), page ix
- [Obtaining Documentation and Submitting a Service Request](#), page ix

Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination ^D or Ctrl-D means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in bold font .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
Courier font	Terminal sessions and information the system displays appear in <i>courier font</i> .
Bold Courier font	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Convention	Description
{x y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
<>	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document may use the following conventions for reader alerts:



Note

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



Tip

Means *the following information will help you solve a problem*.



Caution

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



Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.



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

Related Documentation

**Note**

Before installing or upgrading the switch, refer to the release notes.

- Catalyst 2960-XR Switch, located at http://www.cisco.com/go/cat2960xr_docs.
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:
http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html

Obtaining Documentation and Submitting a Service Request

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<http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>

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Using the Command-Line Interface

- [Information About Using the Command-Line Interface, page 1](#)
- [How to Use the CLI to Configure Features, page 6](#)

Information About Using the Command-Line Interface

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. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user 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 user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	Switch>	Enter logout or quit .	Use this mode to <ul style="list-style-type: none"> • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	While in user EXEC mode, enter the enable command.	Switch#	Enter disable to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the configure command.	Switch(config)#	To exit to privileged EXEC mode, enter exit or end , or press Ctrl-Z .	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the vlan <i>vlan-id</i> command.	Switch(config-vlan)#	To exit to global configuration mode, enter the exit command. To return to privileged EXEC mode, press Ctrl-Z or enter end .	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the interface command (with a specific interface).	Switch(config-if)#		Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
			To exit to global configuration mode, enter exit . To return to privileged EXEC mode, press Ctrl-Z or enter end .	
Line configuration	While in global configuration mode, specify a line with the line vty or line console command.	Switch(config-line)#	To exit to global configuration mode, enter exit . To return to privileged EXEC mode, press Ctrl-Z or enter end .	Use this mode to configure parameters for the terminal line.

Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry ?*
3. *abbreviated-command-entry <Tab>*
4. **?**
5. *command ?*
6. *command keyword ?*

DETAILED STEPS

	Command or Action	Purpose
Step 1	help Example: Switch# help	Obtains a brief description of the help system in any command mode.
Step 2	<i>abbreviated-command-entry ?</i> Example: Switch# di? dir disable disconnect	Obtains a list of commands that begin with a particular character string.
Step 3	<i>abbreviated-command-entry <Tab></i> Example: Switch# sh conf<tab> Switch# show configuration	Completes a partial command name.
Step 4	? Example: Switch> ?	Lists all commands available for a particular command mode.
Step 5	<i>command ?</i> Example: Switch> show ?	Lists the associated keywords for a command.
Step 6	<i>command keyword ?</i> Example: Switch(config)# cdp holdtime ? <10-255> Length of time (in sec) that receiver must keep this packet	Lists the associated arguments for a keyword.

Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

No and Default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

Table 2: Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) without any space between the command and the question mark. The possible keywords that you can enter with the command appear.
% Incomplete command.	You did not enter all of the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
% Invalid input detected at '^' marker.	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all of the commands that are available in this command mode. The possible keywords that you can enter with the command appear.

Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous

notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.



Note Only CLI or HTTP changes are logged.

How to Use the CLI to Configure Features

Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

SUMMARY STEPS

1. `terminal history [size number-of-lines]`

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal history [<i>size number-of-lines</i>] Example: Switch# <code>terminal history size 200</code>	Changes the number of command lines that the switch records during the current terminal session in privileged EXEC mode. You can configure the size from 0 to 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.



Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Ctrl-P or use the up arrow key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Step 2	Ctrl-N or use the down arrow key	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the up arrow key. Repeat the key sequence to recall successively more recent commands.
Step 3	show history Example: Switch# show history	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the terminal history global configuration command and the history line configuration command.

Disabling the Command History Feature

The command history feature is automatically enabled. This procedure is optional.

SUMMARY STEPS

1. **terminal no history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal no history Example: Switch# terminal no history	Disables the feature during the current terminal session in the privileged EXEC mode.

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it, reenable it. This procedures is optional.

SUMMARY STEPS

1. terminal editing

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal editing Example: Switch# <code>terminal editing</code>	Reenables the enhanced editing mode for the current terminal session in the privileged EXEC mode.

Editing Commands Through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.

**Note**

The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-B** or use the **left arrow** key
2. **Ctrl-F** or use the **right arrow** key
3. **Ctrl-A**
4. **Ctrl-E**
5. **Esc B**
6. **Esc F**
7. **Ctrl-T**
8. **Ctrl-Y**
9. **Esc Y**
10. **Delete** or **Backspace** key
11. **Ctrl-D**
12. **Ctrl-K**
13. **Ctrl-U** or **Ctrl-X**
14. **Ctrl-W**
15. **Esc D**
16. **Esc C**
17. **Esc L**
18. **Esc U**
19. **Ctrl-V** or **Esc Q**
20. **Return** key
21. **Space bar**
22. **Ctrl-L** or **Ctrl-R**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Ctrl-B or use the left arrow key	Moves the cursor back one character.
Step 2	Ctrl-F or use the right arrow key	Moves the cursor forward one character.
Step 3	Ctrl-A	Moves the cursor to the beginning of the command line.
Step 4	Ctrl-E	Moves the cursor to the end of the command line.
Step 5	Esc B	Moves the cursor back one word.
Step 6	Esc F	Moves the cursor forward one word.
Step 7	Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Step 8	Ctrl-Y	Recalls the most recent entry in the buffer.

	Command or Action	Purpose
		Recall commands from the buffer and paste them in the command line. The switch provides a buffer with the last ten items that you deleted.
Step 9	Esc Y	Recalls the next buffer entry. The buffer contains only the last 10 items that you have deleted or cut. If you press Esc Y more than ten times, you cycle to the first buffer entry.
Step 10	Delete or Backspace key	Erases the character to the left of the cursor.
Step 11	Ctrl-D	Deletes the character at the cursor.
Step 12	Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Step 13	Ctrl-U or Ctrl-X	Deletes all characters from the cursor to the beginning of the command line.
Step 14	Ctrl-W	Deletes the word to the left of the cursor.
Step 15	Esc D	Deletes from the cursor to the end of the word.
Step 16	Esc C	Capitalizes at the cursor.
Step 17	Esc L	Changes the word at the cursor to lowercase.
Step 18	Esc U	Capitalizes letters from the cursor to the end of the word.
Step 19	Ctrl-V or Esc Q	Designates a particular keystroke as an executable command, perhaps as a shortcut.
Step 20	Return key	Scrolls down a line or screen on displays that are longer than the terminal screen can display. Note The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including show command output. You can use the Return and Space bar keystrokes whenever you see the More prompt.
Step 21	Space bar	Scrolls down one screen.
Step 22	Ctrl-L or Ctrl-R	Redisplays the current command line if the switch suddenly sends a message to your screen.

Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.



Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extends beyond a single line on the screen.

SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return key**

DETAILED STEPS

	Command or Action	Purpose
Step 1	access-list Example: <pre>Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 Switch(config)# \$ 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 255.25 Switch(config)# \$t tcp 10.15.22.25 255.255.255.0 131.108.1.20 255.255.255.0 eq Switch(config)# \$15.22.25 255.255.255.0 10.15.22.35 255.255.255.0 eq 45</pre>	Displays the global configuration command entry that extends beyond one line. When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign (\$) shows that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.
Step 2	Ctrl-A Example: <pre>Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.2\$</pre>	Checks the complete syntax. The dollar sign (\$) appears at the end of the line to show that the line has been scrolled to the right.
Step 3	Return key	Execute the commands. The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the terminal width privileged EXEC command to set the width of your terminal. Use line wrapping with the command history feature to recall and modify previous complex command entries.

Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see. Using these commands is optional.

SUMMARY STEPS

1. `{show | more} command | {begin | include | exclude} regular-expression`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>{show more} command {begin include exclude} regular-expression</code> Example: <pre>Switch# show interfaces include protocol Vlan1 is up, line protocol is up Vlan10 is up, line protocol is down GigabitEthernet1/0/1 is up, line protocol is down GigabitEthernet1/0/2 is up, line protocol is up</pre>	Searches and filters the output. Expressions are case sensitive. For example, if you enter <code> exclude output</code> , the lines that contain output are not displayed, but the lines that contain output appear.

Accessing the CLI on a Switch Stack

You can access the CLI through a console connection, through Telnet, a SSH, or by using the browser.

You manage the switch stack and the stack member interfaces through the active switchstack master. You cannot manage stack members on an individual switch basis. You can connect to the active switchstack master through the console port or the Ethernet management port of one or more stack members. Be careful with using multiple CLI sessions on the active switchstack master. Commands that you enter in one session are not displayed in the other sessions. Therefore, it is possible to lose track of the session from which you entered commands.

**Note**

We recommend using one CLI session when managing the switch stack.

If you want to configure a specific stack member port, you must include the stack member number in the CLI command interface notation.

Accessing the CLI Through a Console Connection or Through Telnet

Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.

- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.
 - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.
 - The switch supports up to five simultaneous secure SSH sessions.

After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.



System Management Commands

- [archive download-sw](#), page 18
- [archive tar](#), page 22
- [archive upload-sw](#), page 26
- [banner config-save](#), page 28
- [boot](#), page 29
- [boot buffersize](#), page 31
- [boot enable-break](#), page 32
- [boot host dhcp](#), page 33
- [boot host retry timeout](#), page 34
- [boot manual](#), page 35
- [boot system](#), page 36
- [cat](#), page 37
- [clear logging onboard](#), page 38
- [clear logging smartlog statistics interface](#), page 39
- [clear mac address-table](#), page 40
- [clear mac address-table move update](#), page 41
- [cluster commander-address](#), page 42
- [cluster discovery hop-count](#), page 44
- [cluster enable](#), page 45
- [cluster holdtime](#), page 47
- [cluster member](#), page 48
- [cluster outside-interface](#), page 50
- [cluster run](#), page 51
- [cluster timer](#), page 52

- [copy](#), page 53
- [debug cluster](#), page 54
- [debug matm move update](#), page 56
- [delete](#), page 57
- [dir](#), page 58
- [help](#), page 60
- [hw-module](#), page 61
- [logging](#), page 63
- [logging buffered](#), page 64
- [logging console](#), page 65
- [logging file flash](#), page 66
- [logging history](#), page 67
- [logging history size](#), page 68
- [logging monitor](#), page 69
- [logging smartlog](#), page 70
- [logging trap](#), page 72
- [mac address-table aging-time](#), page 73
- [mac address-table learning vlan](#), page 74
- [mac address-table move update](#), page 76
- [mac address-table notification](#), page 78
- [mac address-table notification change](#), page 80
- [mac address-table static](#), page 81
- [mkdir](#), page 82
- [more](#), page 83
- [rcommand](#), page 84
- [rename](#), page 86
- [reset](#), page 87
- [rmdir](#), page 88
- [service sequence-numbers](#), page 89
- [set](#), page 90
- [show boot](#), page 93
- [show cable-diagnostics prbs](#), page 95
- [show cable-diagnostics tdr](#), page 98

- [show cluster](#), page 101
- [show cluster candidates](#), page 103
- [show cluster members](#), page 105
- [show logging onboard](#), page 107
- [show logging smartlog](#), page 112
- [show mac address-table](#), page 115
- [show mac address-table address](#), page 116
- [show mac address-table aging-time](#), page 117
- [show mac address-table count](#), page 118
- [show mac address-table dynamic](#), page 119
- [show mac address-table interface](#), page 120
- [show mac address-table learning](#), page 121
- [show mac address-table move update](#), page 122
- [show mac address-table multicast](#), page 124
- [show mac address-table notification](#), page 125
- [show mac address-table secure](#), page 127
- [show mac address-table static](#), page 128
- [show mac address-table vlan](#), page 129
- [show nmsp](#), page 130
- [shutdown](#), page 132
- [test cable-diagnostics prbs](#), page 133
- [test cable-diagnostics tdr](#), page 134
- [traceroute mac](#), page 135
- [traceroute mac ip](#), page 138
- [type](#), page 141
- [unset](#), page 142
- [version](#), page 144

archive download-sw

To download a new image from a TFTP server to the switch or switch stack and to overwrite or keep the existing image, use the **archive download-sw** command in privileged EXEC mode.

```
archive download-sw {/directory | /force-reload | /imageonly | /leave-old-sw | /no-set-boot |
/no-version-check | /destination-system stack-member-number | /only-system-type system-type | /overwrite
| /reload | /safe} source-url
```

Syntax Description

/directory	Specifies a directory for the images.
/force-reload	Unconditionally forces a system reload after successfully downloading the software image.
/imageonly	Downloads only the software image but not the HTML files associated with embedded Device Manager. The HTML files for the existing version are deleted only if the existing version is being overwritten or removed.
/leave-old-sw	Keeps the old software version after a successful download.
/no-set-boot	Stops the setting of the BOOT environment variable from being altered to point to the new software image after it is successfully downloaded.
/no-version-check	Downloads the software image without verifying its version compatibility with the image that is running on the switch. On a switch stack, downloads the software image without checking the compatibility of the stack protocol version on the image and on the stack.
/destination-system <i>stack-member-number</i>	Specifies the specific member to be upgraded. The range is 1 to 49.
/only-system-type <i>system-type</i>	Specifies the specific system type to be upgraded. The range is 0 to FFFFFFFF.
/overwrite	Overwrites the software image in flash memory with the downloaded image.
/reload	Reloads the system after successfully downloading the image, unless the configuration has been changed and has not saved.
/safe	Keeps the current software image. Does not delete it to make room for the new software image before the new image is downloaded. The current image is deleted after the download.

<i>source-url</i>	<p>Specifies the source URL alias for a local or network file system. These options are supported:</p> <ul style="list-style-type: none"> • The secondary boot loader (BS1): bsl: • The local flash: file system on the standalone switch or the active switch: flash: • The local flash: file system on a member: flash member number: • FTP: ftp: <code>[[//username[:password]@location]/directory]/image-name.tar</code> • An HTTP server: http: <code>//[[username:password]@]{hostname host-ip}/[directory]/image-name.tar</code> • A secure HTTP server: https: <code>//[[username:password]@]{hostname host-ip}/[directory]/image-name.tar</code> • Remote Copy Protocol (RCP): rcp: <code>[[//username@location]/directory]/image-name.tar</code> • TFTP: tftp: <code>[[//location]/directory]/image-name.tar</code> <p><i>image-name.tar</i> is the software image to download and install on the switch.</p>
-------------------	---

Command Default

The current software image is not overwritten with the downloaded image. Both the software image and HTML files are downloaded. The new image is downloaded to the flash: file system.

The BOOT environment variable is changed to point to the new software image on the flash: file system. Image files are case-sensitive; the image file is provided in TAR format.

Compatibility of the stack protocol version of the image to be downloaded is checked with the version on the stack.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **/imageonly** option removes the HTML files for the existing image if the existing image is being removed or replaced.

Only the Cisco IOS image (without the HTML files) is downloaded.

Using the **/safe** or **/leave-old-sw** option can cause the new image download to fail if there is insufficient flash memory.

If you leave the software in place, the new image does not have enough flash memory due to space constraints, and an error message is displayed.

If you used the **/leave-old-sw** option and did not overwrite the old image when you downloaded the new one, you can remove the old image by using the **delete** privileged EXEC command.

For more information, see [delete](#), on page 57.

If you want to download an image that has a different stack protocol version than the one existing on the stack, use the **/no-version-check** option.

You must use this option with the **/destination-system** option to specify the specific member to be upgraded with the image.

**Note**

Use the **/no-version-check** option carefully. All members, including the active switch, must have the same stack protocol version to be in the same stack.

This option allows an image to be downloaded without first confirming the compatibility of its stack protocol version with the version of the stack.

You can upgrade more than one specific stack member by repeating the **/destination-system** option in the command for each stack member to be upgraded.

Use the **/overwrite** option to overwrite the image on the flash device with the downloaded one.

If you specify the command *without* the **/overwrite** option, the download algorithm determines whether or not the new image is the same as the one on the switch flash device or is running on any stack members.

If the images are the same, the download does not occur. If the images are different, the old image is deleted, and the new one is downloaded.

After downloading a new image, enter the **/reload** privileged EXEC command to begin using the new image, or specify the **/reload** or **/force-reload** option in the **archive download-sw** command.

Examples

This example shows how to download a new image from a TFTP server at 172.20.129.10 and to overwrite the image on the switch:

```
Switch# archive download-sw /overwrite tftp://172.20.129.10/test-image.tar
```

This example shows how to download only the software image from a TFTP server at 172.20.129.10 to the switch:

```
Switch# archive download-sw /imageonly tftp://172.20.129.10/test-image.tar
```

This example shows how to keep the old software version after a successful download:

```
Switch# archive download-sw /leave-old-sw tftp://172.20.129.10/test-image.tar
```

This example shows how to upgrade stack members 6 and 8:

```
Switch# archive download-sw /imageonly /destination-system 6 /destination-system 8  
tftp://172.20.129.10/test-image.tar
```

Related Commands

Command	Description
archive tar	Creates a TAR file, lists files in a TAR file, or extracts the files from a TAR file.
archive upload-sw	Uploads an existing image on the switch to the server.

archive tar

To create a TAR file, list files in a TAR file, or extract the files from a TAR file, use the **archive tar** command in privileged EXEC mode.

```
archive tar {/create destination-url flash:/file-url} | /table source-url | {/xtract source-url flash:/file-url [dir/file...]}
```

Syntax Description

/create <i>destination-url</i> flash:/file-url	Creates a new TAR file on the local or network file system. <i>destination-url</i> —Specifies the destination URL alias for the local or network file system and the name of the tar file to create. These options are supported: <ul style="list-style-type: none"> • The local flash file system: flash: • FTP: ftp: [[/username[:password]@]location]/directory]/itar-filename.tar • An HTTP server: http: //[[username:password]@]{hostname host-ip}[/directory]/image-name.tar • A secure HTTP server: https: //[[username:password]@]{hostname host-ip}[/directory]/image-name.tar • Remote Copy Protocol (RCP): rcp: [[/username@location]/directory]/tar-filename.tar • TFTP: tftp: [[/location]/directory]/image-name.tar
--	---

tar-filename.tar is the TAR file to be created.

flash:/file-url—Specifies the location on the local flash: file system from which the new tar file is created.

Optionally, you can specify the list of files list of files or directories within the source directory that you want to be written to the new TAR file. If none are specified, all files and directories at this level are written to the newly created TAR file.

table *source-url* Displays the contents of an existing TAR file to the screen.

source-url—Specifies the source URL alias for the local or network file system. These options are supported:

- The local flash: file system:

flash:

- FTP:

ftp: `[[//username[:password]@location]/directory]/tar-filename.tar`

- An HTTP server:

http: `//[[username:password]@]{hostname | host-ip}[/directory]/image-name.tar`

- A secure HTTP server:

https: `//[[username:password]@]{hostname | host-ip}[/directory]/image-name.tar`

- Remote Copy Protocol (RCP):

rcp: `[[//username@location]/directory]/tar-filename.tar`

- TFTP:

tftp: `[[//location]/directory]/image-name.tar`

tar-filename.tar is the TAR file to be displayed.

/xtract Extracts files from a TAR file to the local file system.

source-url

flash:/file-url [*dir/file...*] *source-url*—Specifies the source URL alias for the local file system. These options are supported:

- The local flash: file system:

flash:
- FTP:

ftp: [[/username[:password]@location]/directory]/itar-filename.tar
- An HTTP server:

http: //[[username:password]@]{hostname | host-ip}/[directory]/image-name.tar
- A secure HTTP server:

https: //[[username:password]@]{hostname | host-ip}/[directory]/image-name.tar
- Remote Copy Protocol (RCP):

rcp: [[/username@location]/directory]/tar-filename.tar
- TFTP:

tftp: [[/location]/directory]/image-name.tar

tar-filename.tar is the TAR file from which to extract.

flash:/file-url [*dir/file...*]—Specifies the location on the local flash: file system from which the new TAR file is extracted. Use the *dir/file...* option to specify an optional list of files or directories within the TAR file to be extracted. If none are specified, all files and directories are extracted.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

Image names are case sensitive.

Examples

This example shows how to create a TAR file. The command writes the contents of the *new-configs* directory on the local flash: file device to a file named *saved.tar* on the TFTP server at 172.20.10.30:

```
Switch# archive tar /create tftp:172.20.10.30/saved.tar flash:/new_configs
```

This example shows how to display the contents of the file that is in flash memory. The contents of the TAR file appear on the screen:

```
Switch# archive tar /table flash:c2960-lanbase-tar.12-25.FX.tar
info (219 bytes)
(directory)
(610856 bytes)
  info (219 bytes)
info.ver (219 bytes)
```

This example shows how to display only the /html directory and its contents:

```
flash:2960-lanbase-mz.12-25.FX.tar 2960-lanbase-mz.12-25.FX/html
(directory)
(556 bytes)
(9373 bytes)
(1654 bytes)
<output truncated>
```

This example shows how to extract the contents of a TAR file on the TFTP server at 172.20.10.30. This command extracts just the new-configs directory into the root directory on the local flash: file system. The remaining files in the saved.tar file are not extracted.

```
Switch# archive tar /xtract tftp://172.20.10.30/saved.tar flash:/new-configs
```

Related Commands

Command	Description
archive download-sw	Downloads a new image from a TFTP server to the switch or switch stack and overwrites or keeps the existing image.
archive upload-sw	Uploads an existing image on the switch to the server.

archive upload-sw

To upload an existing image to the server, use the **archive upload-sw** privileged EXEC command.

archive upload-sw [/source-system-num *member number* | /version *version_string*]*destination-url*

Syntax Description

/source-system-num (Optional) Specifies the specific stack member containing the image that is to be uploaded.
stack member number

/version *version_string* (Optional) Specifies the specific version string of the image to be uploaded.

destination-url The destination URL alias for a local or network file system. These options are supported:

- The local flash: file system on the standalone switch or the stack master:

flash:

- The local flash: file system on a member:

flash *member number*:

- FTP:

ftp: [[/username[:password]@location]/directory]/image-name.tar

- An HTTP server:

http: //[[username:password]@]{hostname | host-ip}[/directory]/image-name.tar

- A secure HTTP server:

https: //[[username:password]@]{hostname | host-ip}[/directory]/image-name.tar

- Secure Copy Protocol (SCP):

scp: [[/username@location]/directory]/image-name.tar

- Remote Copy Protocol (RCP):

rcp: [[/username@location]/directory]/image-name.tar

- TFTP:

tftp: [[/location]/directory]/image-name.tar

image-name.tar is the name of the software image to be stored on the server.

Command Default

Uploads the currently running image from the flash: file system.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use the upload feature only if the HTML files associated with embedded Device Manager have been installed with the existing image.

The files are uploaded in this sequence: the Cisco IOS image, the HTML files, and info. After these files are uploaded, the software creates the TAR file.

Image names are case sensitive.

Examples

This example shows how to upload the currently running image on stack member 3 to a TFTP server at 172.20.140.2:

```
Switch# archive upload-sw /source-system-num 3tftp://172.20.140.2/test-image.tar
```

Related Commands

Command	Description
archive download-sw	Downloads a new image from a TFTP server to the switch or switch stack and overwrites or keeps the existing image.
archive tar	Creates a TAR file, lists files in a TAR file, or extracts the files from a TAR file.

banner config-save

To create a warning message to be displayed when you try to save the configuration file to NVRAM, use the **banner config-save** global configuration command.

banner config-save *^Cwarning-message^C*

Syntax Description

<i>^Cwarning-message^C</i>	The warning messages to be displayed when you try to save the configuration file to NVRAM.
----------------------------	--

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example creates the warning message: "Caution - if you save a configuration file to NVRAM, you might not be able to automatically download configuration files during reboot":

```
Switch(config)# banner config-save ^C Caution - if you save a configuration file to NVRAM,
you might not be able to automatically download configuration files during reboot^C
```

boot

To load and boot an executable image and display the command-line interface (CLI), use the **boot** command in boot loader mode.

```
boot [-post | -n | -p |flag] filesystem:/file-url...
```

Syntax Description

-post	(Optional) Run the loaded image with an extended or comprehensive power-on self-test (POST). Using this keyword causes POST to take longer to complete.
-n	(Optional) Pause for the Cisco IOS Debugger immediately after launching.
-p	(Optional) Pause for the JTAG Debugger right after loading the image.
<i>filesystem:</i>	Alias for a file system. Use flash: for the system board flash device; use usbflash0: for USB memory sticks.
<i>/file-url</i>	Path (directory) and name of a bootable image. Separate image names with a semicolon.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When you enter the **boot** command without any arguments, the switch attempts to automatically boot the system by using the information in the BOOT environment variable, if any.

If you supply an image name for the *file-url* variable, the **boot** command attempts to boot the specified image.

When you specify boot loader **boot** command options, they are executed immediately and apply only to the current boot loader session.

These settings are not saved for the next boot operation.

Filenames and directory names are case sensitive.

Examples

This example shows how to boot the switch using the *new-image.bin* image:

```
Switch: set BOOT flash:/new-images/new-image.bin
Switch: boot
```

After entering this command, you are prompted to start the setup program.

Related Commands

Command	Description
boot manual	Enables manual boot of the switch during the next boot cycle.
boot system	Specifies the name of the configuration file that is used as a boot image.
show boot	Displays the setting of the boot environment variables.

boot buffersize

To configure the NVRAM buffer size, use the **boot buffersize** global configuration command.

boot buffersize *size*

Syntax Description

size The NVRAM buffer size in KB. The valid range is from 4096 to 1048576.

Command Default

The default NVRAM buffer size is 512 KB.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

After you configure the NVRAM buffer size, reload the switch or switch stack.

When you add a switch to a stack and the NVRAM size differs, the new switch synchronizes with the stack and reloads automatically.

Examples

The following example sets the buffer size to 524288 KB:

```
Switch(config)# boot buffersize 524288
```

boot enable-break

To enable the interruption of the automatic boot process on a standalone switch, use the **boot enable-break** global configuration command. Use the **no** form of this command to return to the default setting.

boot enable-break

no boot enable-break

Syntax Description This command has no arguments or keywords.

Command Default Disabled. The automatic boot process cannot be interrupted by pressing the **Break** key on the console.

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines This command works properly only from a standalone switch. When you enter this command, you can interrupt the automatic boot process by pressing the **Break** key on the console after the flash: file system is initialized.



Note Despite setting this command, you can interrupt the automatic boot process at any time by pressing the MODE button on the switch front panel.

This command changes the setting of the ENABLE_BREAK environment variable.

boot host dhcp

To configure the switch to download files from a DHCP server, use the **boot host dhcp** global configuration command.

boot host dhcp

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example uses the **boot host dhcp** command to enable auto-configuration with a saved configuration.

```
Switch(config)# boot host dhcp
```

boot host retry timeout

To set the amount of time for which the system tries to download a configuration file, use the **boot host retry timeout** global configuration command.

boot host retry timeout *timeout-value*

Syntax Description

<i>timeout-value</i>	The length of time before the system times out, after trying to download a configuration file.
----------------------	--

Command Default

There is no default. If you do not set a timeout, the system indefinitely tries to obtain an IP address from the DHCP server.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example sets the timeout to 300 seconds:

```
Switch(config)# boot host retry timeout 300
```

boot manual

To enable the ability to manually boot a standalone switch during the next boot cycle, use the **boot manual** global configuration command. Use the **no** form of this command to return to the default setting.

boot manual

no boot manual

Syntax Description This command has no arguments or keywords.

Command Default Manual booting is disabled.

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines This command works properly only from a standalone switch.

The next time you reboot the system, the switch is in boot loader mode, which is shown by the *switch:* prompt. To boot up the system, use the **boot** boot loader command, and specify the name of the bootable image.

This command changes the setting of the MANUAL_BOOT environment variable.

Related Commands	Command	Description
	boot	Loads and boots an executable image and then enters the CLI.
	boot system	Specifies the name of the configuration file that is used as a boot image.

boot system

To specify the name of the configuration file that is used as a boot image, use the **boot system** global configuration command.

boot system *filename* [**switch** {*switch number* | **all**}]

Syntax Description

<i>filename</i>	The name of the boot image configuration file.
switch	(Optional) Sets the system image for switches in the stack.
<i>switch number</i>	The switch number.
all	Sets the system image for all switches in the stack.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example specifies the name of the boot image configuration file as *config-boot.text*:

```
Switch(config)# boot system config-boot.text
```

cat

To display the contents of one or more files, use the **cat** command in boot loader mode.

cat *filesystem:/file-url...*

Syntax Description

<i>filesystem:</i>	Specifies a file system.
<i>/file-url</i>	Specifies the path (directory) and name of the files to display. Separate each filename with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

If you specify a list of files, the contents of each file appears sequentially.

Examples

This example shows how to display the contents of an image file:

```
Switch: cat flash:image_file_name
version_suffix: universal-122-xx.SEx
version_directory: image_file_name
image_system_type_id: 0x00000002
image_name: image_file_name.bin
ios_image_file_size: 8919552
total_image_file_size: 11592192
image_feature: IP|LAYER_3|PLUS|MIN_DRAM_MEG=128
image_family: family
stacking_number: 1.34
board_ids: 0x00000068 0x00000069 0x0000006a 0x0000006b
info_end:
```

clear logging onboard

To clear all of the on-board failure logging (OBFL) data, use the **clear logging onboard** privileged EXEC command on the switch stack or on a standalone switch. The command clears all of the OBFL data except for the uptime and CLI-command information stored in the flash memory.

clear logging onboard [**module** {*switch-number* | **all**}]

Syntax Description

module	(Optional) Clears OBFL data on specified switches in the stack.
<i>switch-number</i>	The identity of the specified switch. The range is from 1 to 4.
all	(Optional) Clears OBFL data on all switches in the stack.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

We recommend that you keep OBFL enabled and do not erase the data stored in the flash memory.

Examples

This example shows how to clear all the OBFL information except for the uptime and CLI-command information:

```
Switch# clear logging onboard
Clear logging onboard buffer [confirm]
```

You can verify that the information is deleted by entering the **show logging onboard** privileged EXEC command.

clear logging smartlog statistics interface

To clear smart logging counters on an interface, use the **clear logging smartlog statistics interface** command in privileged EXEC.

clear logging smartlog statistics [**interface** *interface-id*]

Syntax Description	interface <i>interface-id</i> (Optional) Clears smart log counters on a specified interface.
---------------------------	---

Command Default	None
------------------------	------

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

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines	You can clear all smart logging statistics by using the clear logging smartlog statistics command, or you can clear only the statistics on an interface by using the clear logging smartlog statistics interface <i>interface-id</i> command.
-------------------------	---

Examples	<p>This example shows how to clear all smart logging statistics:</p> <pre>Switch# clear logging smartlog statistics</pre> <p>This example shows how to clear only the smart logging statistics on the specified interface:</p> <pre>Switch# clear logging smartlog statistics interface gigabitethernet1/0</pre> <p>You can verify that the statistics are deleted by entering the show ipc rpc or the show ipc session commands in privileged EXEC.</p>
-----------------	--

Related Commands	Command	Description
	logging smartlog	Enables smart logging on the switch.
	show logging smartlog	Displays smart logging information.

clear mac address-table

To delete a specific dynamic address, all dynamic addresses on a particular interface, all dynamic addresses on stack members,

or all dynamic addresses on a particular VLAN from the MAC address table, use the **clear mac address-table** privileged EXEC command.

This command also clears the MAC address notification global counters.

clear mac address-table {**dynamic** [**address** *mac-addr* | **interface** *interface-id* | **vlan** *vlan-id*] | **notification**}

Syntax Description

dynamic	Deletes all dynamic MAC addresses.
address <i>mac-addr</i>	(Optional) Deletes the specified dynamic MAC address.
interface <i>interface-id</i>	(Optional) Deletes all dynamic MAC addresses on the specified physical port or port channel.
vlan <i>vlan-id</i>	(Optional) Deletes all dynamic MAC addresses for the specified VLAN. The range is 1 to 4094.
notification	Clears the notifications in the history table and reset the counters.

Command Default

No default is defined.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to remove a specific MAC address from the dynamic address table:

```
Switch# clear mac address-table dynamic address 0008.0070.0007
```

You can verify that the information is deleted by entering the **show mac address-table** privileged EXEC command.

Related Commands

Command	Description
show mac address-table	Displays a specific MAC address table entry.

clear mac address-table move update

To clear the mac address-table-move update-related counters, use the **clear mac address-table move update** privileged EXEC command.

clear mac address-table move update

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example shows how to clear the **mac address-table move** update-related counters.

```
Switch# clear mac address-table move update
```

You can verify that the information is cleared by entering the **show mac address-table move update** privileged EXEC command.

Related Commands	Command	Description
	show mac address-table move update	Displays the MAC address-table move update information on the switch.
	mac address-table move update	Adds static addresses to the MAC address table.

cluster commander-address

To specify the cluster command MAC address on a cluster member switch when the member has lost communication with the cluster command switch, use the

cluster commander-address global configuration command. Use the **no** form of this global configuration command from the

cluster member switch console port to remove the switch from a cluster only during debugging or recovery procedures.

cluster commander-address *mac-address* [**member** *number* | **name** *name*]

no cluster commander-address

Syntax Description

<i>mac-address</i>	The MAC address of the cluster command switch.
member <i>number</i>	(Optional) Specifies the number of a configured cluster member switch. The range is 0 to 15.
name <i>name</i>	(Optional) Specifies the name of the configured cluster up to 31 characters.

Command Default

The switch is not a member of any cluster.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command is available only on the cluster command switch. The cluster command switch automatically provides its MAC address to cluster member switches when these switches join the cluster. The cluster member switch adds this information and other cluster information to its running configuration file.

A cluster member can have only one cluster command switch.

The cluster member switch retains the identity of the cluster command switch during a system reload by using the *mac-address* parameter.

You can enter the **no** form on a cluster member switch to remove it from the cluster during debugging or recovery procedures. You usually use this command from

the cluster member switch console port only when the member has lost communication with the cluster command switch. With a typical switch configuration, we recommend that you remove

cluster member switches only by entering the **no cluster member *n*** global configuration command on the cluster command switch.

When a standby cluster command switch becomes active (becomes the cluster command switch), it removes the cluster commander address line from its configuration.

Examples

The following example shows partial output from the running configuration of a cluster member:

```
Switch(config)# show running-configuration
<output truncated>
cluster commander-address 00e0.9bc0.a500 member 4 name my_cluster
<output truncated>
```

This example shows how to remove a member from the cluster by using the cluster member console:

```
Switch # configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# no cluster commander-address
```

You can verify your settings by entering the **show cluster** privileged EXEC command.

Related Commands

Command	Description
cluster member	Adds candidates to a cluster.
show cluster members	Displays information about cluster members.
show cluster	Displays cluster status and cluster summary.
debug cluster	Enables debugging of cluster-specific events.

cluster discovery hop-count

To set the hop-count limit for extended discovery of candidate switches, use the **cluster discovery hop-count** global configuration command on the cluster command switch. Use the **no** form of this command to return to the default setting.

cluster discovery hop-count *number*

no cluster discovery hop-count

Syntax Description

<i>number</i>	The number of hops from the cluster edge that the cluster command switch limits the discovery of candidates. The range is 1 to 7.
---------------	---

Command Default

The default hop count is 3.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command is available only on the cluster command switch. This command does not operate on cluster member switches.

If the hop count is set to 1, extended discovery is disabled. The cluster command switch discovers only candidates that are one hop from the edge of the cluster. The edge of the cluster is the point between the last discovered cluster member switch and the first discovered candidate switch.

Examples

This example shows how to set hop count limit to 4. This command is executed on the cluster command switch:

```
Switch(config)# cluster discovery hop-count 4
```

You can verify your setting by entering the **show cluster** privileged EXEC command.

cluster enable

To enable a command-capable switch as the cluster command switch, assign a cluster name, and optionally assign a member number to it, use the

cluster enable global configuration command. Use the **no** form of the command to remove all members and to

make the cluster command switch a candidate switch.

cluster enable *name* [*command-switch-member-number*]

no cluster enable

Syntax Description

<i>name</i>	The name of the cluster up to 31 characters. Valid characters include only alphanumerics, dashes, and underscores.
<i>command-switch-member-number</i>	(Optional) A member number that is assigned to the cluster command switch of the cluster. The range is 0 to 15.

Command Default

The switch is not a cluster command switch.

No cluster name is defined.

The member number is 0 when the switch is the cluster command switch.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command on any command-capable switch that is not part of any cluster. This command fails if a device is already configured as a member of the cluster.

You must name the cluster when you enable the cluster command switch. If the switch is already configured as the cluster command switch, this command changes the

cluster name if it is different from the previous cluster name.

Examples

This example shows how to enable the cluster command switch, name the cluster, and set the cluster command switch member number to 4:

```
Switch(config)# cluster enable Engineering-IDF4 4
```

You can verify your setting by entering the **show cluster** privileged EXEC command on the cluster command switch.

cluster holdtime

To set the duration in seconds before a switch (either the command or cluster member switch) declares the other switch down after not receiving heartbeat messages, use the **cluster holdtime** global configuration command on the cluster command switch. Use the **no** form of this command to set the duration to the default value.

cluster holdtime *holdtime-in-secs*

no cluster holdtime

Syntax Description

<i>holdtime-in-secs</i>	Duration in seconds before a switch (either a command or cluster member switch) declares the other switch down. The range is 1 to 300 seconds.
-------------------------	--

Command Default

The default holdtime is 80 seconds.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command with the **cluster timer** global configuration command only on the cluster command switch. The cluster command switch propagates the values to all its cluster members so that the setting is consistent among all switches in the cluster. The holdtime is typically set as a multiple of the interval timer (cluster timer). For example, it takes (holdtime-in-secs divided by the interval-in-secs) number of heartbeat messages to be missed in a row to declare a switch down.

Examples

This example shows how to change the interval timer and the duration on the cluster command switch:

```
Switch(config)# cluster timer 3
Switch(config)# cluster holdtime 30
```

You can verify your settings by entering the show cluster privileged EXEC command.

cluster member

To add candidates to a cluster, use the **cluster member** global configuration command on the cluster command switch.

Use the **no** form of the command to remove members from the cluster.

cluster member [*n*] **mac-address** *H.H.H* [**password** *enable-password*] [**vlan** *vlan-id*]

no cluster member *n*

Syntax Description

<i>n</i>	(Optional) The number that identifies a cluster member. The range is 0 to 15.
mac-address <i>H.H.H</i>	Specifies the MAC address of the cluster member switch in hexadecimal format.
password <i>enable-password</i>	(Optional) Enables the password of the candidate switch. The password is not required if there is no password on the candidate switch.
vlan <i>vlan-id</i>	(Optional) Specifies the ID of the VLAN through which the candidate is added to the cluster by the cluster command switch. The range is 1 to 4094.

Command Default

A newly enabled cluster command switch has no associated cluster members.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command only on the cluster command switch to add a candidate to or remove a member from the cluster.

If you enter this command on a switch other than the cluster command switch, the switch rejects the command and displays an error message.

You must enter a member number to remove a switch from the cluster. However, you do not need to enter a member number to add a switch to the cluster.

The cluster command switch selects the next available member number and assigns it to the switch that is joining the cluster.

You must enter the enabled password of the candidate switch for authentication when it joins the cluster. The password is not saved in the running or startup configuration.

After a candidate switch becomes a member of the cluster, its password becomes the same as the cluster command-switch password.

If a switch does not have a configured hostname, the cluster command switch appends a member number to the cluster command-switch hostname and assigns it to the

cluster member switch.

If you do not specify a VLAN ID, the cluster command switch automatically chooses a VLAN and adds the candidate to the cluster.

Examples

This example shows how to add a switch as member 2 with MAC address 00E0.1E00.2222 and the password **key** to a cluster. The cluster command switch

adds the candidate to the cluster through VLAN 3:

```
Switch(config)# cluster member 2 mac-address 00E0.1E00.2222 password key vlan 3
```

This example shows how to add a switch with MAC address 00E0.1E00.3333 to the cluster. This switch does not have a password. The cluster command switch selects the next

available member number and assigns it to the switch that is joining the cluster:

```
Switch(config)# cluster member mac-address 00E0.1E00.3333
```

You can verify your settings by entering the **show cluster members** privileged EXEC command on the cluster command switch.

Related Commands

Command	Description
cluster commander-address	Removes the switch from a cluster during debugging or recovery procedures.
show cluster members	Displays information about cluster members.
show cluster	Displays cluster status and cluster summary.
debug cluster	Enables debugging of cluster-specific events.

cluster outside-interface

To configure the outside interface for cluster Network Address Translation (NAT), use the **cluster outside-interface** global configuration

command on the cluster command switch, so that a member without an IP address can communicate with devices outside the cluster. Use the **no** form

of this command to return to the default setting.

cluster outside-interface *interface-id*

no cluster outside-interface

Syntax Description

<i>interface-id</i>	Interface to serve as the outside interface. Valid interfaces include physical interfaces, port channels, or VLANs. The port channel range is 1 to 6. The VLAN range is 1 to 4094.
---------------------	--

Command Default

The default outside interface is automatically selected by the cluster command switch.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command only on the cluster command switch. If you enter this command on a cluster member switch, an error message appears.

Examples

This example shows how to set the outside interface to VLAN 1:

```
Switch(config)# cluster outside-interface vlan 1
```

You can verify your setting by entering the **show running-config** privileged EXEC command.

cluster run

To enable clustering on a switch, use the **cluster run** global configuration command. Use the **no** form of this command to disable clustering on a switch.

cluster run

no cluster run

Syntax Description This command has no arguments or keywords.

Command Default Clustering is enabled on all switches.

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines When you enter the **no cluster run** command on a cluster command switch, the cluster command switch is disabled. Clustering is disabled, and the switch cannot become a candidate switch.

When you enter the **no cluster run** command on a cluster member switch, it is removed from the cluster. Clustering is disabled, and the switch cannot become a candidate switch.

When you enter the **no cluster run** command on a switch that is not part of a cluster, clustering is disabled on this switch. This switch cannot then become a candidate switch.

Examples This example shows how to disable clustering on the cluster command switch:

```
Switch(config)# no cluster run
```

cluster timer

To set the number of seconds between heartbeat messages, use the **cluster timer** global configuration command on the cluster command switch. To set the interval to the default value, use the **no** form of the command

cluster timer *interval-in-secs*

no cluster timer

Syntax Description

<i>interval-in-secs</i>	Interval in seconds between heartbeat messages. The range is 1 to 300 seconds.
-------------------------	--

Command Default

The default interval is 8 seconds.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command with the **cluster holdtime** global configuration command only on the cluster command switch.

The cluster command switch propagates the values to all its cluster members so that the setting is consistent among all switches in the cluster.

The holdtime is typically set as a multiple of the heartbeat interval timer (**cluster timer**).

For example, the number of heartbeat messages that are missed in a row before a switch is declared down is calculated by dividing the number of seconds of holdtime by the number of seconds in the interval.

Examples

This example shows how to change the heartbeat interval timer and the duration on the cluster command switch:

```
Switch(config)# cluster timer 3
Switch(config)# cluster holdtime 30
```

You can verify your settings by entering the **show cluster** privileged EXEC command.

copy

To copy a file from a source to a destination, use the **copy** command in boot loader mode.

```
copy filesystem:/source-file-url filesystem:/destination-file-url
```

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use usbflash0: for USB memory sticks.
<i>/source-file-url</i>	Path (directory) and filename (source) to be copied.
<i>/destination-file-url</i>	Path (directory) and filename of the destination.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

Directory names are limited to 127 characters between the slashes (/); the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

Filenames are limited to 127 characters; the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

If you are copying a file to a new directory, the directory must already exist.

Examples

This example shows how to copy a file at the root:

```
Switch: copy usbflash0:test1.text usbflash0:test4.text
File "usbflash0:test1.text" successfully copied to "usbflash0:test4.text"
```

You can verify that the file was copied by entering the **dir filesystem:** boot loader command.

debug cluster

Use the **debug cluster** privileged EXEC command to enable debugging of cluster-specific events. Use the **no** form of this command to disable debugging.

debug cluster {**discovery** | **events** | **extended** | **hrsp** | **http** | **ip** [**packet**] | **members** | **nat** | **neighbors** | **platform** | **snmp** | **vqpxy**}

no debug cluster {**discovery** | **events** | **extended** | **hrsp** | **http** | **ip** [**packet**] | **members** | **nat** | **neighbors** | **platform** | **snmp** | **vqpxy**}

Syntax Description

discovery	Displays cluster discovery debug messages.
events	Displays cluster event debug messages.
extended	Displays extended discovery debug messages.
hrsp	Displays the Hot Standby Router Protocol (HSRP) debug messages.
http	Displays Hypertext Transfer Protocol (HTTP) debug messages.
ip [packet]	Displays IP or transport packet debug messages.
members	Displays cluster member debug messages.
nat	Displays Network Address Translation (NAT) debug messages.
neighbors	Displays cluster neighbor debug messages.
platform	Displays platform-specific cluster debug messages.
snmp	Displays Simple Network Management Protocol (SNMP) debug messages.
vqpxy	Displays VLAN Query Protocol (VQP) proxy debug messages.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command is available only on the cluster command switch stack or cluster command switch.

The **undebug cluster** command works the same as the **no debug cluster** command.

When you enable debugging, it is enabled only on the stack master. To enable debugging on a stack member, you can start a session from the stack master by using the **session** *switch-number* privileged EXEC command.

Then enter the **debug** command at the command-line prompt of the stack member.

You also can use the **remote command** *stack-member-number* LINE privileged EXEC command on the stack master switch to enable

debugging on a member switch without first starting a session.

debug matm move update

To enable debugging of MAC address-table move update message processing, use the **debug matm move update** privileged EXEC command. Use the **no** form of this command to return to the default setting.

debug matm move update

no debug matm move update

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug matm move update** command works the same as the **no debug matm move update** command.

When you enable debugging, it is enabled only on the stack master. To enable debugging on a stack member, you can start a session from the stack master by using the **session *switch-number*** privileged EXEC command.

Then enter the **debug** command at the command-line prompt of the stack member.

You can also use the **remote command *stack-member-number* *LINE*** privileged EXEC command on the stack master switch to enable

debugging on a member switch without first starting a session.

delete

To delete one or more files from the specified file system, use the **delete** command in boot loader mode.

delete *filesystem:/file-url...*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use usbflash0: for USB memory sticks.
<i>/file-url...</i>	Path (directory) and filename to delete. Separate each filename with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

The switch prompts you for confirmation before deleting each file.

Examples

This example shows how to delete two files:

```
Switch: delete usbflash0:test2.text usbflash0:test5.text
Are you sure you want to delete "usbflash0:test2.text" (y/n)?y
File "usbflash0:test2.text" deleted
Are you sure you want to delete "usbflash0:test5.text" (y/n)?y
File "usbflash0:test2.text" deleted
```

You can verify that the files were deleted by entering the **dir usbflash0:** boot loader command.

dir

To display the list of files and directories on the specified file system, use the **dir** command in boot loader mode.

dir *filesystem:/file-url*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use flash: for the system board flash device; use usbflash0: for USB memory sticks.
<i>/file-url</i>	(Optional) Path (directory) and directory name that contain the contents you want to display. Separate each directory name with a space.

Command Default

No default behavior or values.

Command Modes

Boot Loader
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Directory names are case sensitive.

Examples

This example shows how to display the files in flash memory:

```
Switch: dir flash:
Directory of flash:/
  2  -rwx      561   Mar 01 2013 00:48:15  express_setup.debug
  3  -rwx    2160256   Mar 01 2013 04:18:48  c2960x-dmon-mz-150-2r.EX
  4  -rwx     1048   Mar 01 2013 00:01:39  multiple-fs
  6  drwx      512   Mar 01 2013 23:11:42  c2960x-universalk9-mz.150-2.EX
645 drwx      512   Mar 01 2013 00:01:11  dc_profile_dir
647 -rwx     4316   Mar 01 2013 01:14:05  config.text
648 -rwx        5   Mar 01 2013 00:01:39  private-config.text

96453632 bytes available (25732096 bytes used)
```

Table 3: dir Field Descriptions

Field	Description
2	Index number of the file.

Field	Description
-rwx	File permission, which can be any or all of the following: <ul style="list-style-type: none"> • d—directory • r—readable • w—writable • x—executable
1644045	Size of the file.
<date>	Last modification date.
env_vars	Filename.

Related Commands

Command	Description
rmdir	Removes one or more empty directories from the specified file system.
mkdir	Creates one or more directories on the specified file system.

help

To display the available commands, use the **help** command in boot loader mode.

help

Syntax Description

This command has no arguments or keywords.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to display a list of available boot loader commands:

```
Switch:help
? -- Present list of available commands
arp -- Show arp table or arp-resolve an address
boot -- Load and boot an executable image
cat -- Concatenate (type) file(s)
copy -- Copy a file
delete -- Delete file(s)
dir -- List files in directories
emergency-install -- Initiate Disaster Recovery
...
...
...
unset -- Unset one or more environment variables
version -- Display boot loader version
```

hw-module

To enable on-board failure logging (OBFL), use the **hw-module** global configuration command on the switch stack or on a standalone switch. Use the **no** form of this command to disable this feature.

hw-module module [*switch-number*] **logging onboard** [**message level** *level*]

no hw-module module [*switch-number*] **logging onboard** [**message level** *level*]

Syntax Description

module	Specifies the module number.
<i>switch-number</i>	(Optional) The switch number, which is the stack member number. If the switch is a standalone switch, the switch number is 1. If the switch is in a stack, the range is 1 to 4, depending on the switch member numbers in the stack.
logging-onboard	Specifies on-board failure logging.
message level <i>level</i>	(Optional) Specifies the severity of the hardware-related messages that are stored in the flash memory. The range is from 1 to 7.

Command Default

OBFL is enabled, and all messages appear.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

We recommend that you keep OBFL enabled and do not erase the data stored in the flash memory.

To ensure that the time stamps in the OBFL data logs are accurate, you should manually set the system clock or configure it by using Network Time Protocol (NTP).

If you do not enter the **message level** *level* parameter, all the hardware-related messages generated by the switch are stored in the flash memory.

On a standalone switch, entering the **hw-module module** [*switch-number*] **logging onboard** [**message level** *level*] command is the same as entering the **hw-module module logging onboard** [**message level** *level*] command.

Entering the **hw-module module logging onboard** [**message level** *level*] command on a stack master enables OBFL on all the stack members that support OBFL.

Examples

This example shows how to enable OBFL on a switch stack and to specify that all the hardware-related messages on stack member 4 are stored in the flash memory when this command is entered on the stack master:

```
Switch(config)# hw-module module 4 logging onboard
```

This example shows how to enable OBFL on a standalone switch and to specify that only severity 1 hardware-related messages are stored in the flash memory of the switch:

```
Switch(config)# hw-module module 1 logging onboard message level 1
```

You can verify your settings by entering the **show logging onboard** privileged EXEC command.

logging

To log messages to a UNIX syslog server host, use the **logging** global configuration command.

logging *host*

Syntax Description

<i>host</i>	The name or IP address of the host to be used as the syslog server.
-------------	---

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

To build a list of syslog servers that receive logging messages, enter this command more than once.

Examples

The following example specifies the logging host IP as 125.1.1.100:

```
Switch(config)# logging 125.1.1.100
```

logging buffered

To log messages to an internal buffer, use the **logging buffered** global configuration command. Use it on the switch or on a standalone switch or, in the case of a switch stack, on the stack master.

logging buffered [*size*]

Syntax Description

<i>size</i>	(Optional) The size of the buffer created, in bytes. The range is 4096 to 2147483647 bytes. The default buffer size is 4096 bytes.
-------------	--

Command Default

The default buffer size is 4096 bytes.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If a standalone switch or the stack master fails, the log file is lost unless you previously saved it to flash memory using the **logging file flash** global configuration command.

Do not make the buffer size too large because the switch could run out of memory for other tasks.

Use the **show memory** privileged EXEC command to view the free processor memory on the switch.

However, this value is the maximum number of bytes available, and the buffer size should not be set to this amount.

Examples

The following example sets the logging buffer to 8192 bytes:

```
Switch(config)# logging buffered 8192
```

logging console

To limit messages logged to the console according to severity, use the **logging console** command. Use the **no** form of this command to disable message logging.

logging console *level*

no logging console

Syntax Description

level The severity level of messages logged to the console. The severity levels are:

- Emergencies—System is unusable (severity=0)
- Alerts—Immediate action needed (severity=1)
- Critical—Critical conditions (severity=2)
- Errors—Error conditions (severity=3)
- Warnings—Warning conditions (severity=4)
- Notifications—Normal but significant conditions (severity=5)
- Informational—Informational messages (severity=6)
- Debugging—Debugging messages (severity=7)
- Discriminator—Establish MD-Console association
- Filtered—Enable filtered logging
- Guaranteed—Guarantee console messages
- XML—Enable logging in XML

Command Default

By default, the console receives debugging messages and numerically lower levels.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the level of console messages received to severity 3 (errors) and above:

```
Switch(config)# logging console 3
```

logging file flash

To store log messages in a file in flash memory, use the **logging file flash** command. Use it on a standalone switch or, in the case of a switch stack, on the stack master.

logging file flash:*filename* [*max-file-size* [*min-file-size*]] [*severity-level-number* | *type*]

Syntax Description

<i>:filename</i>	The log message filename.
<i>max-file-size</i>	(Optional) The maximum logging file size. The range is 4096 to 2147483647. The default is 4096 bytes.
<i>min-file-size</i>	(Optional) The minimum logging file size. The range is 1024 to 2147483647. The default is 2048 bytes.
<i>max-file-size</i> <i>type</i>	(Optional) Either the logging severity level or the logging type. The severity range is 0 to 7.

Command Default

The default maximum file size is 4096 bytes and the default minimum file size is 1024 bytes.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the logging flash: filename to log_msg.txt, the maximum file size to 40960, the minimum file size to 4096, and the message severity level to 3:

```
Switch(config)# logging file flash:log_msg.txt 40960 4096 3
```

logging history

To change the default level of syslog messages stored in the history file and sent to the SNMP server, use the **logging history** command.

logging history *level*

Syntax Description

<i>level</i>	Level of syslog messages stored in the history file and sent to the SNMP server.
--------------	--

Command Default

By default, warning, error, critical, alert, and emergency messages are sent.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the level of syslog messages stored in the history file and sent to the SNMP server to 3:

```
Switch(config)# logging history 3
```

Related Commands

Command	Description
logging history size	Specifies the number of syslog messages that can be stored in the history table.

logging history size

To specify the number of syslog messages that can be stored in the history table, use the **logging history size** global configuration command.



Note

When the history table contains the maximum number of message entries specified, the oldest message entry is deleted from the table to allow the new message entry to be stored.

logging history size *number*

Syntax Description

<i>number</i>	The number of syslog messages that can be stored in the history table.
---------------	--

Command Default

The default is to store one message. The range is 0 to 500 messages.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the number of syslog messages that can be stored in the history table to 200:

```
Switch(config)# logging history size 200
```

Related Commands

Command	Description
logging history	Changes the default level of syslog messages stored in the history file.

logging monitor

To limit messages logged to the terminal lines according to severity, use the **logging monitor** command.

logging monitor *level*

Syntax Description

level The severity level of messages logged to the terminal lines. The severity levels are:

- Emergencies—System is unusable (severity=0)
- Alerts—Immediate action needed (severity=1)
- Critical—Critical conditions (severity=2)
- Errors—Error conditions (severity=3)
- Warnings—Warning conditions (severity=4)
- Notifications—Normal but significant conditions (severity=5)
- Informational—Informational messages (severity=6)
- Debugging—Debugging messages (severity=7)

Command Default

By default, the terminal receives debugging messages and numerically lower levels.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the level of terminal messages received to severity 3 (errors) and above:

```
Switch(config)# logging monitor 3
```

logging smartlog

To enable smart logging, use the **logging smartlog** command in global configuration mode on the switch. Smart logging sends the contents of specified dropped packets to a Cisco IOS Flexible NetFlow collector. To disable smart logging or return to the default setting, use the **no** form of this command.

logging smartlog [*exporter name* | **packet capture size** *bytes*]

no logging smartlog [*exporter name* | **packet capture size** *bytes*]

Syntax Description

exporter <i>name</i>	(Optional) Identifies the Cisco IOS NetFlow exporter (collector) to which contents of dropped packets are sent. You must have already configured the exporter using the Flexible NetFlow CLI. If the exporter name does not exist, you receive an error message. By default, the switch sends data to the collector every 60 seconds.
packet capture size <i>bytes</i>	(Optional) Specifies the size of the smart log packet sent to the collector in the number of bytes. The range is from 64 to 1024 bytes in 4-byte increments. The default size is 64 bytes. Increasing the packet capture size reduces the number of flow records per packet.

Command Default

By default, smart logging is not enabled.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You must configure a NetFlow collector before you enable smart logging. For information on configuring Cisco Flexible NetFlow, see the *Cisco IOS Flexible NetFlow Configuration Guide*.

You can configure smart logging of packets dropped due to DHCP snooping violations, Dynamic ARP inspection violations, IP source guard denied traffic, or ACL permitted or denied traffic.

You can verify the configuration by entering the **show logging smartlog** privileged EXEC command.

Examples

This example shows a typical smart logging configuration. It assumes that you have already used the Flexible NetFlow CLI to configure the NetFlow exporter *cisco*, and configures smart logging to capture the first 128 bytes of the packets:

```
Switch(config)# logging smartlog
```



```
Switch(config)# logging smartlog cisco  
Switch(config)# logging smartlog packet capture size 128
```

Related Commands

Command	Description
clear logging smartlog statistics interface	Clears smart logging counters on an interface.
show logging smartlog	Displays smart logging information.

logging trap

To limit messages logged to the syslog servers according to severity, use the **logging trap** command.

logging trap *level*

Syntax Description

level The severity level of messages logged to the syslog servers. The severity levels are:

- Emergencies—System is unusable (severity=0)
- Alerts—Immediate action needed (severity=1)
- Critical—Critical conditions (severity=2)
- Errors—Error conditions (severity=3)
- Warnings—Warning conditions (severity=4)
- Notifications—Normal but significant conditions (severity=5)
- Informational—Informational messages (severity=6)
- Debugging—Debugging messages (severity=7)

Command Default

By default, the syslog servers receive debugging messages and numerically lower levels.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following example sets the level of syslog server messages received to severity 3 (errors) and above:

```
Switch(config)# logging trap 3
```

mac address-table aging-time

To set the length of time that a dynamic entry remains in the MAC address table after the entry is used or updated, use the **mac address-table aging-time** global configuration command. Use the **no** form of this command to return to the default setting.

mac address-table aging-time {0 | 10 -1000000} [**vlan** *vlan-id*]

no mac address-table aging-time {0 | 10 -1000000} [**vlan** *vlan-id*]

Syntax Description

0	This value disables aging. Static address entries are never aged or removed from the table.
<i>10-1000000</i>	Aging time in seconds. The range is 10 to 1000000 seconds.
vlan <i>vlan-id</i>	(Optional) Specifies the VLAN ID to which to apply the aging time. The range is 1 to 4094.

Command Default

The default is 300 seconds.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The aging time applies to all VLANs or a specified VLAN. If you do not specify a specific VLAN, this command sets the aging time for all VLANs. Enter 0 seconds to disable aging.

Examples

This example shows how to set the aging time to 200 seconds for all VLANs:

```
Switch(config)# mac address-table aging-time 200
```

You can verify your setting by entering the **show mac address-table aging-time** privileged EXEC command.

Related Commands

Command	Description
show mac address-table aging-time	Displays the aging time of a specific address table instance.

mac address-table learning vlan

To enable MAC address learning on a VLAN, use the **mac address-table learning** global configuration command. Use the **no** form of this command to disable MAC address learning on a VLAN to control which VLANs can learn MAC addresses.

mac address-table learning vlan *vlan-id*

no mac address-table learning vlan *vlan-id*

Syntax Description

<i>vlan-id</i>	The VLAN ID or a range of VLAN IDs separated by a hyphen or comma. Valid VLAN IDs are 1 to 4094.
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Command Default

By default, MAC address learning is enabled on all VLANs.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When you control MAC address learning on a VLAN, you can manage the available MAC address table space by controlling which VLANs, and therefore which ports, can learn MAC addresses.

You can disable MAC address learning on a single VLAN ID (for example, **no mac address-table learning vlan 223**) or on a range of VLAN IDs (for example, **no mac address-table learning vlan 1-20, 15**).

Before you disable MAC address learning, be sure that you are familiar with the network topology and the switch system configuration.

Disabling MAC address learning on a VLAN could cause flooding in the network.

For example, if you disable MAC address learning on a VLAN with a configured switch virtual interface (SVI), the switch floods all IP packets in the Layer 2 domain.

If you disable MAC address learning on a VLAN that includes more than two ports, every packet entering the switch is flooded in that VLAN domain.

We recommend that you disable MAC address learning only in VLANs that contain two ports and that you use caution before disabling MAC address learning on a VLAN with an SVI.

You cannot disable MAC address learning on a VLAN that the switch uses internally. If the VLAN ID that you enter in the **no mac address-table learning vlan** *vlan-id* command is an internal VLAN, the switch generates an error message and rejects the command.

To view a list of which internal VLANs are being used, enter the **show vlan internal usage** privileged EXEC command.

If you disable MAC address learning on a VLAN configured as a private VLAN primary or a secondary VLAN, the MAC addresses are still learned on the other VLAN (primary or secondary) that belongs to the private VLAN.

You cannot disable MAC address learning on an RSPAN VLAN. The configuration is not allowed.

If you disable MAC address learning on a VLAN that includes a secure port, MAC address learning is not disabled on the secure port. If you later disable port security on the interface, the disabled MAC address learning state is enabled.

To display the MAC address learning status of all VLANs or a specified VLAN, enter the **show mac-address-table learning [vlan *vlan-id*]** command.

Examples

This example shows how to disable MAC address learning on VLAN 2003:

```
Switch(config)# no mac address-table learning vlan 2003
```

To display the MAC address learning status of all VLANs or a specified VLAN, enter the **mac address-table learning vlan [vlan-id]** command.

Related Commands

Command	Description
show mac address-table learning	Displays the status of MAC address learning for all VLANs or a specified VLAN.

mac address-table move update

To enable the MAC address table move update feature, use the **mac address-table move update** command in global configuration mode on the switch stack or on a standalone switch. To return to the default setting, use the **no** form of this command.

mac address-table move update {receive | transmit}

no mac address-table move update {receive | transmit}

Syntax Description

receive	Specifies that the switch processes MAC address-table move update messages.
transmit	Specifies that the switch sends MAC address-table move update messages to other switches in the network if the primary link goes down and the standby link comes up.

Command Default

By default, the MAC address-table move update feature is disabled.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The MAC address-table move update feature allows the switch to provide rapid bidirectional convergence if a primary (forwarding) link goes down and the standby link begins forwarding traffic.

You can configure the access switch to send the MAC address-table move update messages if the primary link goes down and the standby link comes up. You can configure the uplink switches to receive and process the MAC address-table move update messages.

Examples

This example shows how to configure an access switch to send MAC address-table move update messages:

```
Switch# configure terminal
Switch(config)# mac address-table move update transmit
Switch(config)# end
```

This example shows how to configure an uplink switch to get and process MAC address-table move update messages:

```
Switch# configure terminal
Switch(config)# mac address-table move update receive
Switch(config)# end
```

You can verify your setting by entering the **show mac address-table move update** privileged EXEC command.

Related Commands

Command	Description
clear mac address-table move update	Clears the mac address-table-move update-related counters.
show mac address-table move update	Displays the MAC address-table move update information on the switch.

mac address-table notification

To enable the MAC address notification feature on the switch stack, use the **mac address-table notification** global configuration command. Use the **no** form of this command to return to the default setting.

mac address-table notification [**mac-move** | **threshold** [[**limit percentage**] **interval time**]

no mac address-table notification [**mac-move** | **threshold** [[**limit percentage**] **interval time**]

Syntax Description

mac-move	(Optional) Enables MAC move notification.
threshold	(Optional) Enables MAC threshold notification.
limit percentage	(Optional) Sets the MAC utilization threshold percentage. The range is 1 to 100 percent. The default is 50 percent.
interval time	(Optional) Sets the time between MAC threshold notifications. The range is 120 to 1000000 seconds. The default is 120 seconds.

Command Default

By default, the MAC address notification, MAC move, and MAC threshold monitoring are disabled. The default MAC utilization threshold is 50 percent. The default time between MAC threshold notifications is 120 seconds.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can enable traps whenever a MAC address is moved from one port to another in the same VLAN by entering the **mac address-table notification mac-move** command and the **snmp-server enable traps mac-notification move global configuration** command.

To generate traps whenever the MAC address table threshold limit is reached or exceeded, enter the **mac address-table notification threshold [limit percentage] | [interval time]** command and the **snmp-server enable traps mac-notification threshold** global configuration command.

Examples

This example shows how to set the threshold limit to 10 and set the interval time to 120 seconds:

```
Switch(config)# mac address-table notification threshold limit 10 interval 120
```


You can verify your settings by entering the **show mac address-table notification** privileged EXEC command.

mac address-table notification change

To send a notification of the dynamic changes to the MAC address-table, use the **mac address-table notification change** global configuration command. Use the **no** form of this command to return to the default setting.

mac address-table notification change [*history size* | *interval value*]

no mac address-table notification change [*history size* | *interval value*]

Syntax Description

history size	(Optional) Sets the number of entries in the history buffer; valid values are from 0 to 500 entries.
interval value	(Optional) Sets the minimum change sending interval; valid values are from 0 to 2147483647 seconds.

Command Default

By default, the MAC address-table notification change feature is disabled.

When notification of the dynamic changes to the MAC address-table is enabled, the default settings are:

- **history size** is 1 entry
- **interval value** is 1 second

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to set the history size to 100 entries and set the interval time to 60 seconds:

```
Switch(config)# mac address-table notification change history 100 interval 60
```

You can verify your settings by entering the **show mac address-table notification change** privileged EXEC command

mac address-table static

To add static addresses to the MAC address table, use the **mac address-table static** global configuration command. Use the **no** form of this command to remove static entries from the table.

mac address-table static *mac-addr* **vlan** *vlan-id* **interface** *interface-id*

no mac address-table static *mac-addr* **vlan** *vlan-id* **interface** *interface-id*

Syntax Description

<i>mac-addr</i>	Destination MAC address (unicast or multicast) to add to the address table. Packets with this destination address received in the specified VLAN are forwarded to the specified interface.
vlan <i>vlan-id</i>	Specifies the VLAN for which the packet with the specified MAC address is received. The range is 1 to 4094.
interface <i>interface-id</i>	Specifies the interface to which the received packet is forwarded. Valid interfaces include physical ports and port channels.

Command Default

No static addresses are configured.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to add the static address c2f3.220a.12f4 to the MAC address table. When a packet is received in VLAN 4 with this MAC address as its destination, the packet is forwarded to the specified interface:

```
Switch(config)# mac address-table static c2f3.220a.12f4 vlan 4 interface gigabitethernet6/0/1
```

You can verify your setting by entering the **show mac address-table** privileged EXEC command.

Related Commands

Command	Description
show mac address-table static	Displays only static MAC address table entries.

mkdir

To create one or more directories on the specified file system, use the **mkdir** command in boot loader mode.

mkdir *filesystem:/directory-url...*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use usbflash0: for USB memory sticks.
<i>/directory-url...</i>	Name of the directories to create. Separate each directory name with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Directory names are case sensitive.

Directory names are limited to 127 characters between the slashes (/); the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

Examples

This example shows how to make a directory called Saved_Configs:

```
Switch: mkdir usbflash0:Saved_Configs
Directory "usbflash0:Saved_Configs" created
```

Related Commands

Command	Description
dir	Displays the list of files and directories on the specified file system.
rmdir	Removes one or more empty directories from the specified file system.

more

To display the contents of one or more files, use the **more** command in boot loader mode.

more *filesystem:/file-url...*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use flash: for the system board flash device.
<i>/file-url...</i>	Path (directory) and name of the files to display. Separate each filename with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

If you specify a list of files, the contents of each file appears sequentially.

Examples

This example shows how to display the contents of a file:

```
Switch: more flash:image_file_name
version_suffix: universal-122-xx.SEx
version_directory: image_file_name
image_system_type_id: 0x00000002
image_name: image_file_name.bin
ios_image_file_size: 8919552
total_image_file_size: 11592192
image_feature: IP|LAYER_3|PLUS|MIN_DRAM_MEG=128
image_family: family
stacking_number: 1.34
board_ids: 0x00000068 0x00000069 0x0000006a 0x0000006b
info_end:
```

rcommand

To start a Telnet session and to execute commands, use the **rcommand** user EXEC command. Use it on the switch stack, on the cluster command switch, or on a cluster member switch. To end the session, enter the **exit** command.

rcommand {*n* | **commander** | **mac-address** *hw-addr*}

Syntax Description

<i>n</i>	The number that identifies a cluster member. The range is 0 to 15.
commander	Provides access to the cluster command switch from a cluster member switch.
mac-address <i>hw-addr</i>	Specifies the MAC address of the cluster member switch.

Command Modes

User EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command is available only on the cluster command switch stack or cluster command switch.

If the switch is the cluster command switch, but the cluster member switch *n* does not exist, an error message appears. To get the switch number, enter the **show cluster members** privileged EXEC command on the cluster command switch.

You can use this command to access a cluster member switch from the cluster command-switch prompt or to access a cluster command switch from the member-switch prompt.

For Catalyst 2900 XL, 3500 XL, 2950, 2960, 2970, 3550, 3560, and 3750 switches, the Telnet session accesses the member-switch command-line interface (CLI) at the same privilege level as on the cluster command switch.

For example, if you execute this command at user level on the cluster command switch, the cluster member switch is accessed at user level. If you use this command on the cluster command switch at the privilege level, the command accesses the remote device at the privilege level.

If you use an intermediate enable-level lower than the privilege, access to the cluster member switch is at the user level.

For Catalyst 1900 and 2820 switches running standard edition software, the Telnet session accesses the menu console (the menu-driven interface) if the cluster command switch is at privilege level 15.

If the cluster command switch is at privilege level 1, you are prompted for the password before being able to access the menu console.

Cluster command switch privilege levels map to the cluster member switches running standard edition software as follows:

- If the cluster command switch privilege level is from 1 to 14, the cluster member switch is accessed at privilege level 1.
- If the cluster command switch privilege level is 15, the cluster member switch is accessed at privilege level 15.

The Catalyst 1900 and 2820 CLI is available only on switches running Enterprise Edition Software.

This command will not work if the vty lines of the cluster command switch have access-class configurations.

You are not prompted for a password because the cluster member switches inherited the password of the cluster command switch when they joined the cluster.

Examples

This example shows how to start a session with member 3. All subsequent commands are directed to member 3 until you enter the **exit** command or close the session:

```
Switch> rcommand 3
Switch-3# show version
Cisco Internet Operating System Software ...
...
Switch-3# exit
Switch>
```

rename

To rename a file, use the **rename** command in boot loader mode.

```
rename filesystem:/source-file-url filesystem:/destination-file-url
```

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use usbflash0: for USB memory sticks.
<i>/source-file-url</i>	Original path (directory) and filename.
<i>/destination-file-url</i>	New path (directory) and filename.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

Directory names are limited to 127 characters between the slashes (/); the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

Filenames are limited to 127 characters; the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

Examples

This example shows a file named *config.text* being renamed to *config1.text*:

```
Switch: rename usbflash0:config.text usbflash0:config1.text
```

You can verify that the file was renamed by entering the **dir** *filesystem:* boot loader command.

reset

To perform a hard reset on the system, use the **reset** command in boot loader mode. A hard reset is similar to power-cycling the switch; it clears the processor, registers, and memory.

reset

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values.

Command Modes Boot loader

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example shows how to reset the system:

```
Switch: reset
Are you sure you want to reset the system (y/n)? y
System resetting...
```

Related Commands	Command	Description
	set	Sets or displays environment variables.
	unset	Resets one or more environment variables.

rmdir

To remove one or more empty directories from the specified file system, use the **rmdir** command in boot loader mode.

rmdir *filesystem:/directory-url...*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use usbflash0: for USB memory sticks.
<i>/directory-url...</i>	Path (directory) and name of the empty directories to remove. Separate each directory name with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Directory names are case sensitive and limited to 45 characters between the slashes (/); the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.

Before removing a directory, you must first delete all of the files in the directory.

The switch prompts you for confirmation before deleting each directory.

Examples

This example shows how to remove a directory:

```
Switch: rmdir usbflash0:Test
```

You can verify that the directory was deleted by entering the **dir** *filesystem:* boot loader command.

service sequence-numbers

To display messages with sequence numbers when there is more than one log message with the same time stamp, use the **service sequence-numbers** global configuration command.

service sequence-numbers

Syntax Description This command has no arguments or keywords.

Command Default By default, sequence numbers in log messages are not displayed.

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example shows how to display messages with sequence numbers when there is more than one log message with the same time stamp:

```
Switch(config)# service sequence-numbers
```

set

To set or display environment variables, use the **set** command in boot loader mode. Environment variables can be used to control the boot loader or any other software running on the switch.

set *variable value*

Syntax Description

<i>variable</i>	Use one of the following keywords for <i>variable</i> and the appropriate value for <i>value</i> :
<i>value</i>	<p>MANUAL_BOOT—Decides whether the switch automatically or manually boots. Valid values are 1/Yes and 0/No. If it is set to 0 or No, the boot loader attempts to automatically boot the system. If it is set to anything else, you must manually boot the switch from the boot loader mode.</p> <hr/> <p>BOOT <i>filesystem:/file-url</i>—Identifies a semicolon-separated list of executable files to try to load and execute when automatically booting. If the BOOT environment variable is not set, the system attempts to load and execute the first executable image it can find by using a recursive, depth-first search through the flash: file system. If the BOOT variable is set but the specified images cannot be loaded, the system attempts to boot the first bootable file that it can find in the flash: file system.</p> <hr/> <p>ENABLE_BREAK—Allows the automatic boot process to be interrupted when the user presses the Break key on the console. Valid values are 1, Yes, On, 0, No, and Off. If set to 1, Yes, or On, you can interrupt the automatic boot process by pressing the Break key on the console after the flash: file system has initialized.</p> <hr/> <p>HELPER <i>filesystem:/file-url</i>—Identifies a semicolon-separated list of loadable files to dynamically load during the boot loader initialization. Helper files extend or patch the functionality of the boot loader.</p> <hr/> <p>PS1 <i>prompt</i>—Specifies a string that is used as the command-line prompt in boot loader mode.</p> <hr/> <p>CONFIG_FILE flash: <i>/file-url</i>—Specifies the filename that Cisco IOS uses to read and write a nonvolatile copy of the system configuration.</p> <hr/> <p>BAUD <i>rate</i>—Specifies the number of bits per second (b/s) that is used for the baud rate for the console. The Cisco IOS software inherits the baud rate setting from the boot loader and continues to use this value unless the configuration file specifies another setting. The range is from 0 to 128000 b/s. Valid values are 50, 75, 110, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 56000, 57600, 115200, and 128000. The most commonly used values are 300, 1200, 2400, 9600, 19200, 57600, and 115200.</p> <hr/> <p>SWITCH_NUMBER <i>stack-member-number</i>—Changes the member number of a stack member.</p> <hr/> <p>SWITCH_PRIORITY <i>priority-number</i>—Changes the priority value of a stack member.</p>

Command Default

The environment variables have these default values:

MANUAL_BOOT: No (0)

BOOT: Null string

ENABLE_BREAK: No (Off or 0) (the automatic boot process cannot be interrupted by pressing the **Break** key on the console).

HELPER: No default value (helper files are not automatically loaded).

PS1 switch:

CONFIG_FILE: config.text

BAUD: 9600 b/s

SWITCH_NUMBER: 1

SWITCH_PRIORITY: 1

**Note**

Environment variables that have values are stored in the flash: file system in various files. Each line in the files contains an environment variable name and an equal sign followed by the value of the variable.

A variable has no value if it is not listed in these files; it has a value if it is listed even if the value is a null string. A variable that is set to a null string (for example, “ ”) is a variable with a value.

Many environment variables are predefined and have default values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Environment variables are case sensitive and must be entered as documented.

Environment variables that have values are stored in flash memory outside of the flash: file system.

Under typical circumstances, it is not necessary to alter the setting of the environment variables.

The MANUAL_BOOT environment variable can also be set by using the **boot manual** global configuration command.

The BOOT environment variable can also be set by using the **boot system filesystem:/file-url** global configuration command.

The ENABLE_BREAK environment variable can also be set by using the **boot enable-break** global configuration command.

The HELPER environment variable can also be set by using the **boot helper filesystem: /file-url** global configuration command.

The CONFIG_FILE environment variable can also be set by using the **boot config-file flash: /file-url** global configuration command.

The SWITCH_NUMBER environment variable can also be set by using the **switch current-stack-member-number renumber new-stack-member-number** global configuration command.

The SWITCH_PRIORITY environment variable can also be set by using the switch **stack-member-number priority priority-number** global configuration command.

The boot loader prompt string (PS1) can be up to 120 printable characters not including the equal sign (=).

Examples

This example shows how to set the SWITCH_PRIORITY environment variable:

```
Switch: set SWITCH_PRIORITY 2
```

You can verify your setting by using the **set** boot loader command.

Related Commands

Command	Description
reset	Performs a hard reset on the system.
unset	Resets one or more environment variables.

show boot

To display the settings of the boot environment variables, use the **show boot** privileged EXEC command.

show boot

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show boot** command. The table below describes each field in the display:

```
Switch# show boot
BOOT path-list      :flash:/image
Config file         :flash:/config.text
Private Config file :flash:/private-config.text
Enable Break        :no
Manual Boot         :yes
HELPER path-list    :
Auto upgrade        :yes
-----
```

For switch stacks, information is shown for each switch in the stack.

Table 4: show boot Field Descriptions

Field	Description
BOOT path-list	<p>Displays a semicolon-separated list of executable files to try to load and execute when automatically booting up.</p> <p>If the BOOT environment variable is not set, the system attempts to load and execute the first executable image it can find by using a recursive, depth-first search through the flash: file system. In a depth-first search of a directory, each encountered subdirectory is completely searched before continuing the search in the original directory.</p> <p>If the BOOT variable is set but the specified images cannot be loaded, the system attempts to boot up with the first bootable file that it can find in the flash: file system.</p>

Field	Description
Config file	Displays the filename that Cisco IOS uses to read and write a nonvolatile copy of the system configuration.
Private config file	Displays the filename that Cisco IOS uses to read and write a private nonvolatile copy of the system configuration.
Enable break	Displays whether a break is permitted during booting up is enabled or disabled. If it is set to yes, on, or 1, you can interrupt the automatic bootup process by pressing the Break key on the console after the flash: file system is initialized.
Manual boot	Displays whether the switch automatically or manually boots up. If it is set to no or 0, the bootloader attempts to automatically boot up the system. If it is set to anything else, you must manually boot up the switch from the bootloader mode.
Helper path-list	Displays a semicolon-separated list of loadable files to dynamically load during the bootloader initialization. Helper files extend or patch the functionality of the bootloader.
Auto upgrade	<p>Displays whether the switch stack is set to automatically copy its software version to an incompatible switch so that it can join the stack.</p> <p>A switch in version-mismatch mode is a switch that has a different stack protocol version than the version on the stack. Switches in version-mismatch mode cannot join the stack. If the stack has an image that can be copied to a switch in version-mismatch mode, and if the boot auto-copy-sw feature is enabled, the stack automatically copies the image from another stack member to the switch in version-mismatch mode. The switch then exits version-mismatch mode, reboots, and joins the stack.</p>
NVRAM/Config file buffer size	Displays the buffer size that Cisco IOS uses to hold a copy of the configuration file in memory. The configuration file cannot be larger than the buffer size allocation.

Related Commands

Command	Description
boot	Loads and boots an executable image and then enters the CLI.

show cable-diagnostics prbs

To display the pseudo-random binary sequence (PRBS) test results, use the **show cable-diagnostics prbs** command in privileged EXEC mode.

show cable-diagnostics prbs interface *interface-id*

Syntax Description	<i>interface-id</i>	The interface on which PRBS is run.
---------------------------	---------------------	-------------------------------------

Command Default None

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines PRBS is only supported on 10-Gigabit Ethernet ports. It is not supported on 10/100/100 copper Ethernet ports and small form-factor pluggable (SFP) module ports.

Examples This example shows the output from the **show cable-diagnostics prbs interface** *interface-id* command on a switch:

```
Switch# show cable-diagnostics prbs interface gigabitethernet1/0/23
prbs test last run on: March 01 00:04:08
Interface Speed Local pair Pair length Remote pair Pair status
-----
Gi1/0/23 1000M Pair A 1 +/- 1 meters Pair A Normal
          Pair B 1 +/- 1 meters Pair B Normal
          Pair C 1 +/- 1 meters Pair C Normal
          Pair D 1 +/- 1 meters Pair D Normal
```

Table 5: Field Descriptions for the show cable-diagnostics prbs Command Output

Field	Description
Interface	Interface on which PRBS is run.
Speed	Speed of connection.
Local pair	The name of the pair of wires that PRBS is testing on the local interface.

Field	Description
Pair length	<p>The location of the problem on the cable, with respect to your switch. PRBS can only find the location in one of these cases:</p> <ul style="list-style-type: none"> • The cable is properly connected, the link is up, and the interface speed is 10-Gps. • The cable is open. • The cable has a short.
Remote pair	<p>The name of the pair of wires to which the local pair is connected. PRBS can learn about the remote pair only when the cable is properly connected and the link is up.</p>
Pair status	<p>The status of the pair of wires on which PRBS is running:</p> <ul style="list-style-type: none"> • Normal—The pair of wires is properly connected. • Not completed—The test is running and is not completed. • Not supported—The interface does not support PRBS. • Open—The pair of wires is open. • Shorted—The pair of wires is shorted. • ImpedanceMis—The impedance is mismatched. • Short/Impedance Mismatched—The impedance mismatched or the cable is short. • InProgress—The diagnostic test is in progress.

This example shows the output from the **show interface** *interface-id* command when PRBS is running:

```
Switch# show interface gigabitethernet1/0/2
gigabitethernet1/0/2 is up, line protocol is up (connected: TDR in Progress)
```

This example shows the output from the **show cable-diagnostics prbs interface** *interface-id* command when PRBS is not running:

```
Switch# show cable-diagnostics PRBS interface gigabitethernet1/0/2
% PRBS test was never issued on Gi1/0/2
```

If an interface does not support PRBS, this message appears:

```
% PRBS test is not supported on switch 1
```

Related Commands

Command	Description
test cable-diagnostics prbs	Runs the pseudo-random binary sequence (PRBS) feature on an interface.

show cable-diagnostics tdr

To display the Time Domain Reflector (TDR) results, use the **show cable-diagnostics tdr** command in privileged EXEC mode.

show cable-diagnostics tdr interface *interface-id*

Syntax Description

<i>interface-id</i>	Specifies the interface on which TDR is run.
---------------------	--

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

TDR is supported only on 10/100/100 copper Ethernet ports. It is not supported on 10-Gigabit Ethernet ports and small form-factor pluggable (SFP) module ports.

Examples

This example shows the output from the **show cable-diagnostics tdr interface** *interface-id* command on a switch:

```
Switch# show cable-diagnostics tdr interface gigabitethernet1/0/23
TDR test last run on: March 01 00:04:08
Interface  Speed  Local pair  Pair length  Remote pair  Pair status
-----
Gi1/0/23  1000M  Pair A     1 +/- 1 meters  Pair A     Normal
           Pair B     1 +/- 1 meters  Pair B     Normal
           Pair C     1 +/- 1 meters  Pair C     Normal
           Pair D     1 +/- 1 meters  Pair D     Normal
```

Table 6: Field Descriptions for the show cable-diagnostics tdr Command Output

Field	Description
Interface	The interface on which TDR is run.
Speed	The speed of connection.
Local pair	The name of the pair of wires that TDR is testing on the local interface.

Field	Description
Pair length	<p>The location of the problem on the cable, with respect to your switch. TDR can only find the location in one of these cases:</p> <ul style="list-style-type: none"> • The cable is properly connected, the link is up, and the interface speed is 1000 Mb/s. • The cable is open. • The cable has a short.
Remote pair	<p>The name of the pair of wires to which the local pair is connected. TDR can learn about the remote pair only when the cable is properly connected and the link is up.</p>
Pair status	<p>The status of the pair of wires on which TDR is running:</p> <ul style="list-style-type: none"> • Normal—The pair of wires is properly connected. • Not completed—The test is running and is not completed. • Not supported—The interface does not support TDR. • Open—The pair of wires is open. • Shorted—The pair of wires is shorted. • ImpedanceMis—The impedance is mismatched. • Short/Impedance Mismatched—The impedance mismatched or the cable is short. • InProgress—The diagnostic test is in progress.

This example shows the output from the **show interface** *interface-id* command when TDR is running:

```
Switch# show interface gigabitethernet1/0/2
gigabitethernet1/0/2 is up, line protocol is up (connected: TDR in Progress)
```

This example shows the output from the **show cable-diagnostics tdr interface** *interface-id* command when TDR is not running:

```
Switch# show cable-diagnostics tdr interface gigabitethernet1/0/2
% TDR test was never issued on gigabitethernet1/0/2
```

If an interface does not support TDR, this message appears:

```
% TDR test is not supported on switch 1
```

Related Commands

Command	Description
test cable-diagnostics tdr	Runs the Time Domain Reflector (TDR) feature on an interface.

show cluster

To display the cluster status and a summary of the cluster to which the switch belongs, use the **show cluster EXEC** command. This command can be entered on the cluster command switch and cluster member switches.

show cluster

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If you enter this command on a switch that is not a cluster member, the following error message appears:

```
Not a management cluster member.
```

On a cluster member switch, this command displays the identity of the cluster command switch, the switch member number, and the state of its connectivity with the cluster command switch.

On a cluster command switch stack or cluster command switch, this command displays the cluster name and the total number of members.

It also shows the cluster status and time since the status changed. If redundancy is enabled, it displays the primary and secondary command-switch information.

Examples This example shows the output from the **show cluster** command entered on the cluster command switch:

```
Switch# show cluster
Command switch for cluster "Ajang"
  Total number of members:      7
  Status:                       1 members are unreachable
  Time since last status change: 0 days, 0 hours, 2 minutes
  Redundancy:                   Enabled
    Standby command switch:     Member 1
    Standby Group:              Ajang_standby
    Standby Group Number:       110
  Heartbeat interval:           8
  Heartbeat hold-time:          80
  Extended discovery hop count: 3
```

This example shows the output from the **show cluster** command entered on a cluster member switch:

```
Switch1# show cluster
Member switch for cluster "hapuna"
  Member number:                3
  Management IP address:         192.192.192.192
  Command switch mac address:    0000.0c07.ac14
```

```
Heartbeat interval:      8
Heartbeat hold-time:    80
```

This example shows the output from the **show cluster** command entered on a cluster member switch that has lost connectivity with member 1:

```
Switch# show cluster
Command switch for cluster "Ajang"
Total number of members:      7
Status:                       1 members are unreachable
Time since last status change: 0 days, 0 hours, 5 minutes
Redundancy:                   Disabled
Heartbeat interval:          8
Heartbeat hold-time:         80
Extended discovery hop count: 3
```

This example shows the output from the **show cluster** command entered on a cluster member switch that has lost connectivity with the cluster command switch:

```
Switch# show cluster
Member switch for cluster "hapuna"
Member number:                <UNKNOWN>
Management IP address:        192.192.192.192
Command switch mac address:   0000.0c07.ac14
Heartbeat interval:          8
Heartbeat hold-time:         80
```


show cluster candidates

To display a list of candidate switches, use the **show cluster candidates EXEC** command.

show cluster candidates [**detail** | **mac-address** *H.H.H*]

Syntax Description

detail	(Optional) Displays detailed information for all candidates.
mac-address <i>H.H.H</i>	(Optional) Specifies the MAC address of the cluster candidate.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command is available only on the cluster command switch stack or cluster command switch.

If the switch is not a cluster command switch, the command displays an empty line at the prompt.

The SN in the display means *switch member number*. If E appears in the SN column, it means that the switch is discovered through extended discovery.

If E does not appear in the SN column, it means that the *switch member number* is the upstream neighbor of the candidate switch.

The hop count is the number of devices the candidate is located from the cluster command switch.

Examples

This example shows the output from the **show cluster candidates** command:

```
Switch# show cluster candidates
MAC Address      Name           Device Type   PortIf  FEC Hops  SN  PortIf  FEC
00d0.7961.c4c0  StLouis-2     WS-C2960-12T Gi0/1    2   1     1   Fa0/11
00d0.bbf5.e900  ldf-dist-128 WS-C3524-XL  Fa0/7    1   0     0   Fa0/24
00e0.1e7e.be80  1900_Switch   1900          3         0   1     0   Fa0/11
00e0.1e9f.7a00  Surfers-24    WS-C2924-XL  Fa0/5    1   0     0   Fa0/3
00e0.1e9f.8c00  Surfers-12-2  WS-C2912-XL  Fa0/4    1   0     0   Fa0/7
00e0.1e9f.8c40  Surfers-12-1  WS-C2912-XL  Fa0/1    1   0     0   Fa0/9
```

This example shows the output from the **show cluster candidates** that uses the MAC address of a cluster member switch directly connected to the cluster command switch:

```
Switch# show cluster candidates mac-address 00d0.7961.c4c0
Device 'Tahiti-12' with mac address number 00d0.7961.c4c0
  Device type:          cisco WS-C2960-12T
  Upstream MAC address: 00d0.796d.2f00 (Cluster Member 0)
  Local port:          Gi6/0/1 FEC number:
```

```

Upstream port:      GI6/0/11 FEC Number:
Hops from cluster edge: 1
Hops from command device: 1

```

This example shows the output from the **show cluster candidates** that uses the MAC address of a cluster member switch that is three hops from the cluster edge:

```

Switch# show cluster candidates mac-address 0010.7bb6.1cc0
Device 'Ventura' with mac address number 0010.7bb6.1cc0
Device type:      cisco WS-C2912MF-XL
Upstream MAC address: 0010.7bb6.1cd4
Local port:      Fa2/1   FEC number:
Upstream port:   Fa0/24  FEC Number:
Hops from cluster edge: 3
Hops from command device: -

```

This example shows the output from the **show cluster candidates detail** command:

```

Switch# show cluster candidates detail
Device 'Tahiti-12' with mac address number 00d0.7961.c4c0
Device type:      cisco WS-C3512-XL
Upstream MAC address: 00d0.796d.2f00 (Cluster Member 1)
Local port:      Fa0/3   FEC number:
Upstream port:   Fa0/13  FEC Number:
Hops from cluster edge: 1
Hops from command device: 2
Device '1900_Switch' with mac address number 00e0.1e7e.be80
Device type:      cisco 1900
Upstream MAC address: 00d0.796d.2f00 (Cluster Member 2)
Local port:      3       FEC number: 0
Upstream port:   Fa0/11  FEC Number:
Hops from cluster edge: 1
Hops from command device: 2
Device 'Surfers-24' with mac address number 00e0.1e9f.7a00
Device type:      cisco WS-C2924-XL
Upstream MAC address: 00d0.796d.2f00 (Cluster Member 3)
Local port:      Fa0/5   FEC number:
Upstream port:   Fa0/3   FEC Number:
Hops from cluster edge: 1
Hops from command device: 2

```

show cluster members

To display information about cluster members, use the **show cluster members** privileged EXEC command.

show cluster members [*n* | **detail**]

Syntax Description	
<i>n</i>	(Optional) Number that identifies a cluster member. The range is 0 to 15.
detail	(Optional) Displays detailed information for all cluster members.

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines This command is available only on the cluster command switch stack or cluster command switch. If the cluster has no members, this command displays an empty line at the prompt.

Examples This example shows the output from the **show cluster members** command. The SN in the display means *switch number*.

```
Switch# show cluster members
                                |---Upstream---|
SN MAC Address Name           PortIf  FEC Hops SN  PortIf  FEC  State
0 0002.4b29.2e00 StLouis1          0      0      0      Gi0/1   Up (Cmdr)
1 0030.946c.d740 tal-switch-1 Fa0/13  0      1      0      Gi0/1   Up
2 0002.b922.7180 nms-2820          10     2      1      Fa0/18  Up
3 0002.4b29.4400 SanJuan2          Gi0/1   2      1      Fa0/11  Up
4 0002.4b28.c480 GenieTest          Gi0/2   2      1      Fa0/9   Up
```

This example shows the output from the **show cluster members** for cluster member 3:

```
Switch# show cluster members 3
Device 'SanJuan2' with member number 3
  Device type:      cisco WS-C2960
  MAC address:      0002.4b29.4400
  Upstream MAC address: 0030.946c.d740 (Cluster member 1)
  Local port:       Gi6/0/1   FEC number:
  Upstream port:    GI6/0/11  FEC Number:
  Hops from command device: 2
```

This example shows the output from the **show cluster members detail** command:

```
Switch# show cluster members detail
Device 'StLouis1' with member number 0 (Command Switch)
  Device type:      cisco WS-C2960
  MAC address:      0002.4b29.2e00
  Upstream MAC address:
  Local port:       FEC number:
```

show cluster members

```

Upstream port:          FEC Number:
Hops from command device: 0
Device 'tal-switch-14' with member number 1
Device type:           cisco WS-C3548-XL
MAC address:           0030.946c.d740
Upstream MAC address: 0002.4b29.2e00 (Cluster member 0)
Local port:            Fa0/13   FEC number:
Upstream port:        Gi0/1    FEC Number:
Hops from command device: 1
Device 'nms-2820' with member number 2
Device type:           cisco 2820
MAC address:           0002.b922.7180
Upstream MAC address: 0030.946c.d740 (Cluster member 1)
Local port:            10        FEC number: 0
Upstream port:        Fa0/18   FEC Number:
Hops from command device: 2
Device 'SanJuan2' with member number 3
Device type:           cisco WS-C2960
MAC address:           0002.4b29.4400
Upstream MAC address: 0030.946c.d740 (Cluster member 1)
Local port:            Gi6/0/1  FEC number:
Upstream port:        Fa6/0/11 FEC Number:
Hops from command device: 2
Device 'GenieTest' with member number 4
Device type:           cisco SeaHorse
MAC address:           0002.4b28.c480
Upstream MAC address: 0030.946c.d740 (Cluster member 1)
Local port:            Gi0/2    FEC number:
Upstream port:        Fa0/9    FEC Number:
Hops from command device: 2
Device 'Palpatine' with member number 5
Device type:           cisco WS-C2924M-XL
MAC address:           00b0.6404.f8c0
Upstream MAC address: 0002.4b29.2e00 (Cluster member 0)
Local port:            Gi2/1    FEC number:
Upstream port:        Gi0/7    FEC Number:
Hops from command device: 1

```

show logging onboard

Display the on-board failure logging (OBFL) information using the **show logging onboard** privileged EXEC command.

```
show logging onboard [module [switch number]] { {clilog | environment | message | poe | temperature |
uptime | voltage} [continuous | detail | summary] [start hh:mm:ss day month year] [end hh:mm:ss day
month year] }
```

Syntax Description

module [switch number]	(Optional) Displays OBFL information about the specified switches. Uses the <i>switch number</i> parameter to specify the switch number, which is the stack member number. If the switch is a standalone switch, the switch number is 1. If the switch is in a stack, the range is 1 to 8, depending on the switch member numbers in the stack. For more information about this parameter, see the “Usage Guidelines” section for this command.
clilog	Displays the OBFL CLI commands that were entered on the standalone switch or specified stack members.
environment	Displays the unique device identifier (UDI) information for the standalone switch or specified stack members. For all the connected FRU devices, it displays the product identification (PID), the version identification (VID), and the serial number.
message	Displays the hardware-related system messages generated by the standalone switch or specified stack members.
poe	Displays the power consumption of PoE ports on the standalone switch or specified stack members.
temperature	Displays the temperature of the standalone switch or specified stack members.
uptime	Displays the time when the standalone switch or specified stack members start, the reason the standalone switch or specified members restart, and the length of time the standalone switch or specified stack members have been running since they last restarted.
voltage	Displays the system voltages of the standalone switch or the specified switch stack members.
continuous	(Optional) Displays the data in the <i>continuous</i> file.
detail	(Optional) Displays both the continuous and summary data.
summary	(Optional) Displays the data in the <i>summary</i> file.
start hh:mm:ss day month year	(Optional) Displays the data from the specified time and date. For more information, see the “Usage Guidelines” section.

end *hh:mm:ss day month year* (Optional) Displays the data from the specified time and date. For more information, see the “Usage Guidelines” section.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When OBFL is enabled, the switch records OBFL data in a continuous file that contains all of the data. The continuous file is circular. When the continuous file is full, the switch combines the data into a summary file, which is also known as a historical file.

Creating the summary file frees up space in the continuous file so that the switch can write newer data to it.

If you enter the **module** keyword, but do not enter the switch number, the switch displays OBFL information about the stack members that support OBFL.

Use the **start** and **end** keywords to display data collected only during a particular time period. When specifying the start and end times, follow these guidelines:

- *hh:mm:ss*—Enter the time as a two-digit number for a 24-hour clock. Make sure to use the colons (:). For example, enter **13:32:45**.
- *day*—Enter the day of the month. The range is from 1 to 31.
- *month*—Enter the month in uppercase or lowercase letters. You can enter the full name of the month, such as **January** or **august**, or the first three letters of the month, such as **jan** or **Aug**.
- *year*—Enter the year as a 4-digit number, such as 2008. The range is from 1993 to 2035.

Examples

This example shows the output from the **show logging onboard cliilog continuous** command:

```
Switch# show logging onboard cliilog continuous
-----
CLI LOGGING CONTINUOUS INFORMATION
-----
MM/DD/YYYY HH:MM:SS COMMAND
-----
05/12/2006 15:33:17 show logging onboard temperature detail
05/12/2006 15:33:21 show logging onboard voltage detail
05/12/2006 15:33:32 show logging onboard poe detail
05/12/2006 16:14:09 show logging onboard temperature summary
...
<output truncated>
....
05/16/2006 13:07:53 no hw-module module logging onboard message level
05/16/2006 13:16:13 show logging onboard uptime continuous
05/16/2006 13:39:18 show logging onboard uptime summary
05/16/2006 13:45:57 show logging onboard cliilog summary
-----
```

This example shows the output from the **show logging onboard poe continuous end 01:01:00 jan 2000** command on a switch:

```
Switch# show logging onboard message poe continuous end 01:01:00 jan 2000
POE CONTINUOUS INFORMATION
-----
Sensor                | ID |
-----
Gi1/0/1                1
Gi1/0/2                2
Gi1/0/3                3
Gi1/0/4                4
...
<output truncated>
...
Gi1/0/21              21
Gi1/0/22              22
Gi1/0/23              23
Gi1/0/24              24
-----
Time Stamp            |Sensor Watts
MM/DD/YYYY HH:MM:SS | Gi1/0/1 Gi1/0/2 Gi1/0/3 Gi1/0/4 Gi1/0/5 Gi1/0/6 Gi1/0/7 Gi1/0/8 Gi1/0/9
Gi1/0/10 Gi1/0/11 Gi1/0/12 Gi1/0/13 Gi1/0/14 Gi1/0/15 Gi1/0/16 Gi1/0/17 Gi1/0/18 Gi1/0/19
Gi1/0/20 Gi1/0/21
Gi1/0/22 Gi1/0/23 Gi1/0/24
-----
03/01/1993 00:04:03  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
0.000  0.000  0.000
03/01/1993 00:05:03  0.000  1.862  0.000  1.862  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
0.000  0.000
-----
```

This example shows the output from the **show logging onboard status** command:

```
Switch# show logging onboard status
Devices registered with infra
      Slot no.: 0 Subslot no.: 0, Device obf10:
Application name cliilog :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name environment :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name errmsg :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name poe :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name temperature :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name uptime :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
Application name voltage :
      Path : obf10:
      CLI enable status : enabled
      Platform enable status: enabled
```

This example shows the output from the **show logging onboard temperature continuous** command:

```
Switch# show logging onboard temperature continuous
-----
TEMPERATURE CONTINUOUS INFORMATION
```

show logging onboard

```

-----
Sensor | ID |
-----
Board temperature | 1 |
-----
Time Stamp | Sensor Temperature 0C
MM/DD/YYYY HH:MM:SS | 1 2 3 4 5 6 7 8 9 10 11 12
-----
05/12/2006 15:33:20 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 16:31:21 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 17:31:21 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 18:31:21 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 19:31:21 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 20:31:21 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 21:29:22 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 22:29:22 35 -- -- -- -- -- -- -- -- -- --
05/12/2006 23:29:22 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 00:29:22 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 01:29:22 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 02:27:23 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 03:27:23 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 04:27:23 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 05:27:23 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 06:27:23 35 -- -- -- -- -- -- -- -- -- --
05/13/2006 07:25:24 36 -- -- -- -- -- -- -- -- -- --
05/13/2006 08:25:24 35 -- -- -- -- -- -- -- -- -- --
<output truncated>

```

This example shows the output from the **show logging onboard uptime summary** command:

```

Switch# show logging onboard uptime summary
-----
UPTIME SUMMARY INFORMATION
-----
First customer power on : 03/01/1993 00:03:50
Total uptime           : 0 years 0 weeks 3 days 21 hours 55 minutes
Total downtime        : 0 years 0 weeks 0 days 0 hours 0 minutes
Number of resets       : 2
Number of slot changes : 1
Current reset reason   : 0x0
Current reset timestamp : 03/01/1993 00:03:28
Current slot          : 1
Current uptime         : 0 years 0 weeks 0 days 0 hours 55 minutes
-----
Reset | |
Reason | Count |
-----
No historical data to display
-----

```

This example shows the output from the **show logging onboard voltage summary** command:

```

Switch# show logging onboard voltage summary
-----
VOLTAGE SUMMARY INFORMATION
-----
Number of sensors       : 8
Sampling frequency     : 60 seconds
Maximum time of storage : 3600 minutes
-----
Sensor | ID | Maximum Voltage
-----
12.00V | 0 | 12.567
5.00V  | 1 | 5.198
3.30V  | 2 | 3.439
2.50V  | 3 | 2.594
1.50V  | 4 | 1.556
1.20V  | 5 | 1.239
1.00V  | 6 | 0.980
0.75V  | 7 | 0.768
-----
Nominal Range | Sensor ID
-----

```


No historical data to display

show logging smartlog

To display smart logging information, use the **show logging smartlog** command in privileged EXEC mode.

show logging smartlog [**event-ids** | **events** | **statistics** {**interface** *interface-id* | **summary**}]

Syntax Description

event-ids	(Optional) Displays the IDs and names of smart log events. The NetFlow collector uses the event IDs to identify each event.
events	(Optional) Displays descriptions of smart log events. The display shows the last 10 smart logging events.
statistics	(Optional) Displays smart log statistics.
interface <i>interface-id</i>	(Optional) Displays smart log statistics for the specified interface.
summary	(Optional) Displays a summary of the smart log event statistics.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can configure smart logging of packets dropped because of DHCP snooping violations, Dynamic ARP inspection violations, IP source guard denied traffic, or ACL permitted or denied traffic. The packet contents are sent to the identified Cisco IOS NetFlow collector.

The statistics counters reflect the number of packets that have been sent to the collector by smart logging.

Examples

This example shows output from the **show logging smartlog event-ids** command:

```
Switch# show logging smartlog event-ids
EventID: 1 Description: DHCPSPNP
Extended Events:
-----
ID | Description
-----
1 | DHCPSPNP_DENY_INVALID_MSGTYPE
2 | DHCPSPNP_DENY_INVALID_PKTLEN
3 | DHCPSPNP_DENY_INVALID_BIND
4 | DHCPSPNP_DENY_INVALID_OPT
5 | DHCPSPNP_DENY_OPT82_DISALLOW
```

```

6 | DHCPSNP_DENY_SRCMAC_MSMTCH

EventID: 2 Description: DAI
Extended Events:
-----
ID | Description
-----
1 | DAI_DENY_INVALID_BIND
2 | DAI_DENY_INVALID_SRCMAC
3 | DAI_DENY_INVALID_IP
4 | DAI_DENY_ACL
5 | DAI_DENY_INVALID_PKT
6 | DAI_DENY_INVALID_DSTMAC

EventID: 3 Description: IPSG
Extended Events:
-----
ID | Description
-----
1 | IPSG_DENY

EventID: 4 Description: ACL
Extended Events:
-----
ID | Description
-----
1 | PACL_PERMIT
2 | PACL_DENY

```

This example shows output from the **show logging smartlog statistics interface** command:

```

Switch# show logging smartlog statistics interface gigabitethernet1/0

Total number of DHCP Snooping logged packets: 0
DHCPSNP_DENY_INVALID_MSGTYPE: 0

DHCPSNP_DENY_INVALID_PKTLEN: 0

DHCPSNP_DENY_INVALID_BIND: 0

DHCPSNP_DENY_INVALID_OPT: 0

DHCPSNP_DENY_OPT82_DISALLOW: 0

DHCPSNP_DENY_SRCMAC_MSMTCH: 0

Total number of Dynamic ARP Inspection logged packets: 0
DAI_DENY_INVALID_BIND: 0

DAI_DENY_INVALID_SRCMAC: 0

DAI_DENY_INVALID_IP: 0

DAI_DENY_ACL: 0

DAI_DENY_INVALID_PKT: 0

DAI_DENY_INVALID_DSTMAC: 0

Total number of IP Source Guard logged packets: 793
IPSG_DENY: 793

Total number of ACL logged packets: 10135

PACL_PERMIT: 10135

PACL_DENY: 0

```

Related Commands

Command	Description
clear logging smartlog statistics interface	Clears smart logging counters on an interface.
logging smartlog	Enables smart logging on the switch.

show mac address-table

To display a specific MAC address table entry, use the **show mac address-table** command in EXEC mode.

show mac-address-table

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines This command can display static and dynamic entries or the MAC address table static and dynamic entries on a specific interface or VLAN.

Examples This example shows the output from the **show mac address-table** command:

```
Switch# show mac address-table
      Mac Address Table
-----
Vlan    Mac Address      Type    Ports
-----
  All    0000.0000.0001   STATIC  CPU
  All    0000.0000.0002   STATIC  CPU
  All    0000.0000.0003   STATIC  CPU
  All    0000.0000.0009   STATIC  CPU
  All    0000.0000.0012   STATIC  CPU
  All    0180.c200.000b   STATIC  CPU
  All    0180.c200.000c   STATIC  CPU
  All    0180.c200.000d   STATIC  CPU
  All    0180.c200.000e   STATIC  CPU
  All    0180.c200.000f   STATIC  CPU
  All    0180.c200.0010   STATIC  CPU
  1      0030.9441.6327   DYNAMIC Gi0/4
Total Mac Addresses for this criterion: 12
```

Related Commands	Command	Description
	clear mac address-table	Deletes dynamic addresses from the MAC address table and clears global notification counters.

show mac address-table address

To display MAC address table information for a specified MAC address, use the **show mac address-table address** command in EXEC mode.

show mac address-table address *mac-address* [**interface** *interface-id*] [**vlan** *vlan-id*]

Syntax Description

<i>mac-address</i>	The 48-bit MAC address; valid format is H.H.H.
interface <i>interface-id</i>	(Optional) Displays information for a specific interface. Valid interfaces include physical ports and port channels.
vlan <i>vlan-id</i>	(Optional) Displays entries for the specific VLAN only. The range is 1 to 4094.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table address** command:

```
Switch# show mac address-table address 0002.4b28.c482
      Mac Address Table
-----
Vlan  Mac Address      Type    Ports
----  -
All   0002.4b28.c482   STATIC CPU
Total Mac Addresses for this criterion: 1
```

show mac address-table aging-time

To display the aging time of address table entries, use the **show mac address-table aging-time** command in EXEC mode.

```
show mac address-table aging-time [vlan vlan-id]
```

Syntax Description

vlan <i>vlan-id</i>	(Optional) Displays aging time information for a specific VLAN. The range is 1 to 4094.
----------------------------	---

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If no VLAN number is specified, the aging time for all VLANs appears. This command displays the aging time of a specific address table instance, all address table instances on a specified VLAN, or, if a specific VLAN is not specified, on all VLANs.

Examples

This example shows the output from the **show mac address-table aging-time** command:

```
Switch# show mac address-table aging-time

Vlan    Aging Time
----    -
  1      300
```

This example shows the output from the **show mac address-table aging-time vlan 10** command:

```
Switch# show mac address-table aging-time vlan 10

Vlan    Aging Time
----    -
  10     300
```

show mac address-table count

To display the number of addresses present in all VLANs or the specified VLAN, use the **show mac address-table count** command in EXEC mode.

show mac address-table count [*vlan vlan-id*]

Syntax Description	
<i>vlan vlan-id</i>	(Optional) Displays the number of addresses for a specific VLAN. The range is 1 to 4094.

Command Modes	
	User EXEC
	Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines If no VLAN number is specified, the address count for all VLANs appears.

Examples This example shows the output from the **show mac address-table count** command:

```
Switch# show mac address-table count

Mac Entries for Vlan   : 1
-----
Dynamic Address Count : 2
Static Address Count  : 0
Total Mac Addresses   : 2
```


show mac address-table dynamic

To display only dynamic MAC address table entries, use the **show mac address-table dynamic** command in EXEC mode.

```
show mac address-table dynamic [address mac-address] [interface interface-id] [vlan vlan-id]
```

Syntax Description

address <i>mac-address</i>	(Optional) Specifies a 48-bit MAC address; the valid format is H.H.H (available in privileged EXEC mode only).
interface <i>interface-id</i>	(Optional) Specifies an interface to match; valid interfaces include physical ports and port channels.
vlan <i>vlan-id</i>	(Optional) Displays entries for a specific VLAN; the range is 1 to 4094.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table dynamic** command:

```
Switch# show mac address-table dynamic
-----
                Mac Address Table
-----
Vlan  Mac Address      Type    Ports
----  -
  1    0030.b635.7862  DYNAMIC Gi0/2
  1    00b0.6496.2741  DYNAMIC Gi0/2
Total Mac Addresses for this criterion: 2
```

show mac address-table interface

To display the MAC address table information for a specified interface on a specified VLAN, use the **show mac address-table interface** EXEC command.

show mac address-table interface *interface-id* [**vlan** *vlan-id*]

Syntax Description

<i>interface-id</i>	The interface type; valid interfaces include physical ports and port channels.
vlan <i>vlan-id</i>	(Optional) Displays entries for a specific VLAN; the range is 1 to 4094.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table interface** command:

```
Switch# show mac address-table interface gigabitethernet0/2
```

```

                Mac Address Table
-----
Vlan Mac Address      Type      Ports
----  -
1     0030.b635.7862    DYNAMIC   Gi0/2
1     00b0.6496.2741    DYNAMIC   Gi0/2
Total Mac Addresses for this criterion: 2

```

show mac address-table learning

To display the status of MAC address learning for all VLANs or a specified VLAN, use the **show mac address-table learning** command in EXEC mode.

```
show mac address-table learning [vlan vlan-id]
```

Syntax Description	vlan <i>vlan-id</i> (Optional) Displays information for a specific VLAN. The range is 1 to 4094.
---------------------------	---

Command Modes	User EXEC Privileged EXEC
----------------------	------------------------------

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use the **show mac address-table learning** command without any keywords to display configured VLANs and whether MAC address learning is enabled or disabled on them.

The default is that MAC address learning is enabled on all VLANs. Use the command with a specific VLAN ID to display the learning status on an individual VLAN.

Examples

This example shows the output from the **show mac address-table learning** command showing that MAC address learning is disabled on VLAN 200:

```
Switch# show mac address-table learning

VLAN      Learning Status
----      -
1         yes
100       yes
200       no
```

show mac address-table move update

To display the MAC address-table move update information on the switch, use the **show mac address-table move update** command in EXEC mode.

show mac address-table move update

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values.

Command Modes
User EXEC
Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example shows the output from the **show mac address-table move update** command:

```
Switch# show mac address-table move update

Switch-ID : 010b.4630.1780
Dst mac-address : 0180.c200.0010
Vlans/Macs supported : 1023/8320
Default/Current settings: Rcv Off/On, Xmt Off/On
Max packets per min : Rcv 40, Xmt 60
Rcv packet count : 10
Rcv conforming packet count : 5
Rcv invalid packet count : 0
Rcv packet count this min : 0
Rcv threshold exceed count : 0
Rcv last sequence# this min : 0
Rcv last interface : Po2
Rcv last src-mac-address : 0003.fd6a.8701
Rcv last switch-ID : 0303.fd63.7600
Xmt packet count : 0
Xmt packet count this min : 0
Xmt threshold exceed count : 0
Xmt pak buf unavail cnt : 0
Xmt last interface : None
```

Related Commands	Command	Description
	clear mac address-table move update	Clears the mac address-table-move update-related counters.

Command	Description
mac address-table move update	Adds static addresses to the MAC address table.

show mac address-table multicast

To display information about the multicast MAC address table, use the **show mac-address-table multicast** command.

show mac-address-table multicast [**count** | **{igmp-snooping [count]}** | **{user [count]}** | **{vlan vlan_num}**]

Syntax Description

count	(Optional) Displays the number of multicast entries.
igmp-snooping	(Optional) Displays only the addresses learned by IGMP snooping.
user	(Optional) Displays only the user-entered static addresses.
vlan vlan_num	(Optional) Displays information for a specific VLAN only; valid values are from 1 to 4094.

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

For the MAC address table entries that are used by the routed ports, the routed port name is displayed in the "vlan" column, not the internal VLAN number.

Examples

This example shows how to display multicast MAC address table information for a specific VLAN:

```
Switch# show mac-address-table multicast vlan 1
```

```
Multicast Entries
vlan   mac address      type   ports
-----+-----+-----+-----
  1    ffff.ffff.ffff    system Switch,Fa6/15
Switch#
```

This example shows how to display the number of multicast MAC entries for all VLANs:

```
Switch# show mac-address-table multicast count
```

```
MAC Entries for all vlans:
Multicast MAC Address Count:           141
Total Multicast MAC Addresses Available: 16384
Switch#
```

show mac address-table notification

To display the MAC address notification settings for all interfaces or the specified interface, use the **show mac address-table notification** command in EXEC mode.

show mac address-table notification {*change* [**interface**[*interface-id*]] | **mac-move** | **threshold**}

Syntax Description

<i>change</i>	The MAC change notification feature parameters and history table.
interface	(Optional) Displays information for all interfaces. Valid interfaces include physical ports and port channels.
<i>interface-id</i>	(Optional) The specified interface. Valid interfaces include physical ports and port channels.
mac-move	Displays status for MAC address move notifications.
threshold	Displays status for MAC address-table threshold monitoring.

Command Default

By default, the MAC address notification, MAC move, and MAC threshold monitoring are disabled.
The default MAC utilization threshold is 50 percent.
The default time between MAC threshold notifications is 120 seconds.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use the **show mac address-table notification change** command without keywords to see if the MAC address change notification feature is enabled or disabled, the number of seconds in the MAC notification interval, the maximum number of entries allowed in the history table, and the history table contents.

Use the **interface** keyword to display the notifications for all interfaces. If the interface ID is included, only the flags for that interface appear.

Examples

This example shows the output from the **show mac address-table notification change** command:

```
Switch# show mac address-table notification change
```

show mac address-table notification

```
MAC Notification Feature is Enabled on the switch
Interval between Notification Traps : 60 secs
Number of MAC Addresses Added : 4
Number of MAC Addresses Removed : 4
Number of Notifications sent to NMS : 3
Maximum Number of entries configured in History Table : 100
Current History Table Length : 3
MAC Notification Traps are Enabled

History Table contents
-----
History Index 0, Entry Timestamp 1032254, Despatch Timestamp 1032254
MAC Changed Message :
Operation: Added Vlan: 2 MAC Addr: 0000.0000.0001 Module: 0 Port: 1

History Index 1, Entry Timestamp 1038254, Despatch Timestamp 1038254
MAC Changed Message :
Operation: Added Vlan: 2 MAC Addr: 0000.0000.0000 Module: 0 Port: 1
Operation: Added Vlan: 2 MAC Addr: 0000.0000.0002 Module: 0 Port: 1
Operation: Added Vlan: 2 MAC Addr: 0000.0000.0003 Module: 0 Port: 1

History Index 2, Entry Timestamp 1074254, Despatch Timestamp 1074254
MAC Changed Message :
Operation: Deleted Vlan: 2 MAC Addr: 0000.0000.0001 Module: 0 Port: 1
Operation: Deleted Vlan: 2 MAC Addr: 0000.0000.0002 Module: 0 Port: 1
Operation: Deleted Vlan: 2 MAC Addr: 0000.0000.0003 Module: 0 Port: 1
```


show mac address-table secure

To display only secure MAC address table entries, use the **show mac address-table secure** command in EXEC mode.

```
show mac address-table secure [address mac-address] [interface interface-id] [vlan vlan-id]
```

Syntax Description

address <i>mac-address</i>	(Optional) Specifies a 48-bit MAC address; the valid format is H.H.H (available in privileged EXEC mode only).
interface <i>interface-id</i>	(Optional) Specifies an interface to match; valid interfaces include physical ports and port channels.
vlan <i>vlan-id</i>	(Optional) Displays entries for a specific VLAN; the range is 1 to 4094.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table secure** command:

```
Switch# show mac address-table secure
-----
                Mac Address Table
-----
Vlan  Mac Address      Type    Ports
----  -
  1    0030.b635.7862    DYNAMIC Gi0/2
  1    00b0.6496.2741    DYNAMIC Gi0/2
Total Mac Addresses for this criterion: 2
```

show mac address-table static

To display only static MAC address table entries, use the **show mac address-table static** command in EXEC mode.

show mac address-table static [*address mac-address*] [*interface interface-id*] [*vlan vlan-id*]

Syntax Description

address <i>mac-address</i>	(Optional) Specifies a 48-bit MAC address; the valid format is H.H.H (available in privileged EXEC mode only).
interface <i>interface-id</i>	(Optional) Specifies an interface to match; valid interfaces include physical ports and port channels.
vlan <i>vlan-id</i>	(Optional) Specifies the address for a specific VLAN. The range is from 1 to 4094.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table static** command:

```
Switch# show mac address-table static

                Mac Address Table
-----
Vlan    Mac Address      Type    Ports
----    -
All     0100.0ccc.cccc  STATIC CPU
All     0180.c200.0000  STATIC CPU
All     0100.0ccc.cccd  STATIC CPU
All     0180.c200.0001  STATIC CPU
All     0180.c200.0004  STATIC CPU
All     0180.c200.0005  STATIC CPU
4       0001.0002.0004  STATIC Drop
6       0001.0002.0007  STATIC Drop
Total Mac Addresses for this criterion: 8
```

show mac address-table vlan

To display the MAC address table information for a specified VLAN, use the **show mac address-table vlan** command in EXEC mode.

show mac address-table vlan *vlan-id*

Syntax Description

<i>vlan-id</i>	The address for a specific VLAN. The range is 1 to 4094.
----------------	--

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows the output from the **show mac address-table vlan 1** command:

```
Switch# show mac address-table vlan 1
-----
                Mac Address Table
-----
Vlan  Mac Address      Type    Ports
----  -
  1    0100.0ccc.cccc    STATIC  CPU
  1    0180.c200.0000    STATIC  CPU
  1    0100.0ccc.cccd    STATIC  CPU
  1    0180.c200.0001    STATIC  CPU
  1    0180.c200.0002    STATIC  CPU
  1    0180.c200.0003    STATIC  CPU
  1    0180.c200.0005    STATIC  CPU
  1    0180.c200.0006    STATIC  CPU
  1    0180.c200.0007    STATIC  CPU
Total Mac Addresses for this criterion: 9
```

show nmosp

To display the Network Mobility Services Protocol (NMSP) configuration settings, use the **show nmosp** command.

show nmosp {**attachment** | {**suppress interfaces**}| **capability**| **notification interval**| **statistics** {**connection**| **summary**}| **status**| **subscription detail** [*ip-addr*]| **summary**}

Syntax Description

attachment suppress interfaces	Displays attachment suppress interfaces.
capability	Displays NMSP capabilities.
notification interval	Displays the NMSP notification interval.
statistics connection	Displays all connection-specific counters.
statistics summary	Displays the NMSP counters.
status	Displays status of active NMSP connections.
subscription detail <i>ip-addr</i>	The details are only for the NMSP services subscribed to by a specific IP address.
subscription summary	Displays details for all of the NMSP services to which the controller is subscribed. The details are only for the NMSP services subscribed to by a specific IP address.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

The following is sample output from the **show nmosp notification interval** command:

```
Switch# show nmosp notification interval
NMSP Notification Intervals
-----

RSSI Interval:
  Client           : 2 sec
  RFID             : 2 sec
```

```
Rogue AP           : 2 sec  
Rogue Client       : 2 sec  
Attachment Interval : 30 sec  
Location Interval  : 30 sec
```

shutdown

To shut down VLAN switching, use the **shutdown** command in global configuration mode. To disable the configuration set, use the **no** form of this command.

shutdown [**vlan** *vlan-id*]

no shutdown

Syntax Description

vlan <i>vlan-id</i>	VLAN ID of VLAN to shutdown.
----------------------------	------------------------------

Command Default

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to shutdown a VLAN:

```
Switch(config)# vlan open1
Switch(config-wlan)# shutdown
```

This example shows that the access point is not shut down:

```
Switch# configure terminal
Switch(config)# ap name 3602a no shutdown
```

test cable-diagnostics prbs

To run the pseudo-random binary sequence (PRBS) feature on an interface, use the **test cable-diagnostics prbs** command in privileged EXEC mode.

test cable-diagnostics prbs interface *interface-id*

Syntax Description	
<i>interface-id</i>	The interface on which to run PRBS.

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

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines PRBS is supported only on 10-Gigabit Ethernet ports. It is not supported on 10/100/100 copper Ethernet ports and small form-factor pluggable (SFP) module ports.

After you run PRBS by using the **test cable-diagnostics prbs interface** *interface-id* command, use the **show cable-diagnostics prbs interface** *interface-id* privileged EXEC command to display the results.

Examples This example shows how to run PRBS on an interface:

```
Switch# test cable-diagnostics prbs interface gigabitethernet1/0/2
PRBS test started on interface Gi1/0/2
A PRBS test can take a few seconds to run on an interface
Use 'show cable-diagnostics prbs' to read the TDR results
```

Related Commands	Command	Description
	show cable-diagnostics prbs	Displays the PRBS test results.

test cable-diagnostics tdr

To run the Time Domain Reflector (TDR) feature on an interface, use the **test cable-diagnostics tdr** command in privileged EXEC mode.

test cable-diagnostics tdr interface *interface-id*

Syntax Description

<i>interface-id</i>	The interface on which to run TDR.
---------------------	------------------------------------

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

TDR is supported only on 10/100/100 copper Ethernet ports. It is not supported on 10-Gigabit Ethernet ports or small form-factor pluggable (SFP) module ports.

After you run TDR by using the **test cable-diagnostics tdr interface** *interface-id* command, use the **show cable-diagnostics tdr interface** *interface-id* privileged EXEC command to display the results.

Examples

This example shows how to run TDR on an interface:

```
Switch# test cable-diagnostics tdr interface gigabitethernet1/0/2
TDR test started on interface Gi1/0/2
A TDR test can take a few seconds to run on an interface
Use 'show cable-diagnostics tdr' to read the TDR results
```

If you enter the **test cable-diagnostics tdr interface** *interface-id* command on an interface that has an link up status and a speed of 10 or 100 Mb/s, these messages appear:

```
Switch# test cable-diagnostics tdr interface gigabitethernet1/0/3
TDR test on Gi1/0/9 will affect link state and traffic
TDR test started on interface Gi1/0/3
A TDR test can take a few seconds to run on an interface
Use 'show cable-diagnostics tdr' to read the TDR results.
```

Related Commands

Command	Description
show cable-diagnostics tdr	Displays the TDR results.

traceroute mac

To display the Layer 2 path taken by the packets from the specified source MAC address to the specified destination MAC address, use the **traceroute mac** command in privileged EXEC mode.

traceroute mac [**interface** *interface-id*] *source-mac-address* [**interface** *interface-id*] *destination-mac-address* [**vlan** *vlan-id*] [**detail**]

Syntax Description

interface <i>interface-id</i>	(Optional) Specifies an interface on the source or destination switch.
<i>source-mac-address</i>	The MAC address of the source switch in hexadecimal format.
<i>destination-mac-address</i>	The MAC address of the destination switch in hexadecimal format.
vlan <i>vlan-id</i>	(Optional) Specifies the VLAN on which to trace the Layer 2 path that the packets take from the source switch to the destination switch. Valid VLAN IDs are 1 to 4094.
detail	(Optional) Specifies that detailed information appears.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

For Layer 2 traceroute to function properly, Cisco Discovery Protocol (CDP) must be enabled on all of the switches in the network. Do not disable CDP.

When the switch detects a device in the Layer 2 path that does not support Layer 2 traceroute, the switch continues to send Layer 2 trace queries and lets them time out.

The maximum number of hops identified in the path is ten.

Layer 2 traceroute supports only unicast traffic. If you specify a multicast source or destination MAC address, the physical path is not identified, and an error message appears.

The **traceroute mac** command output shows the Layer 2 path when the specified source and destination addresses belong to the same VLAN.

If you specify source and destination addresses that belong to different VLANs, the Layer 2 path is not identified, and an error message appears.

If the source or destination MAC address belongs to multiple VLANs, you must specify the VLAN to which both the source and destination MAC addresses belong.

If the VLAN is not specified, the path is not identified, and an error message appears.

The Layer 2 traceroute feature is not supported when multiple devices are attached to one port through hubs (for example, multiple CDP neighbors are detected on a port).

When more than one CDP neighbor is detected on a port, the Layer 2 path is not identified, and an error message appears.

This feature is not supported in Token Ring VLANs.

Examples

This example shows how to display the Layer 2 path by specifying the source and destination MAC addresses:

```
Switch# traceroute mac 0000.0201.0601 0000.0201.0201
Source 0000.0201.0601 found on con6[WS-C3750E-24PD] (2.2.6.6)
con6 (2.2.6.6) :Gi0/0/1 => Gi0/0/3
con5          (2.2.5.5       ) :   Gi0/0/3 => Gi0/0/1
con1          (2.2.1.1       ) :   Gi0/0/1 => Gi0/0/2
con2          (2.2.2.2       ) :   Gi0/0/2 => Gi0/0/1
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed
```

This example shows how to display the Layer 2 path by using the **detail** keyword:

```
Switch# traceroute mac 0000.0201.0601 0000.0201.0201 detail
Source 0000.0201.0601 found on con6[WS-C3750E-24PD] (2.2.6.6)
con6 / WS-C3750E-24PD / 2.2.6.6 :
    Gi0/0/2 [auto, auto] => Gi0/0/3 [auto, auto]
con5 / WS-C2950G-24-EI / 2.2.5.5 :
    Fa0/3 [auto, auto] => Gi0/1 [auto, auto]
con1 / WS-C3550-12G / 2.2.1.1 :
    Gi0/1 [auto, auto] => Gi0/2 [auto, auto]
con2 / WS-C3550-24 / 2.2.2.2 :
    Gi0/2 [auto, auto] => Fa0/1 [auto, auto]
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed.
```

This example shows how to display the Layer 2 path by specifying the interfaces on the source and destination switches:

```
Switch# traceroute mac interface fastethernet0/1 0000.0201.0601 interface fastethernet0/3
0000.0201.0201
Source 0000.0201.0601 found on con6[WS-C3750E-24PD] (2.2.6.6)
con6 (2.2.6.6) :Gi0/0/1 => Gi0/0/3
con5          (2.2.5.5       ) :   Gi0/0/3 => Gi0/0/1
con1          (2.2.1.1       ) :   Gi0/0/1 => Gi0/0/2
con2          (2.2.2.2       ) :   Gi0/0/2 => Gi0/0/1
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed
```

This example shows the Layer 2 path when the switch is not connected to the source switch:

```
Switch# traceroute mac 0000.0201.0501 0000.0201.0201 detail
Source not directly connected, tracing source .....
Source 0000.0201.0501 found on con5[WS-C3750E-24TD] (2.2.5.5)
con5 / WS-C3750E-24TD / 2.2.5.5 :
    Gi0/0/1 [auto, auto] => Gi0/0/3 [auto, auto]
con1 / WS-C3550-12G / 2.2.1.1 :
    Gi0/1 [auto, auto] => Gi0/2 [auto, auto]
con2 / WS-C3550-24 / 2.2.2.2 :
```

```

      Gi0/2 [auto, auto] => Fa0/1 [auto, auto]
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed.

```

This example shows the Layer 2 path when the switch cannot find the destination port for the source MAC address:

```

Switch# traceroute mac 0000.0011.1111 0000.0201.0201
Error:Source Mac address not found.
Layer2 trace aborted.

```

This example shows the Layer 2 path when the source and destination devices are in different VLANs:

```

Switch# traceroute mac 0000.0201.0601 0000.0301.0201
Error:Source and destination macs are on different vlans.
Layer2 trace aborted.

```

This example shows the Layer 2 path when the destination MAC address is a multicast address:

```

Switch# traceroute mac 0000.0201.0601 0100.0201.0201
Invalid destination mac address

```

This example shows the Layer 2 path when source and destination switches belong to multiple VLANs:

```

Switch# traceroute mac 0000.0201.0601 0000.0201.0201
Error:Mac found on multiple vlans.
Layer2 trace aborted.

```

Related Commands

Command	Description
traceroute mac ip	Displays the Layer 2 path taken by the packets from the specified source IP address or hostname to the specified destination IP address or hostname.

tracert mac ip

To display the Layer 2 path taken by the packets from the specified source IP address or hostname to the specified destination IP address or hostname, use the **tracert mac ip** command in privileged EXEC mode.

tracert mac ip {*source-ip-address* | *source-hostname*} {*destination-ip-address* | *destination-hostname*} [**detail**]

Syntax Description

<i>source-ip-address</i>	The IP address of the source switch as a 32-bit quantity in dotted-decimal format.
<i>source-hostname</i>	The IP hostname of the source switch.
<i>destination-ip-address</i>	The IP address of the destination switch as a 32-bit quantity in dotted-decimal format.
<i>destination-hostname</i>	The IP hostname of the destination switch.
detail	(Optional) Specifies that detailed information appears.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

For Layer 2 tracert to function properly, Cisco Discovery Protocol (CDP) must be enabled on each switch in the network. Do not disable CDP.

When the switch detects a device in the Layer 2 path that does not support Layer 2 tracert, the switch continues to send Layer 2 trace queries and lets them time out.

The maximum number of hops identified in the path is ten.

The **tracert mac ip** command output shows the Layer 2 path when the specified source and destination IP addresses are in the same subnet.

When you specify the IP addresses, the switch uses Address Resolution Protocol (ARP) to associate the IP addresses with the corresponding MAC addresses and the VLAN IDs.

- If an ARP entry exists for the specified IP address, the switch uses the associated MAC address and identifies the physical path.

- If an ARP entry does not exist, the switch sends an ARP query and tries to resolve the IP address. The IP addresses must be in the same subnet. If the IP address is not resolved, the path is not identified, and an error message appears.

The Layer 2 traceroute feature is not supported when multiple devices are attached to one port through hubs (for example, multiple CDP neighbors are detected on a port).

When more than one CDP neighbor is detected on a port, the Layer 2 path is not identified, and an error message appears.

This feature is not supported in Token Ring VLANs.

Examples

This example shows how to display the Layer 2 path by specifying the source and destination IP addresses and by using the **detail** keyword:

```
Switch# traceroute mac ip 2.2.66.66 2.2.22.22 detail
Translating IP to mac .....
2.2.66.66 => 0000.0201.0601
2.2.22.22 => 0000.0201.0201

Source 0000.0201.0601 found on con6[WS-C2950G-24-EI] (2.2.6.6)
con6 / WS-C3750E-24TD / 2.2.6.6 :
    Gi0/0/1 [auto, auto] => Gi0/0/3 [auto, auto]
con5 / WS-C2950G-24-EI / 2.2.5.5 :
    Fa0/3 [auto, auto] => Gi0/1 [auto, auto]
con1 / WS-C3550-12G / 2.2.1.1 :
    Gi0/1 [auto, auto] => Gi0/2 [auto, auto]
con2 / WS-C3550-24 / 2.2.2.2 :
    Gi0/2 [auto, auto] => Fa0/1 [auto, auto]
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed.
```

This example shows how to display the Layer 2 path by specifying the source and destination hostnames:

```
Switch# traceroute mac ip con6 con2
Translating IP to mac .....
2.2.66.66 => 0000.0201.0601
2.2.22.22 => 0000.0201.0201

Source 0000.0201.0601 found on con6
con6 (2.2.6.6) :Gi0/0/1 => Gi0/0/3
con5          (2.2.5.5)   ) :   Gi0/0/3 => Gi0/1
con1          (2.2.1.1)   ) :   Gi0/0/1 => Gi0/2
con2          (2.2.2.2)   ) :   Gi0/0/2 => Fa0/1
Destination 0000.0201.0201 found on con2
Layer 2 trace completed
```

This example shows the Layer 2 path when ARP cannot associate the source IP address with the corresponding MAC address:

```
Switch# traceroute mac ip 2.2.66.66 2.2.77.77
Arp failed for destination 2.2.77.77.
Layer2 trace aborted.
```

Related Commands

Command	Description
tracroute mac	Displays the Layer 2 path taken by the packets from the specified source MAC address to the specified destination MAC address.

type

To display the contents of one or more files, use the **type** command in boot loader mode.

type *filesystem:/file-url...*

Syntax Description

<i>filesystem:</i>	Alias for a file system. Use flash: for the system board flash device; use usbflash0: for USB memory sticks.
<i>/file-url...</i>	Path (directory) and name of the files to display. Separate each filename with a space.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Filenames and directory names are case sensitive.

If you specify a list of files, the contents of each file appear sequentially.

Examples

This example shows how to display the contents of a file:

```
Switch: type flash:image_file_name
version_suffix: universal-122-xx.SEx
version_directory: image_file_name
image_system_type_id: 0x00000002
image_name: image_file_name.bin
ios_image_file_size: 8919552
total_image_file_size: 11592192
image_feature: IP|LAYER_3|PLUS|MIN_DRAM_MEG=128
image_family: family
stacking_number: 1.34
board_ids: 0x00000068 0x00000069 0x0000006a 0x0000006b
info_end:
```

unset

To reset one or more environment variables, use the **unset** command in boot loader mode.

unset *variable*...

Syntax Description

<i>variable</i>	Use one of these keywords for <i>variable</i> : MANUAL_BOOT —Specifies whether the switch automatically or manually boots.
	BOOT —Resets the list of executable files to try to load and execute when automatically booting. If the BOOT environment variable is not set, the system attempts to load and execute the first executable image it can find by using a recursive, depth-first search through the flash: file system. If the BOOT variable is set but the specified images cannot be loaded, the system attempts to boot the first bootable file that it can find in the flash: file system.
	ENABLE_BREAK —Specifies whether the automatic boot process can be interrupted by using the Break key on the console after the flash: file system has been initialized.
	HELPER —Identifies the semicolon-separated list of loadable files to dynamically load during the boot loader initialization. Helper files extend or patch the functionality of the boot loader.
	PS1 —Specifies the string that is used as the command-line prompt in boot loader mode.
	CONFIG_FILE —Resets the filename that Cisco IOS uses to read and write a nonvolatile copy of the system configuration.
	BAUD —Resets the rate in bits per second (b/s) used for the console. The Cisco IOS software inherits the baud rate setting from the boot loader and continues to use this value unless the configuration file specifies another setting.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Under typical circumstances, it is not necessary to alter the setting of the environment variables.

The `MANUAL_BOOT` environment variable can also be reset by using the **no boot manual** global configuration command.

The `BOOT` environment variable can also be reset by using the **no boot system** global configuration command.

The `ENABLE_BREAK` environment variable can also be reset by using the **no boot enable-break** global configuration command.

The `HELPER` environment variable can also be reset by using the **no boot helper** global configuration command.

The `CONFIG_FILE` environment variable can also be reset by using the **no boot config-file** global configuration command.

Examples

This example shows how to unset the `SWITCH_PRIORITY` environment variable:

```
Switch: unset SWITCH_PRIORITY
```

version

To display the boot loader version, use the **version** command in boot loader mode.

version

Syntax Description

This command has no arguments or keywords.

Command Default

No default behavior or values.

Command Modes

Boot loader

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to display the boot loader version on a switch:

```
Switch: version
C2960X Boot Loader (C2960X-HBOOT-M) Version 15.0(2r)EX, RELEASE SOFTWARE (fc1)
Compiled Wed 15-May-13 21:39 by rel
```



INDEX

A

archive download-sw command [18](#)
archive tar command [22](#)
archive upload-sw command [26](#)

B

boot buffersize command [31](#)
boot command [29](#)
boot enable-break command [32](#)
boot host dhcp command [33](#)
boot host retry timeout command [34](#)
boot manual command [35](#)
boot system command [36](#)

C

cat command [37](#)
clear logging onboard command [38](#)
clear logging smartlog statistics interface command [39](#)
clear mac address-table command [40](#)
cluster commander-address command [42](#)
cluster discovery hop-count command [44](#)
cluster enable command [45](#)
cluster holdtime command [47](#)
cluster member command [48](#)
cluster outside-interface command [50](#)
cluster run command [51](#)
cluster timer command [52](#)
copy command [53](#)

D

debug cluster command [54](#)
debug matm move update command [56](#)
delete command [57](#)
dir command [58](#)

H

help command [60](#)
hw-module command [61](#)

L

logging buffered command [64](#)
logging command [63](#)
logging console command [65](#)
logging file flash command [66](#)
logging history command [67](#)
logging history size command [68](#)
logging monitor command [69](#)
logging smartlog command [70](#)
logging trap command [72](#)

M

mac address-table aging-time command [73](#)
mac address-table move update command [41, 76](#)
mac address-table notification change command [80](#)
mac address-table notification command [78, 125](#)
mac address-table static command [81](#)
mkdir command [82](#)
more command [83](#)

R

rcommand command [84](#)
rename command [86](#)
reset command [87](#)
rmdir command [88](#)

S

service sequence-numbers command [89](#)

set command [90](#)
show boot command [93](#)
show cable-diagnostics prbs command [95](#)
show cable-diagnostics tdr command [98](#)
show logging smartlog command [112](#)
show mac address-table dynamic [119](#)
show mac address-table interface command [120](#)
show mac address-table learning vlan command [74](#)
show mac address-table move update command [122](#)
show mac address-table vlan command [129](#)
show nmsp command [130](#)
shutdown command [132](#)

T

test cable-diagnostics prbs [133](#)

test cable-diagnostics tdr command [134](#)
traceroute mac command [135](#)
traceroute mac ip command [138](#)
type command [141](#)

U

unset command [142](#)

V

version command [144](#)