



Cisco Nexus 3000 Series NX-OS Fundamentals Configuration Guide, Release 5.0(3)U4(1)

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Preface

This preface contains the following sections:

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- [Document Conventions, page ix](#)
- [Related Documentation for Nexus 3000 Series NX-OS Software, page x](#)
- [Documentation Feedback , page xii](#)
- [Obtaining Documentation and Submitting a Service Request, page xii](#)

Audience

This publication is for experienced network administrators who configure and maintain Cisco Nexus Series devices.

Document Conventions

Command descriptions use the following conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
<i>Italic</i>	Italic text indicates arguments for which the user supplies the values.
[x]	Square brackets enclose an optional element(keyword or argument).
[x y]	Square brackets enclosing keywords or arguments separated by a vertical bar indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical bar indicate a required choice.

Convention	Description
[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.
<i>variable</i>	Indicates a variable for which you supply values, in context where italics cannot be used.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Examples use the following conventions:

Convention	Description
<code>screen font</code>	Terminal sessions and information the switch displays are in screen font.
<code>boldface screen font</code>	Information you must enter is in boldface screen font.
<i><code>italic screen font</code></i>	Arguments for which you supply values are in italic screen font.
<>	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.

This document uses the following conventions:



Note

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



Caution

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

Related Documentation for Nexus 3000 Series NX-OS Software

The entire Cisco NX-OS 3000 Series documentation set is available at the following URL:

http://www.cisco.com/en/US/products/ps11541/tsd_products_support_series_home.html

Release Notes

The release notes are available at the following URL:

http://www.cisco.com/en/US/products/ps11541/prod_release_notes_list.html

Installation and Upgrade Guides

The installation and upgrade guides are available at the following URL:

http://www.cisco.com/en/US/products/ps11541/prod_installation_guides_list.html

The documents in this category include:

- *Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series Safety Information and Documentation*
- *Regulatory, Compliance, and Safety Information for the Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series*
- *Cisco Nexus 3000 Series Hardware Installation Guide*

License Information

For information about feature licenses in NX-OS, see the *Cisco NX-OS Licensing Guide*, available at the following URL: http://www.cisco.com/en/US/docs/switches/datacenter/sw/nx-os/licensing/guide/b_Cisco_NX-OS_Licensing_Guide.html.

For the NX-OS end user agreement and copyright information, see *License and Copyright Information for Cisco NX-OS Software*, available at the following URL: http://www.cisco.com/en/US/docs/switches/datacenter/sw/4_0/nx-os/license_agreement/nx-ossw_lisns.html.

Configuration Guides

The configuration guides are available at the following URL:

http://www.cisco.com/en/US/products/ps11541/products_installation_and_configuration_guides_list.html

The documents in this category include:

- *Fundamentals Configuration Guide*
- *Interfaces Configuration Guide*
- *Layer 2 Switching Configuration Guide*
- *Multicast Configuration Guide*
- *Quality of Service Configuration Guide*
- *Security Configuration Guide*
- *System Management Configuration Guide*
- *Unicast Routing Configuration Guide*
- *Verified Scalability Guide for Cisco NX-OS*

Technical References

The technical references are available at the following URL:

http://www.cisco.com/en/US/products/ps11541/prod_technical_reference_list.html

Error and System Messages

The error and system message reference guides are available at the following URL:

http://www.cisco.com/en/US/products/ps11541/products_system_message_guides_list.html

Documentation Feedback

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Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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CHAPTER

1

New and Changed Information for this Release

The following table provides an overview of the significant changes to this guide for this current release. The table does not provide an exhaustive list of all changes made to the configuration guides or of the new features in this release.

- [New and Changed Information for this Release, page 1](#)

New and Changed Information for this Release

The following table provides an overview of the significant changes to this guide for this current release. The table does not provide an exhaustive list of all changes made to the configuration guides or of the new features in this release.

Table 1: New and Changed Features

Feature	Description	Added or Changed in Release	Where Documented
PowerOn Auto Provisioning (POAP)	Added USB support.	5.0(3)U4(1)	Using PowerOn Auto Provisioning, on page 59



Understanding the Command-Line Interface

This chapter describes the Cisco NX-OS software command-line interface (CLI).

This chapter includes the following sections:

- [Information About the CLI Prompt, page 4](#)
- [Command Modes, page 4](#)
- [Special Characters, page 8](#)
- [Keystroke Shortcuts, page 9](#)
- [Abbreviating Commands, page 11](#)
- [Completing a Partial Command Name, page 12](#)
- [Identifying Your Location in the Command Hierarchy, page 12](#)
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- [Understanding Regular Expressions, page 21](#)
- [Searching and Filtering show Command Output, page 22](#)
- [Searching and Filtering from the --More-- Prompt, page 28](#)
- [Using the Command History, page 29](#)
- [Enabling or Disabling the CLI Confirmation Prompts, page 31](#)
- [Setting CLI Display Colors, page 31](#)
- [Sending Commands to Modules, page 32](#)
- [BIOS Loader Prompt, page 33](#)
- [Examples Using the CLI , page 33](#)

- [Additional References for the CLI, page 35](#)

Information About the CLI Prompt

Once you have successfully accessed the device, the CLI prompt displays in the terminal window of your console port or remote workstation as shown in the following example:

```
User Access Verification
login: admin
Password:<password>
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2009, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
switch#
```

You can change the default device hostname.

From the CLI prompt, you can do the following:

- Use CLI commands for configuring features
- Access the command history
- Use command parsing functions



Note

In normal operation, usernames are case sensitive. However, when you are connected to the device through its console port, you can enter a login username in all uppercase letters regardless of how the username was defined. As long as you provide the correct password, the device logs you in.

Command Modes

This section describes command modes in the Cisco NX-OS CLI.

EXEC Command Mode

When you first log in, the Cisco NX-OS software places you in EXEC mode. The commands available in EXEC mode include the **show** commands that display the device status and configuration information, the **clear** commands, and other commands that perform actions that you do not save in the device configuration.

Global Configuration Command Mode

Global configuration mode provides access to the broadest range of commands. The term indicates characteristics or features that affect the device as a whole. You can enter commands in global configuration mode to configure your device globally, or to enter more specific configuration modes to configure specific elements such as interfaces or protocols.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode. Note The CLI prompt changes to indicate that you are in global configuration mode.

Interface Configuration Command Mode

One example of a specific configuration mode that you enter from global configuration mode is interface configuration mode. To configure interfaces on your device, you must specify the interface and enter interface configuration mode.

You must enable many features on a per-interface basis. Interface configuration commands modify the operation of the interfaces on the device, such as Ethernet interfaces or management interfaces (mgmt 0).

For more information about configuring interfaces, see the .

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	interface <i>type number</i> Example: <pre>switch(config)# interface ethernet 2/2 switch(config-if)#</pre>	Specifies the interface that you want to configure. The CLI places you into interface configuration mode for the specified interface. Note The CLI prompt changes to indicate that you are in interface configuration mode.

Subinterface Configuration Command Mode

From global configuration mode, you can access a configuration submode for configuring VLAN interfaces called subinterfaces. In subinterface configuration mode, you can configure multiple virtual interfaces on a single physical interface. Subinterfaces appear to a protocol as distinct physical interfaces.

Subinterfaces also allow multiple encapsulations for a protocol on a single interface. For example, you can configure IEEE 802.1Q encapsulation to associate a subinterface with a VLAN.

For more information about configuring subinterfaces, see the . For details about the subinterface commands, see *Cisco Nexus 7000 Series NX-OS Interfaces Command Reference*.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	interface type number.subint Example: switch(config)# interface ethernet 2/2.1 switch(config-subif)#	Specifies the VLAN interface to be configured. The CLI places you into a subinterface configuration mode for the specified VLAN interface. Note The CLI prompt changes to indicate that you are in global configuration mode.

Saving and Restoring a Command Mode

The Cisco NX-OS software allows you to save current command mode, configure a feature, and then restore the previous command mode. The **push** command saves the command mode and the **pop** command restores the command mode.

The following example shows how to save and restore a command mode:

```
switch# configure terminal
switch(config)# event manager applet test
switch(config-applet)# push
switch(config-applet)# configure terminal
switch(config)# username testuser password newtest
switch(config)# pop
switch(config-applet)#
```

Exiting a Configuration Command Mode

To exit from any configuration command mode, perform one of the following tasks:

Procedure

	Command or Action	Purpose
Step 1	exit Example: switch(config-if)# exit switch(config)#	Exits from the current configuration command mode and returns to the previous configuration command mode.
Step 2	end Example: switch(config-if)# end switch#	Exits from the current configuration command mode and returns to EXEC mode.
Step 3	Ctrl-Z Example: switch(config-if)# ^Z switch#	(Optional) Exits the current configuration command mode and returns to EXEC mode. Caution If you use Ctrl-Z at the end of a command line in which a valid command has been typed, the CLI adds the command to the running configuration file. In most cases, you should exit a configuration mode using the exit or end command.

Command Mode Summary

This table summarizes information about the main command modes.

Table 2: Command Mode Summary

Mode	Access Method	Prompt	Exit Method
EXEC	From the login prompt, enter your username and password.	switch#	To exit to the login prompt, use the exit command.
Global configuration	From EXEC mode, use the configure terminal command.	switch(config)#	To exit to EXEC mode, use the end or exit command or press Ctrl-Z .
Interface configuration	From global configuration mode, use an interface command and specify an interface with an interface command.	switch(config-if)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the exit command or press Ctrl-Z .
Subinterface configuration	From global configuration mode, specify a subinterface with an interface command.	switch(config-subif)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the end command or press Ctrl-Z .

Special Characters

This table lists the characters that have special meaning in Cisco NX-OS text strings and should be used only in regular expressions or other special contexts.

Table 3: Special Characters

Character	Description
%	Percent
#	Pound, hash, or number
...	Ellipsis
	Vertical bar
<>	Less than or greater than
[]	Brackets

Character	Description
{ }	Braces

Keystroke Shortcuts

This table lists command key combinations that can be used in both EXEC and configuration modes.

Table 4: Keystroke Shortcuts

Keystokes	Description
Ctrl-A	Moves the cursor to the beginning of the line.
Ctrl-B	Moves the cursor one character to the left. When you enter a command that extends beyond a single line, you can press the Left Arrow or Ctrl-B keys repeatedly to scroll back toward the system prompt and verify the beginning of the command entry, or you can press the Ctrl-A key combination.
Ctrl-C	Cancels the command and returns to the command prompt.
Ctrl-D	Deletes the character at the cursor.
Ctrl-E	Moves the cursor to the end of the line.
Ctrl-F	Moves the cursor one character to the right.
Ctrl-G	Exits to the previous command mode without removing the command string.
Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Ctrl-L	Redisplays the current command line.
Ctrl-N	Displays the next command in the command history.
Ctrl-O	Clears the terminal screen.
Ctrl-P	Displays the previous command in the command history.
Ctrl-R	Redisplays the current command line.

Keystrokes	Description
Ctrl-T	Transposes the character under the cursor with the character located to the right of the cursor. The cursor is then moved right one character.
Ctrl-U	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-V	Removes any special meaning for the following keystroke. For example, press Ctrl-V before entering a question mark (?) in a regular expression.
Ctrl-W	Deletes the word to the left of the cursor.
Ctrl-X, H	Lists the history of commands you have entered. When using this key combination, press and release the Ctrl and X keys together before pressing H.
Ctrl-Y	Recalls the most recent entry in the buffer (press keys simultaneously).
Ctrl-Z	Ends a configuration session, and returns you to EXEC mode. When used at the end of a command line in which a valid command has been typed, the resulting configuration is first added to the running configuration file.
Up arrow key	Displays the previous command in the command history.
Down arrow key	Displays the next command in the command history.
Right arrow key Left arrow key	Moves your cursor through the command string, either forward or backward, allowing you to edit the current command.
?	Displays a list of available commands.

Keystokes	Description
Tab	<p>Completes the word for you after entering the first characters of the word, and then pressing the Tab key. All options that match are presented.</p> <p>Use tabs to complete the following items:</p> <ul style="list-style-type: none"> • Command names • Scheme names in the file system • Server names in the file system • Filenames in the file system <p>Example:</p> <pre>switch(config)# xm<Tab> switch(config)# xml<Tab> switch(config)# xml server</pre> <p>Example:</p> <pre>switch(config)# c<Tab> callhome class-map clock cts cdp cli control-plane switch(config)# cl<Tab> class-map cli clock switch(config)# cla<Tab> switch(config)# class-map</pre> <p>Example:</p> <pre>switch# cd bootflash:<Tab> bootflash: bootflash://sup-1/ bootflash:/// bootflash://sup-2/ bootflash://module-5/ bootflash://sup-active/ bootflash://module-6/ bootflash://sup-local/</pre> <p>Example:</p> <pre>switch# cd bootflash://mo<Tab> bootflash://module-5/ bootflash://module-6/cv switch# cd bootflash://module-</pre>

Abbreviating Commands

You can abbreviate commands and keywords by entering the first few characters of a command. The abbreviation must include sufficient characters to make it unique from other commands or keywords. If you are having trouble entering a command, check the system prompt and enter the question mark (?) for a list of available commands. You might be in the wrong command mode or using incorrect syntax.

This table lists examples of command abbreviations.

Table 5: Examples of Command Abbreviations

Command	Abbreviation
configure terminal	conf t
copy running-config startup-config	copy run start
interface ethernet 1/2	int e 1/2
show running-config	sh run

Completing a Partial Command Name

If you cannot remember a complete command name, or if you want to reduce the amount of typing you have to perform, enter the first few letters of the command, then press the **Tab** key. The command line parser will complete the command if the string entered is unique to the command mode. If your keyboard does not have a **Tab** key, press **Ctrl-I** instead.

The CLI recognizes a command once you have entered enough characters to make the command unique. For example, if you enter "conf" in EXEC mode, the CLI will be able to associate your entry with the **configure** command, because only the **configure** command begins with "conf".

In the following example the CLI recognizes the unique string for **conf** in EXEC mode when you press the **Tab** key:

```
switch# conf<Tab>
switch# configure
```

When you use the command completion feature the CLI displays the full command name. The CLI does not execute the command until you press the **Return** or **Enter** key. This allows you to modify the command if the full command was not what you intended by the abbreviation. If you enter a set of characters that could indicate more than one command, a list of matching commands displays.

For example, entering **co<Tab>** lists all commands available in EXEC mode beginning with "co":

```
switch# co<Tab>
configure  copy
switch# co
```

Note that the characters you entered appear at the prompt again to allow you to complete the command entry.

Identifying Your Location in the Command Hierarchy

Some features have a configuration submenu hierarchy nested more than one level. In these cases, you can display information about your present working context (PWC).

Procedure

	Command or Action	Purpose
Step 1	where detail Example: <pre>switch# configure terminal switch(config)# interface mgmt0 switch(config-if)# where detail mode: conf interface mgmt0 username: admin</pre>	Displays the PWC.

Using the no Form of a Command

Almost every configuration command has a **no** form that can be used to disable a feature, revert to a default value, or remove a configuration. The Cisco NX-OS command reference publications describe the function of the **no** form of the command whenever a **no** form is available.

This example shows how to disable a feature:

```
switch# configure terminal
switch(config)# feature tacacs+
switch(config)# no feature tacacs+
```

This example shows how to revert to the default value for a feature:

```
switch# configure terminal
switch(config)# banner motd #Welcome to the switch#
switch(config)# show banner motd
Welcome to the switch

switch(config)# no banner motd
switch(config)# show banner motd
User Access Verification
```

This example shows how to remove the configuration for a feature:

```
switch# configure terminal
switch(config)# radius-server host 10.10.2.2
switch(config)# show radius-server
retransmission count:0
timeout value:1
deadtime value:1
total number of servers:1

following RADIUS servers are configured:
 10.10.1.1:
    available for authentication on port:1812
    available for accounting on port:1813
 10.10.2.2:
    available for authentication on port:1812
    available for accounting on port:1813

switch(config)# no radius-server host 10.10.2.2
switch(config)# show radius-server
retransmission count:0
```

```

timeout value:1
deadtime value:1
total number of servers:1

following RADIUS servers are configured:
  10.10.1.1:
    available for authentication on port:1812
    available for accounting on port:1813

```

This example shows how to use the **no** form of a command in EXEC mode:

```

switch# cli var name testinterface ethernet1/2
switch# show cli variables
SWITCHNAME="switch"
TIMESTAMP="2009-05-12-13.43.13"
testinterface="ethernet1/2"

switch# cli no var name testinterface
switch# show cli variables
SWITCHNAME="switch"
TIMESTAMP="2009-05-12-13.43.13"

```

Configuring CLI Variables

This section describes CLI variables in the Cisco NX-OS CLI.

About CLI Variables

The Cisco NX-OS software supports the definition and use of variables in CLI commands.

You can refer to CLI variables in the following ways:

- Entered directly on the command line.
- Passed to a script initiated using the **run-script** command. The variables defined in the parent shell are available for use in the child **run-script** command process.

CLI variables have the following characteristics:

- Cannot have nested references through another variable
- Can persist across switch reloads or exist only for the current session

Cisco NX-OS supports one predefined variable: **TIMESTAMP**. This variable refers to the current time when the command executes in the format **YYYY-MM-DD-HH.MM.SS**.



Note

The **TIMESTAMP** variable name is case sensitive. All letters must be uppercase.

Configuring CLI Session-Only Variables

You can define CLI session variables to persist only for the duration of your CLI session. These variables are useful for scripts that you execute periodically. You can reference the variable by enclosing the name in parentheses and preceding it with a dollar sign (\$), for example $\$(variable-name)$.

Procedure

	Command or Action	Purpose
Step 1	cli var name <i>variable-name</i> <i>variable-text</i> Example: <pre>switch# cli var name testinterface ethernet 2/1</pre>	Configures the CLI session variable. The <i>variable-name</i> argument is alphanumeric, case sensitive, and has a maximum length of 31 characters. The <i>variable-text</i> argument is alphanumeric, case sensitive, can contain spaces, and has a maximum length of 200 characters.
Step 2	show cli variables Example: <pre>switch# show cli variables</pre>	(Optional) Displays the CLI variable configuration.

Configuring Persistent CLI Variables

You can configure CLI variables that persist across CLI sessions and device reloads.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	cli var name <i>variable-name</i> <i>variable-text</i> Example: <pre>switch(config)# cli var name testinterface ethernet 2/1</pre>	Configures the CLI persistent variable. The variable name is case-sensitive alphanumeric string and must begin with an alphabetic character. The maximum length is 31 characters.
Step 3	exit Example: <pre>switch(config)# exit switch#</pre>	Exits global configuration mode.
Step 4	show cli variables Example: <pre>switch# show cli variables</pre>	(Optional) Displays the CLI variable configuration.
Step 5	copy running-config startup-config Example: <pre>switch(config)# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Command Aliases

This section provides information about command aliases.

About Command Aliases

You can define command aliases to replace frequently used commands. The command aliases can represent all or part of the command syntax.

Command alias support has the following characteristics:

- Command aliases are global for all user sessions.
- Command aliases persist across reboots if you save them to the startup configuration.
- Command alias translation always takes precedence over any keyword in any configuration mode or submode.
- Command alias configuration takes effect for other user sessions immediately.
- The Cisco NX-OS software provides one default alias, **alias**, which is the equivalent to the **show cli alias** command that displays all user-defined aliases.
- You cannot delete or change the default command alias **alias**.
- You can nest aliases to a maximum depth of 1. One command alias can refer to another command alias that must refer to a valid command, not to another command alias.
- A command alias always replaces the first command keyword on the command line.
- You can define command aliases for commands in any command mode.
- If you reference a CLI variable in a command alias, the current value of the variable appears in the alias, not the variable reference.
- You can use command aliases for **show** command searching and filtering.

Defining Command Aliases

You can define command aliases for commonly used commands.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.

	Command or Action	Purpose
Step 2	cli alias name <i>alias-name alias-text</i> Example: <pre>switch(config)# cli alias name ethint interface ethernet</pre>	Configures the command alias. The alias name is an alphanumeric string that is not case sensitive and must begin with an alphabetic character. The maximum length is 30 characters.
Step 3	exit Example: <pre>switch(config)# exit switch#</pre>	Exits global configuration mode.
Step 4	alias Example: <pre>switch# alias</pre>	(Optional) Displays the command alias configuration.
Step 5	copy running-config startup-config Example: <pre>switch# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Configuring Command Aliases for a User Session

You can create a command alias for the current user session which is not available to any other user on the Cisco NX-OS device. You can also save the command alias for future use by the current user account.

Procedure

	Command or Action	Purpose
Step 1	terminal alias [persist] <i>alias-name command -string</i> Example: <pre>switch# terminal alias shintbr show interface brief</pre>	Configures a command alias for the current user session. Use the persist keyword to save the alias for future use by the user account. Note Do not abbreviate the persist keyword.

Command Scripts

This section describes how you can create scripts of commands to perform multiple tasks.

Running a Command Script

You can create a list of commands in a file and execute them from the CLI. You can use CLI variables in the command script.



Note

You cannot create the script files at the CLI prompt. You can create the script file on a remote device and copy it to the bootflash:, slot0:, or volatile: directory on the Cisco NX-OS device.

Procedure

	Command or Action	Purpose
Step 1	run-script [bootflash: slot0: volatile:] <i>filename</i> Example: switch# run-script testfile	Executes the commands in the file on the default directory.

Echoing Information to the Terminal

You can echo information to the terminal, which is particularly useful from a command script. You can reference CLI variables and use formatting options in the echoed text.

This table lists the formatting options that you can insert in the text.

Table 6: Formatting Options for the echo Command

Formatting Option	Description
\b	Inserts back spaces.
\c	Removes the new line character at the end of the text string.
\f	Inserts a form feed character.
\n	Inserts a new line character.
\r	Returns to the beginning of the text line.
\t	Inserts a horizontal tab character.
\v	Inserts a vertical tab character.
\\	Displays a backslash character.

Formatting Option	Description
<code>\nnn</code>	Displays the corresponding ASCII octal character.

Procedure

	Command or Action	Purpose
Step 1	echo [backslash-interpret] [<i>text</i>] Example: <pre>switch# echo This is a test. This is a test.</pre>	The backslash-interpret keyword indicates that the text string contains formatting options. The <i>text</i> argument is alphanumeric, case sensitive, and can contain blanks. The maximum length is 200 characters. The default is a blank line.

Delaying Command Action

You can delay a command action for a period of time, which is particularly useful within a command script.

Procedure

	Command or Action	Purpose
Step 1	sleep <i>seconds</i> Example: <pre>switch# sleep 30</pre>	Causes a delay for a number of seconds. The range is from 0 to 2147483647.

Context-Sensitive Help

The Cisco NX-OS software provides context-sensitive help in the CLI. You can use a question mark (?) at any point in a command to list the valid input options.

CLI uses the caret (^) symbol to isolate input errors. The ^ symbol appears at the point in the command string where you have entered an incorrect command, keyword, or argument.

This table shows example outputs of context sensitive help.

Table 7: Context-Sensitive Help Example

Example Outputs	Description
<pre>switch# clock ? set HH:MM:SS Current Time switch# clock</pre>	<p>Displays the command syntax for the clock command in EXEC mode.</p> <p>The switch output shows that the set keyword is required for using the clock command.</p>
<pre>switch# clock set ? WORD HH:MM:SS Current Time switch# clock set</pre>	<p>Displays the command syntax for setting the time.</p> <p>The help output shows that the current time is required for setting the clock and how to format the time.</p>
<pre>switch# clock set 13:32:00<CR> % Incomplete command switch#</pre>	<p>Adds the current time.</p> <p>The CLI indicates the command is incomplete.</p>
<pre>switch# <Ctrl-P> switch# clock set 13:32:00</pre>	<p>Displays the previous command that you entered.</p>
<pre>switch# clock set 13:32:00 ? <1-31> Day of the month switch# clock set 13:32:00</pre>	<p>Displays the additional arguments for the clock set command.</p>
<pre>switch# clock set 13:32:00 18 ? April Month of the year August Month of the year December Month of the year February Month of the year January Month of the year July Month of the year June Month of the year March Month of the year May Month of the year November Month of the year October Month of the year September Month of the year switch# clock set 13:32:00 18</pre>	<p>Displays the additional arguments for the clock set command.</p>
<pre>switch# clock set 13:32:00 18 April 08<CR> % Invalid input detected at '^' marker.</pre>	<p>Adds the date to the clock setting.</p> <p>The CLI indicates an error with the caret symbol (^) at 08.</p>
<pre>switch# clock set 13:32:00 18 April ? <2000-2030> Enter the year (no abbreviation) switch# clock set 13:32:00 18 April</pre>	<p>Displays the correct arguments for the year.</p>
<pre>switch# clock set 13:32:00 18 April 2008<CR> switch#</pre>	<p>Enters the correct syntax for the clock set command.</p>

Understanding Regular Expressions

The Cisco NX-OS software supports regular expressions for searching and filtering in CLI output, such as the **show** commands. Regular expressions are case sensitive and allow for complex matching requirements.

Special Characters

You can also use other keyboard characters (such as ! or ~) as single-character patterns, but certain keyboard characters have special meanings when used in regular expressions.

This table lists the keyboard characters that have special meanings.

Table 8: Special Characters with Special Meaning

Character	Special Meaning
.	Matches any single character, including white space.
*	Matches 0 or more sequences of the pattern.
+	Matches 1 or more sequences of the pattern.
?	Matches 0 or 1 occurrences of the pattern.
^	Matches the beginning of the string.
\$	Matches the end of the string.
_ (underscore)	Matches a comma (,), left brace ({}), right brace (}), left parenthesis ((), right parenthesis ()), the beginning of the string, the end of the string, or a space. Note The underscore is only treated as a regular expression for BPG related commands

To use these special characters as single-character patterns, remove the special meaning by preceding each character with a backslash (\). This example contains single-character patterns that match a dollar sign (\$), an underscore (_), and a plus sign (+), respectively:

```
\$ \_ \+
```

Multiple-Character Patterns

You can also specify a pattern that contains multiple characters by joining letters, digits, or keyboard characters that do not have special meanings. For example, a4% is a multiple-character regular expression.

With multiple-character patterns, the order is important. The regular expression a4% matches the character a followed by a 4 followed by a percent sign (%). If the string does not have a4%, in that order, pattern matching

fails. The multiple-character regular expression `a.` (the character `a` followed by a period) uses the special meaning of the period character to match the letter `a` followed by any single character. With this example, the strings `ab`, `a!`, or `a2` are all valid matches for the regular expression.

You can remove the special meaning of a special character by inserting a backslash before it. For example, when the expression `a\.` is used in the command syntax, only the string `a.` will be matched.

Anchoring

You can match a regular expression pattern against the beginning or the end of the string by anchoring these regular expressions to a portion of the string using the special characters.

This table lists the special characters that you can use for anchoring.

Table 9: Special Characters Used for Anchoring

Character	Description
<code>^</code>	Matches the beginning of the string.
<code>\$</code>	Matches the end of the string.

For example, the regular expression `^con` matches any string that starts with "con", and `sole$` matches any string that ends with "sole".



Note

The `^` symbol can also be used to indicate the logical function "not" when used in a bracketed range. For example, the expression `[^abcd]` indicates a range that matches any single letter, as long as it is not `a`, `b`, `c`, or `d`.

Searching and Filtering show Command Output

Often, the output from **show** commands can be lengthy and cumbersome. The Cisco NX-OS software provides the means to search and filter the output so that you can easily locate information. The searching and filtering options follow a pipe character (`|`) at the end of the **show** command. You can display the options using the using the CLI context-sensitive help facility:

```
switch# show running-config | ?
cut      Print selected parts of lines.
diff     Show difference between current and previous invocation (creates temp files;
         remove them with 'diff-clean' command and don't use it on commands with big
         outputs, like 'show tech!')
egrep    Egrep - print lines matching a pattern
grep     Grep - print lines matching a pattern
head     Display first lines
human    Output in human format
last     Display last lines
less     Filter for paging
no-more  Turn-off pagination for command output
perl     Use perl script to filter output
section  Show lines that include the pattern as well as the subsequent lines that are
         more indented than matching line
sed      Stream Editor
```

```

sort      Stream Sorter
sscp     Stream SCP (secure copy)
tr       Translate, squeeze, and/or delete characters
uniq     Discard all but one of successive identical lines
vsh     The shell that understands cli command
wc       Count words, lines, characters
xml     Output in xml format (according to .xsd definitions)
begin    Begin with the line that matches
count    Count number of lines
end      End with the line that matches
exclude  Exclude lines that match
include  Include lines that match

```

Filtering and Searching Keywords

The Cisco NX-OS CLI provides a set of keywords that you can use with the **show** commands to search and filter the command output.

This table lists the keywords for filtering and searching the CLI output.

Table 10: Filtering and Searching Keywords

Keyword Syntax	Description
begin <i>string</i> Example: <code>show version begin Hardware</code>	Starts displaying at the line that contains the text that matches the search string. The search string is case sensitive.
count Example: <code>show running-config count</code>	Displays the number of lines in the command output.
cut [-d <i>character</i>] {-b -c -f -s} Example: <code>show file testoutput cut -b 1-10</code>	Displays only the part of the output lines. You can display a number of bytes (-b), characters (-vcut [-d <i>character</i>] {-b -c -f -s}), or fields (-f). You can also use the -d keyword to define a field delimiter other than the tag character default. The -s keyword suppress the display of line not containing the delimiter.
end <i>string</i> Example: <code>show running-config end interface</code>	Displays all lines up to the last occurrence of the search string.
exclude <i>string</i> Example: <code>show interface brief exclude down</code>	Displays all lines that do not include the search string. The search string is case sensitive.
head [<i>lines lines</i>] Example: <code>show logging logfile head lines 50</code>	Displays the beginning of the output for the number of lines specified. The default number of lines is 10.

Keyword Syntax	Description
human Example: <code>show version human</code>	Displays the output in normal format if you have previously set the output format to XML using the terminal output xml command.
include <i>string</i> Example: <code>show interface brief include up</code>	Displays all lines that include the search string. The search string is case sensitive.
last [<i>lines</i>] Example: <code>show logging logfile last 50</code>	Displays the end of the output for the number of lines specified. The default number of lines is 10.
no-more Example: <code>show interface brief no-more</code>	Displays all the output without stopping at the end of the screen with the —More— prompt.
sscp <i>SSH-connection-name filename</i> Example: <code>show version sscp MyConnection</code> <code>show_version_output</code>	Redirects the output using streaming secure copy (sscp) to a named SSH connection. You can create the SSH named connection using the ssh name command.
wc [<i>bytes</i> <i>lines</i> <i>words</i>] Example: <code>show file testoutput wc bytes</code>	Displays counts of characters, lines, or words. The default is to display the number of lines, words, and characters.
xml Example: <code>show version xml</code>	Displays the output in XML format.

diff Utility

You can compare the output from a **show** command with the output from the previous invocation of that command.



Caution

Do not use the diff utility for **show** commands that have very long output, such as the **show tech-support** command.

The diff utility syntax is as follows:

```
diff [--left-column] [-B] [-I] [-W columns] [-b] [-c lines] [-I] [-q] [-s] [-y] [again] [echo]
```

This table describes the keywords for the diff utility.

Table 11: diff Utility Keywords

Keyword	Description
--left-column	Prints only the left column of the two common lines in side-by-side format.
-B	Ignores the changes that only insert or delete blank lines.
-I	Ignores the changes that only insert or delete lines that match the regular expression.
-W columns	Specifies the output column width for the side-by-side format. The range is from 0 to 4294967295.
-b	Ignores the changes in the amount of white space. The default is to display the white space differences.
-c lines	Sets the number of lines of context displayed. The default number of lines is 3. The range is from 0 to 4294967295.
-I	Ignores uppercase and lowercase differences. The default is to report the uppercase and lowercase differences.
-q	Indicates whether the files differ but does not display the details of the differences. The default is to display the differences.
-s	Indicates whether the two outputs are the same. The default is no indication when the outputs are the same.
-y	Uses the side-by-side format for the output differences. The default is to display the old output lines first, followed by the current output lines.
again	Does not create new output file: use old ones, just change display options or add more filters.
echo	Echoes the current command output. This keyword is only effective when there is no previous command output.

The Cisco NX-OS software creates temporary files for the most current output for a **show** command for all current and previous users sessions. You can remove these temporary files using the **diff-clean** command.

diff-clean [**all-sessions** | **all-users**]

By default, the **diff-clean** command removes the temporary files for the current user's active session. The **all-sessions** keyword removes temporary files for all past and present sessions for the current user. The **all-users** keyword removes temporary files for all past and present sessions for the all users.

grep and egrep Utilities

You can use the Global Regular Expression Print (grep) and Extended grep (egrep) command-line utilities to filter the **show** command output.

The grep and egrep syntax is as follows:

```
{grep | egrep} [count] [ignore-case] [invert-match] [line-exp] [line-number] [next lines] [prev lines]
[word-exp] expression}
```

This table lists the **grep** and **egrep** parameters.

Table 12: grep and egrep Parameters

Parameter	Description
count	Displays only the total count of matched lines.
ignore-case	Specifies to ignore the case difference in matched lines.
invert-match	Displays lines that do not match the expression.
line-exp	Displays only lines that match a complete line.
line-number	Specifies to display the line number before each matched line.
next lines	Specifies the number of lines to display after a matched line. The default is 0. The range is from 1 to 999.
prev lines	Specifies the number of lines to display before a matched line. The default is 0. The range is from 1 to 999.
word-exp	Displays only lines that match a complete word.
<i>expression</i>	Specifies a regular expression for searching the output.

less Utility

You can use the less utility to display the contents of the **show** command output one screen at a time. You can enter less commands at the : prompt. To display all less commands you can use, enter h at the : prompt.

sed Utility

You can use the Stream Editor (sed) utility to filter and manipulate the **show** command output as follows:

sed *command*

The *command* argument contains sed utility commands.

sort Utility

You can use the sort utility to filter **show** command output.

The sort utility syntax is as follows:

sort [-M] [-b] [-d] [-f] [-g] [-i] [-k *field-number*[.*char-position*][*ordering*]] [-n] [-r] [-t *delimiter*] [-u]

This table describes the sort utility parameters.

Table 13: sort Utility Parameters

Parameter	Description
-M	Sorts by month.
-b	Ignores leading blanks (space characters). The default sort includes the leading blanks.
-d	Sorts by comparing only blanks and alphanumeric characters. The default sort includes all characters.
-f	Folds lowercase characters into uppercase characters.
-g	Sorts by comparing a general numeric value.
-i	Sorts only using printable characters. The default sort includes nonprintable characters.
-k <i>field-number</i> [. <i>char-position</i>][<i>ordering</i>]	Sorts according to a key value. There is no default key value.
-n	Sorts according to a numeric string value.
-r	Reverses order of the sort results. The default sort output is in ascending order.
-t <i>delimiter</i>	Sorts using a specified delimiter. The default delimiter is the space character.
-u	Removes duplicate lines from the sort results. The sort output displays the duplicate lines.

Searching and Filtering from the --More-- Prompt

You can search and filter output from --More-- prompts in the **show** command output.

This table describes the --More-- prompt commands.

Table 14: --More-- Prompt Commands

Commands	Description
[<i>lines</i>]<space>	Displays output lines for either the specified number of lines or the current screen size.
[<i>lines</i>]z	Displays output lines for either the specified number of lines or the current screen size. If you use the <i>lines</i> argument, that value becomes the new default screen size.
[<i>lines</i>]<return>	Displays output lines for either the specified number of lines or the current default number of lines. The initial default is 1 line. If you use the optional <i>lines</i> argument, that value becomes the new default number of lines to display for this command.
[<i>lines</i>]d or [<i>lines</i>]Ctrl+shift+D	Scrolls through output lines for either the specified number of lines or the current default number of lines. The initial default is 11 lines. If you use the optional <i>lines</i> argument, that value becomes the new default number of lines to display for this command.
q or Q or Ctrl-C	Exits the --More-- prompt.
[<i>lines</i>]s	Skips forward in the output for either the specified number of lines or the current default number of lines and displays a screen of lines. The default is 1 line.
[<i>lines</i>]f	Skips forward in the output for either the specified number of screens or the current default number of screens and displays a screen of lines. The default is 1 screen.
=	Displays the current line number.
[<i>count</i>]/ <i>expression</i>	Skips to the line that matches the regular expression and displays a screen of output lines. Use the optional <i>count</i> argument to search for lines with multiple occurrences of the expression. This command sets the current regular expression that you can use in other commands.

Commands	Description
[<i>count</i>]n	Skips to the next line that matches the current regular expression and displays a screen of output lines. Use the optional <i>count</i> argument to skip past matches.
{! <i> </i> :! <i>[shell-cmd]</i> }	Executes the command specified in the <i>shell-cmd</i> argument in a subshell.
.	Repeats the previous command.

Using the Command History

The Cisco NX-OS software CLI allows you to access the command history for the current user session. You can recall and reissue commands, with or without modification. You can also clear the command history.

Recalling a Command

You can recall a command in the command history to optionally modify and enter again.

This example shows how to recall a command and reenter it:

```
switch(config)# show cli history
0 11:04:07  configure terminal
1 11:04:28  show interface ethernet 2/24
2 11:04:39  interface ethernet 2/24
3 11:05:13  no shutdown
4 11:05:19  exit
5 11:05:25  show cli history
switch(config)# !1
switch(config)# show interface ethernet 2/24
```

You can also use the **Ctrl-P** and **Ctrl-N** keystroke shortcuts to recall commands.

Controlling CLI History Recall

You can control the commands that you recall from the CLI history using the **Ctrl-P** and **Ctrl-N** keystroke shortcuts. By default, the Cisco NX-OS software recalls all commands from the current command mode and higher command modes. For example, if you are working in global configuration mode, the command recall keystroke shortcuts recall both EXEC mode and global configuration mode commands. Using the **terminal history no-exec-in-config** command, you can avoid recalling EXEC mode commands when you are in a configuration mode.

Procedure

	Command or Action	Purpose
Step 1	[no] terminal history no-exec-in-config	Configures the CLI history to remove the EXEC commands when you use the recall keystroke shortcuts in a

	Command or Action	Purpose
	Example: switch# terminal history no-exec-in-config	configuration mode. The default recalls EXEC commands. You can revert to the default using the no form of the command.

Configuring the CLI Edit Mode

You can recall commands from the CLI history using the **Ctrl-P** and **Ctrl-N** keystroke shortcuts and edit them before reissuing them. The default edit mode is emacs. You can change the edit mode to vi.

Procedure

	Command or Action	Purpose
Step 1	[no] terminal edit-mode vi [persist] Example: switch# terminal edit-mode vi	Changes the CLI edit mode to vi for the user session. The persist keyword makes the setting persistent across sessions for the current username. Use the no to revert to using emacs.

Displaying the Command History

You can display the command history using the **show cli history** command.

The **show cli history** command has the following syntax:

show cli history [*lines*] [**unformatted**]

show cli history [*lines*] [**config-only** | **exec-only** | **this-mode-only**] [**unformatted**]

By default, the number of lines displayed is 12 and the output includes the command number and timestamp.

The example shows how to display default number of lines of the command history:

```
switch# show cli history
```

The example shows how to display 20 lines of the command history:

```
switch# show cli history 20
```

The example shows how to display only the configuration commands in the command history:

```
switch(config)# show cli history config-only
```

The example shows how to display only the EXEC commands in the command history:

```
switch(config)# show cli history exec-only
```

The example shows how to display only the commands in the command history for the current command mode:

```
switch(config-if)# show cli history this-mode-only
```

The example shows how to display only the commands in the command history without the command number and timestamp:

```
switch(config)# show cli history unformatted
```

Enabling or Disabling the CLI Confirmation Prompts

For many features, the Cisco NX-OS software displays prompts on the CLI that ask for confirmation before continuing. You can enable or disable these prompts. The default is enabled.

Procedure

	Command or Action	Purpose
Step 1	[no] terminal dont-ask [persist] Example: switch# terminal dont-ask	Disables the CLI confirmation prompt. The persist keyword makes the setting persistent across sessions for the current username. The default is enabled. Use the no form of the command to enable the CLI confirmation prompts.

Setting CLI Display Colors

You can change the CLI colors to display as follows:

- The prompt displays in green if the previous command succeeded.
- The prompt displays in red if the previous command failed.
- The user input displays in blue.
- The command output displays in the default color.

The default colors are those sent by the terminal emulator software.

Procedure

	Command or Action	Purpose
Step 1	terminal color [evening] [persist] Example: switch# terminal color	Sets the CLI display colors for the terminal session. The evening keyword is not supported. The persist keyword makes the setting persistent across sessions for the current username. The default setting is not persistent.

	Command or Action	Purpose
--	-------------------	---------

Sending Commands to Modules

You can send commands directly to modules from the supervisor module session using the **slot** command.

The **slot** has the following syntax:

```
slot slot-number [quoted] command-string
```

By default, the keyword and arguments in the *command-string* argument are space-separated. To send more than one command to a module, separate the commands with a space character, a semicolon character (;), and a space character.

The **quoted** keyword indicates that the command string begins and ends with double quotation marks ("). Use this keyword when you want to redirect the module command output to a filtering utility, such as diff, that is only supported on the supervisor module session.

The following example shows how to display and filter module information:

```
switch# slot 2 show version | grep lc
```

The following example shows how to filter module information on the supervisor module session:

```
switch# slot 2 quoted "show version" | diff
switch# slot 4 quoted "show version" | diff -c
*** /volatile/vsh_diff_1_root_8430_slot__quoted_show_version.old      Wed Apr 29 20:10:41
    2009
--- -      Wed Apr 29 20:10:41 2009
*****
*** 1,5 ****
! RAM 1036860 kB
! lc2
  Software
    BIOS:      version 1.10.6
    system:    version 4.2(1) [build 4.2(0.202)]
--- 1,5 ----
! RAM 516692 kB
! lc4
  Software
    BIOS:      version 1.10.6
    system:    version 4.2(1) [build 4.2(0.202)]
*****
*** 12,16 ****
  Hardware
    bootflash: 0 blocks (block size 512b)

!    uptime is 0 days 1 hours 45 minute(s) 34 second(s)

--- 12,16 ----
  Hardware
    bootflash: 0 blocks (block size 512b)

!    uptime is 0 days 1 hours 45 minute(s) 42 second(s)
```

BIOS Loader Prompt

When the supervisor modules power up, a specialized BIOS image automatically loads and tries to locate a valid kickstart image for booting the system. If a valid kickstart image is not found, the following BIOS loader prompt displays:

```
loader>
```

Examples Using the CLI

This section includes examples of using the CLI.

Defining Command Aliases

This example shows how to define command aliases:

```
cli alias name ethint interface ethernet
cli alias name shintbr show interface brief
cli alias name shintupbr shintbr | include up | include ethernet
```

This example shows how to use a command alias:

```
switch# configure terminal
switch(config)# ethint 2/3
switch(config-if)#
```

Using CLI Session Variables

You can reference a variable using the syntax `$(variable-name)`.

This example shows how to reference a user-defined CLI session variable:

```
switch# show interface $(testinterface)
Ethernet2/1 is down (Administratively down)
  Hardware is 10/100/1000 Ethernet, address is 0000.0000.0000 (bia 0019.076c.4dac)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA
  auto-duplex, auto-speed
  Beacon is turned off
  Auto-Negotiation is turned on
  Input flow-control is off, output flow-control is off
  Auto-mdix is turned on
  Switchport monitor is off
  Last clearing of "show interface" counters never
  5 minute input rate 0 bytes/sec, 0 packets/sec
  5 minute output rate 0 bytes/sec, 0 packets/sec
  L3 in Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
  L3 out Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
  Rx
    0 input packets 0 unicast packets 0 multicast packets
    0 broadcast packets 0 jumbo packets 0 storm suppression packets
```

```

0 bytes
Tx
0 output packets 0 multicast packets
0 broadcast packets 0 jumbo packets
0 bytes
0 input error 0 short frame 0 watchdog
0 no buffer 0 runt 0 CRC 0 ecc
0 overrun 0 underrun 0 ignored 0 bad etype drop
0 bad proto drop 0 if down drop 0 input with dribble
0 input discard
0 output error 0 collision 0 deferred
0 late collision 0 lost carrier 0 no carrier
0 babble
0 Rx pause 0 Tx pause 0 reset

```

Using the System-Defined Timestamp Variable

This example uses \$(TIMESTAMP) when redirecting **show** command output to a file:

```

switch# show running-config > rcfg.$(TIMESTAMP)
Preparing to copy...done
switch# dir
    12667      May 01 12:27:59 2008  rcfg.2008-05-01-12.27.59

Usage for bootflash://sup-local
8192 bytes used
20963328 bytes free
20971520 bytes total

```

Running a Command Script

This example displays the CLI commands specified in the script file:

```

switch# show file testfile
configure terminal
interface ethernet 2/1
no shutdown
end
show interface ethernet 2/1

```

This example displays the **run-script** command execution output:

```

switch# run-script testfile
`configure terminal`
`interface ethernet 2/1`
`no shutdown`
`end`
`show interface ethernet 2/1`
Ethernet2/1 is down (Link not connected)
Hardware is 10/100/1000 Ethernet, address is 0019.076c.4dac (bia 0019.076c.4dac)
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
auto-duplex, auto-speed
Beacon is turned off
Auto-Negotiation is turned on
Input flow-control is off, output flow-control is off
Auto-mdix is turned on
Switchport monitor is off
Last clearing of "show interface" counters 1d26.2uh
5 minute input rate 0 bytes/sec, 0 packets/sec
5 minute output rate 0 bytes/sec, 0 packets/sec

```

```

Rx
 0 input packets 0 unicast packets 0 multicast packets
 0 broadcast packets 0 jumbo packets 0 storm suppression packets
 0 bytes
Tx
 0 output packets 0 multicast packets
 0 broadcast packets 0 jumbo packets
 0 bytes
 0 input error 0 short frame 0 watchdog
 0 no buffer 0 runt 0 CRC 0 ecc
 0 overrun 0 underrun 0 ignored 0 bad etype drop
 0 bad proto drop 0 if down drop 0 input with dribble
 0 input discard
 0 output error 0 collision 0 deferred
 0 late collision 0 lost carrier 0 no carrier
 0 babble
 0 Rx pause 0 Tx pause 0 reset

```

Additional References for the CLI

This section includes additional information related to the CLI.

Related Documents for the CLI

Related Topic	Document Title
Cisco NX-OS Licensing	<i>Cisco NX-OS Licensing Guide</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference</i> <i>Cisco Nexus 3000 Series NX-OS Command Reference</i>



Configuring Terminal Settings and Sessions

This chapter describes how to manage the terminal settings and sessions on a Cisco NX-OS device.

This chapter includes the following sections:

- [Information About Terminal Settings and Sessions, page 37](#)
- [Licensing Requirements for Terminal Settings and Sessions, page 39](#)
- [Configuring the Console Port, page 39](#)
- [Configuring Virtual Terminals, page 41](#)
- [Configuring Modem Connections, page 43](#)
- [Clearing Terminal Sessions, page 46](#)
- [Displaying Terminal and Session Information, page 46](#)
- [Default Settings for File System Parameters, page 47](#)
- [Additional References for Terminal Settings and Sessions, page 47](#)

Information About Terminal Settings and Sessions

This section includes information about terminal settings and sessions.

Terminal Session Settings

The Cisco NX-OS software features allow you to manage the following characteristics of terminals:

Terminal type

Name used by Telnet when communicating with remote hosts

Length

Number of lines of command output displayed before pausing

Width

Number of characters displayed before wrapping the line

Inactive session timeout

Number of minutes that a session remains inactive before the device terminates it

Console Port

The console port is an asynchronous serial port that allows you to connect to the device for initial configuration through a standard RS-232 port with an RJ-45 connector. Any device connected to this port must be capable of asynchronous transmission. You can configure the following parameters for the console port:

Data bits

Specifies the number of bits in an 8-bit byte that is used for data.

Inactive session timeout

Specifies the number of minutes a session can be inactive before it is terminated.

Parity

Specifies the odd or even parity for error detection.

Speed

Specifies the transmission speed for the connection.

Stop bits

Specifies the stop bits for an asynchronous line.

Configure your terminal emulator with 9600 baud, 8 data bits, 1 stop bit, and no parity.

Virtual Terminals

You can use virtual terminal lines to connect to your Cisco NX-OS device. Secure Shell (SSH) and Telnet create virtual terminal sessions. You can configure an inactive session timeout and a maximum sessions limit for virtual terminals.

Modem Support

You can connect a modem to the console ports only on the supervisor 1 module. The following modems were tested on devices running the Cisco NX-OS software:

- MultiTech MT2834BA (http://www.multitech.com/en_us/support/families/multimodemii/)
- Hayes Accura V.92 (http://www.zoom.com/products/dial_up_external_serial.html#hayes)



Note Do not connect a modem when the device is booting. Only connect the modem when the device is powered up.

The Cisco NX-OS software has the default initialization string (ATE0Q1&D2&C1S0=1\015) to detect connected modems. The default string is defined as follows:

AT

Attention

E0 (required)

No echo

Q1

Result code on

&D2

Normal data terminal ready (DTR) option

&C1

Enable tracking the state of the data carrier

S0=1

Pick up after one ring

\015 (required)

Carriage return in octal

Licensing Requirements for Terminal Settings and Sessions

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	Terminal setting configuration requires no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the .

Configuring the Console Port

You can set the following characteristics for the console port:

- Data bits

- Inactive session timeout
- Parity
- Speed
- Stop bits

Before You Begin

Log in to the console port.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line console Example: switch# line console switch(config-console)#	Enters console configuration mode.
Step 3	databits <i>bits</i> Example: switch(config-console)# databits 7	Configures the number of data bits per byte. The range is from 5 to 8. The default is 8.
Step 4	exec-timeout <i>minutes</i> Example: switch(config-console)# exec-timeout 30	Configures the timeout for an inactive session. The range is from 0 to 525600 minutes (8760 hours). A value of 0 minutes disables the session timeout. The default is 30 minutes.
Step 5	parity {even none odd} Example: switch(config-console)# parity even	Configures the parity. The default is none .
Step 6	speed {300 1200 2400 4800 9600 38400 57600 115200} Example: switch(config-console)# speed 115200	Configures the transmit and receive speed. The default is 115200 .
Step 7	stopbits {1 2} Example: switch(config-console)# stopbits 2	Configures the stop bits. The default is 1 .

	Command or Action	Purpose
Step 8	exit Example: switch(config-console)# exit switch(config)#	Exits console configuration mode.
Step 9	show line console Example: switch(config)# show line console	(Optional) Displays the console settings.
Step 10	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring Virtual Terminals

This section describes how to configure virtual terminals on Cisco NX-OS devices.

Configuring the Inactive Session Timeout

You can configure a timeout for inactive virtual terminal sessions on a Cisco NX-OS device.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line vty Example: switch# line vty switch(config-line)#	Enters line configuration mode.
Step 3	exec-timeout <i>minutes</i> Example: switch(config-line)# exec-timeout 30	Configures the inactive session timeout. The range is from 0 to 525600 minutes (8760 hours). A value of 0 minutes disables the timeout. The default value is 30.

	Command or Action	Purpose
Step 4	exit Example: switch(config-line)# exit switch(config)#	Exits line configuration mode.
Step 5	show running-config all begin vty Example: switch(config)# show running-config all begin vty	(Optional) Displays the virtual terminal configuration.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring the Session Limit

You can limit the number of virtual terminal sessions on your Cisco NX-OS device.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line vty Example: switch# line vty switch(config-line)#	Enters line configuration mode.
Step 3	session-limit <i>sessions</i> Example: switch(config-line)# session-limit 10	Configures the maximum number of virtual sessions for the Cisco NX-OS device. The range is from 1 to 60. The default is 32.
Step 4	exit Example: switch(config-line)# exit switch(config)#	Exits line configuration mode.

	Command or Action	Purpose
Step 5	show running-config all begin vty Example: switch(config)# show running-config all begin vty	(Optional) Displays the virtual terminal configuration.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring Modem Connections

You can connect a modem to the console port.

Enabling a Modem Connection

You must enable the modem connection on the port before you can use the modem.

Before You Begin

Log in to the console port.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line console	Enters console configuration mode.
Step 3	modem in	Enables modem input on the port.
Step 4	exit	Exits console configuration mode.
Step 5	show line Example: switch(config)# show line	(Optional) Displays the console settings.

	Command or Action	Purpose
Step 6	copy running-config startup-config Example: <pre>switch(config)# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Downloading the Default Initialization String

The Cisco NX-OS software provides a default initialization string that you can download for connecting with the modem. The default initialization string is ATE0Q1&D2&C1S0=1\015.

Before You Begin

Log in to the console port.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	line console	
Step 3	modem init-string default	Writes the default initialization string to the modem.
Step 4	exit	Exits console configuration mode.
Step 5	show line Example: <pre>switch(config)# show line</pre>	(Optional) Displays the console settings.
Step 6	copy running-config startup-config Example: <pre>switch(config)# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Configuring and Downloading a User-Specified Initialization String

You can configure and download your own initialization when the default initialization string is not compatible with your modem.

Before You Begin

Log in to the console port.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line console	
Step 3	modem set-string user-input <i>string</i>	Sets the user-specified initialization string for the console port. The initialization string is alphanumeric and case sensitive, can contain special characters, and has a maximum of 100 characters. Note You must first set the user-input string before initializing the string.
Step 4	modem init-string user-input	Writes the user-specified initialization string to the modem connected to the console port.
Step 5	exit	Exits console configuration mode.
Step 6	show line Example: switch(config)# show line	(Optional) Displays the console settings.
Step 7	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Initializing a Modem for a Powered-Up Cisco NX-OS Device

If you connect a modem to a powered-up physical device, you must initialize the modem before you can use it.

Before You Begin

After waiting until the Cisco NX-OS device has completed the boot sequence and the system image is running, connect the modem to either the console port on the device.

Enable the modem connection on the port.

Procedure

	Command or Action	Purpose
Step 1	modem connect line console} Example: switch# modem connect line console	Initializes the modem connected to the device.

Clearing Terminal Sessions

You can clear terminal sessions on the Cisco NX-OS device.

Procedure

	Command or Action	Purpose
Step 1	show users Example: switch# show users	(Optional) Displays the user sessions on the device.
Step 2	clear line <i>name</i> Example: switch# clear line pts/0	Clears a terminal session on a specific line. The line name is case sensitive.

Displaying Terminal and Session Information

To display terminal and session information, perform one of the following tasks:

Command	Purpose
show terminal	Displays terminal settings.
show line	Displays the console ports settings.
show users	Displays virtual terminal sessions.

Command	Purpose
<code>show running-config [all]</code>	Displays the user account configuration in the running configuration. The all keyword displays the default values for the user accounts.

For detailed information about the fields in the output from these commands, see the Cisco Nexus command reference guide for your device.

Default Settings for File System Parameters

This table lists the default settings for the file system parameters.

Table 15: Default File System Settings

Parameters	Default
Default filesystem	bootflash:

Additional References for Terminal Settings and Sessions

This section includes additional references for terminal settings and sessions on NX-OS devices.

Related Documents for Terminal Settings and Sessions

Related Topic	Document Title
Licensing	<i>Cisco NX-OS Licensing Guide</i>
Command reference	<i>Cisco Nexus 3000 Command Reference</i>



Basic Device Management

This chapter describes how to perform basic management tasks on the Cisco NX-OS device.

This chapter includes the following sections:

- [Information About Basic Device Management, page 49](#)
- [Licensing Requirements for Basic Device Management, page 50](#)
- [Changing the Device Hostname, page 51](#)
- [Configuring the MOTD Banner, page 51](#)
- [Configuring the Time Zone, page 52](#)
- [Configuring Summer Time \(Daylight Saving Time\), page 53](#)
- [Manually Setting the Device Clock, page 54](#)
- [Setting the Clock Manager, page 55](#)
- [Managing Users, page 55](#)
- [Verifying the Device Configuration, page 56](#)
- [Default Settings for Basic Device Parameters, page 57](#)
- [Additional References for Basic Device Management, page 57](#)

Information About Basic Device Management

This section provides information about basic device management.

Device Hostname

You can change the device hostname displayed in the command prompt from the default (switch) to another character string. When you give the device a unique hostname, you can easily identify the device from the command-line interface (CLI) prompt.

Message-of-the-Day Banner

The message-of-the-day (MOTD) banner displays before the user login prompt on the device. This message can contain any information that you want to display for users of the device.

Device Clock

If you do not synchronize your device with a valid outside timing mechanism, such as an NTP clock source, you can manually set the clock time when your device boots.

Clock Manager

The Nexus 7000 chassis may contain clocks of different types that may need to be synchronized. These clocks are a part of various components (such as the supervisor, LC processors, or linecards) and each may be using a different protocol.

The clock manager provides a way to synchronize these different clocks.

Time Zone and Summer Time (Daylight Saving Time)

You can configure the time zone and summer time (daylight saving time) setting for your device. These values offset the clock time from Coordinated Universal Time (UTC). UTC is International Atomic Time (TAI) with leap seconds added periodically to compensate for the Earth's slowing rotation. UTC was formerly called Greenwich Mean Time (GMT).

User Sessions

You can display the active user session on your device. You can also send messages to the user sessions. For more information about managing user sessions and accounts, see the .

Licensing Requirements for Basic Device Management

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	Basic device management requires no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the .

Changing the Device Hostname

You can change the device hostname displayed in the command prompt from the default (switch) to another character string.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	{hostname switchname} name Example: Using the hostname command: <pre>switch(config)# hostname Engineering1 Engineering1(config)#</pre> Using the switchname command: <pre>Engineering1(config)# switchname Engineering2 Engineering2(config)#</pre>	Changes the device hostname. The <i>name</i> argument is alphanumeric, case sensitive, and has a maximum length of 32 characters. The default is switch. Note The switchname command performs the same function as the hostname command.
Step 3	exit Example: <pre>Engineering2(config)# exit Engineering2#</pre>	Exits global configuration mode.
Step 4	copy running-config startup-config Example: <pre>Engineering2# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Configuring the MOTD Banner

You can configure the MOTD to display before the login prompt on the terminal when a user logs in. The MOTD banner has the following characteristics:

- Maximum of 80 characters per line
- Maximum of 40 lines

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	banner motd <i>delimiting-character message delimiting-character</i> Example: switch(config)# banner motd #Welcome to the Switch# switch(config)#	Configures the MOTD banner. Do not use the <i>delimiting-character</i> in the <i>message</i> text. Note Do not use " or % as a delimiting character.
Step 3	exit Example: switch(config)# exit switch#	Exits global configuration mode.
Step 4	show banner motd Example: switch# show banner motd	(Optional) Displays the configured MOTD banner.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring the Time Zone

You can configure the time zone to offset the device clock time from UTC.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	clock timezone <i>zone-name offset-hours offset-minutes</i>	Configures the time zone. The <i>zone-name</i> argument is a 3-character string for the time zone acronym (for example, PST or EST). The <i>offset-hours</i>

	Command or Action	Purpose
	Example: <pre>switch(config)# clock timezone EST -5 0</pre>	argument is the offset from the UTC and the range is from -23 to 23 hours. The range for the <i>offset-minutes</i> argument is from 0 to 59 minutes.
Step 3	exit Example: <pre>switch(config)# exit switch#</pre>	Exits global configuration mode.
Step 4	show clock Example: <pre>switch# show clock</pre>	(Optional) Displays the time and time zone.
Step 5	copy running-config startup-config Example: <pre>switch# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.

Configuring Summer Time (Daylight Saving Time)

You can configure when summer time, or daylight saving time, is in effect for the device and the offset in minutes.

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: <pre>switch# configure terminal switch(config)#</pre>	Enters global configuration mode.
Step 2	clock summer-time zone-name <i>start-week start-day start-month start-time</i> <i>end-week end-day end-month end-time</i> <i>offset-minutes</i> Example: <pre>switch(config)# clock summer-time PDT 1 Sunday March 02:00 1 Sunday November 02:00 60</pre>	<p>Configures summer time or daylight saving time.</p> <p>The <i>zone-name</i> argument is a three character string for the time zone acronym (for example, PST and EST).</p> <p>The values for the <i>start-day</i> and <i>end-day</i> arguments are Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday.</p> <p>The values for the <i>start-month</i> and <i>end-month</i> arguments are January, February, March, April, May, June, July, August, September, October, November, and December.</p>

	Command or Action	Purpose
		The value for the <i>start-time</i> and <i>end-time</i> arguments are in the format <i>hh:mm</i> . The range for the <i>offset-minutes</i> argument is from 0 to 1440 minutes.
Step 3	exit Example: switch(config)# exit switch#	Exits global configuration mode.
Step 4	show clock detail Example: switch(config)# show clock detail	(Optional) Displays the configured MOTD banner.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Manually Setting the Device Clock

You can set the clock manually if your device cannot access a remote time source.

Before You Begin

Configure the time zone.

Procedure

	Command or Action	Purpose
Step 1	clock set <i>time day month year</i> Example: switch# clock set 15:00:00 30 May 2008 Fri May 30 15:14:00 PDT 2008	Configures the device clock. The format for the <i>time</i> argument is <i>hh:mm:ss</i> . The range for the <i>day</i> argument is from 1 to 31. The values for the <i>month</i> argument are January, February, March, April, May, June, July, August, September, October, November, and December . The range for the <i>year</i> argument is from 2000 to 2030.
Step 2	show clock Example: switch(config)# show clock	(Optional) Displays the current clock value.

Related Topics

[Configuring the Time Zone, on page 52](#)

Setting the Clock Manager

You can configure the clock manager to synchronize all the clocks of the components contained in a Nexus 7000 chassis.

Procedure

	Command or Action	Purpose
Step 1	<p>clock protocol <i>protocol</i> vdc <i>vdc-num</i></p> <p>Example: <pre>#clock protocol ptp vdc 2</pre></p>	<p>Configures the clock manager.</p> <p>The values for the <i>protocol</i> argument are ptp, ntp, and none.</p> <p>The following describes the values:</p> <ul style="list-style-type: none"> • ptp: Synchronize clocks with Precision Time Protocol (PTP) as described by IEEE 1588. • ntp: Synchronize clocks with Network Time Protocol (NTP). • none: Use 'clock set <HH:MM:SS>' to set SUP clocks. <p>Note When none is used, the clock in the specified VDC must be configured.</p> <p>Note Once the protocol is configured, the clock in the specified VDC must use that protocol.</p> <p>For example, if the command 'clock protocol ptp vdc 2' is entered, then PTP should be configured in VDC 2.</p> <p>The range for the <i>vdc</i> argument is 1 to 8.</p>
Step 2	<p>show run clock_manager</p> <p>Example: <pre>#show run clock_manager</pre></p>	<p>(Optional)</p> <p>Displays the configuration of the clock manager.</p>

Managing Users

You can display information about users logged into the device and send messages to those users.

Displaying Information about the User Sessions

You can display information about the user session on the device.

Procedure

	Command or Action	Purpose
Step 1	show users Example: switch# show users	Displays the user sessions.

Sending a Message to Users

You can send a message to active users currently using the device CLI.

Procedure

	Command or Action	Purpose
Step 1	show users Example: switch# show users	(Optional) Displays the active user sessions.
Step 2	send [session line] message-text Example: switch# send Reloading the device is 10 minutes!	Sends a message to all active users or to a specific user. The message can be up to 80 alphanumeric characters and is case sensitive.

Verifying the Device Configuration

Use one of the following commands to verify the configuration after bootstrapping the device using POAP:

Command	Purpose
show running-config	Displays the running configuration.
show startup-config	Displays the startup configuration.

For detailed information about the fields in the output from these commands, see the *Cisco Nexus 3000 Series NX-OS Command Reference*.

Default Settings for Basic Device Parameters

This table lists the default settings for basic device parameters.

Table 16: Default Basic Device Parameters

Parameters	Default
MOTD banner text	User Access Verification
Clock time zone	UTC

Additional References for Basic Device Management

You can find additional information related to basic device management.

Related Documents for Basic Device Management

Related Topic	Document Title
Licensing	<i>Cisco NX-OS Licensing Guide</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference</i> <i>Cisco Nexus 3000 Series NX-OS Command Reference</i>



Using PowerOn Auto Provisioning

This chapter describes how to deploy and use PowerOn Auto Provisioning (POAP)

This chapter contains the following sections:

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- [Guidelines and Limitations for POAP](#), page 65
- [Setting Up the Network Environment To Use POAP](#), page 66
- [Configuring a Switch Using POAP](#), page 66
- [Verifying the Device Configuration](#), page 67
- [Related Documents for POAP](#), page 67

Information About PowerOn Auto Provisioning

PowerOn Auto Provisioning (POAP) automates the process of upgrading software images and installing configuration files on Cisco Nexus switches that are being deployed in the network for the first time.

When a Cisco Nexus Series switch with the POAP feature boots and does not find the startup configuration, the switch enters POAP mode and checks for a USB device containing the configuration script file. If it finds one, it checks that device to see if it also contains the software image files and the switch configuration file.

If the switch does not find a USB device, or if the USB device does not contain the needed image files or switch configuration file, the switch also locates a DHCP server and bootstraps itself with its interface IP address, gateway, and DNS server IP addresses. The switch then obtains the IP address of a TFTP server or the URL of an HTTP server from which it downloads the necessary configuration files.



Note

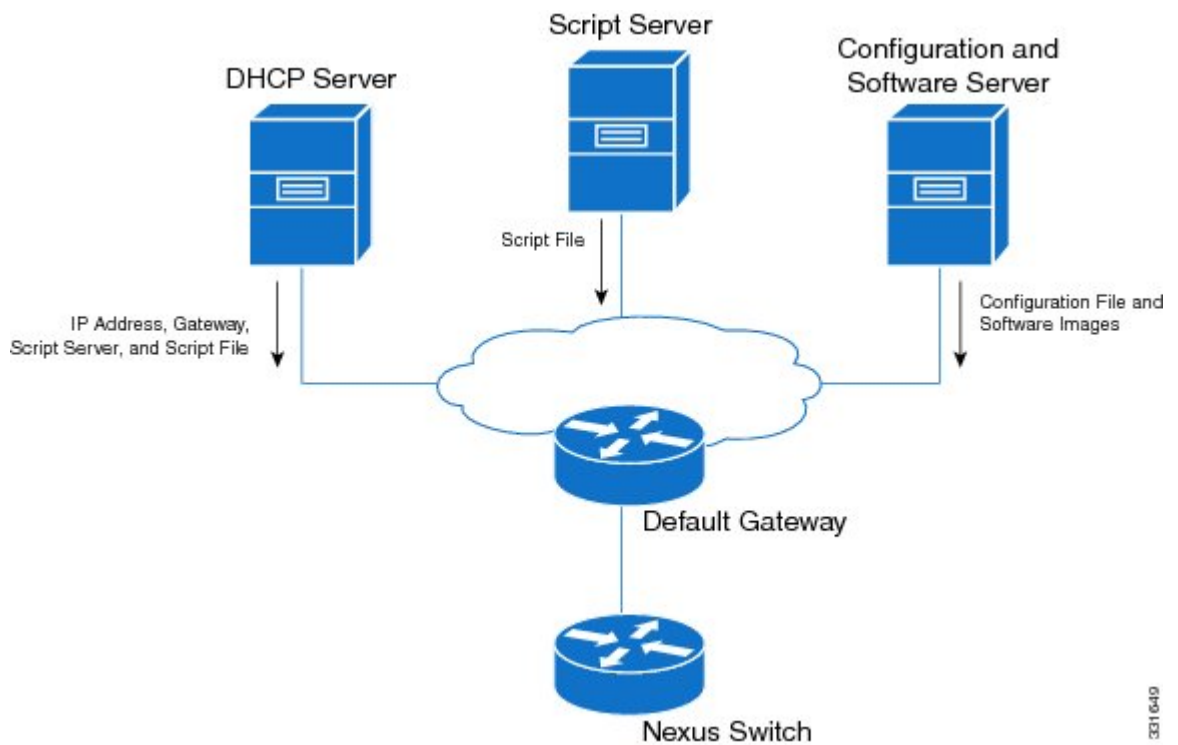
The DHCP information is used only during the POAP process if any configuration files are unavailable on the USB device.

Network Requirements for POAP

If a USB device containing the required installation files is not available, POAP with requires the following network infrastructure:

- A DHCP server to bootstrap the interface IP address, gateway address, and DNS server
- A TFTP or HTTP server containing the configuration script used to automate the software image installation and configuration process
- One or more servers containing the desired software images and configuration files

Figure 1: POAP Network Infrastructure



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POAP Configuration Script

The reference script supplied by Cisco supports the following functionality:

- Retrieves the switch-specific identifier, for example, the serial number.
- Downloads the software image (system and kickstart images) if the files do not already exist on the switch. The software image is installed on the switch and is used at the next reboot.
- Schedules the downloaded configuration to be applied at the next switch reboot.
- Stores the configuration as the startup-configuration.

We provide sample configuration scripts that were developed using the Python programming language and Tool Command Language (Tcl). You can customize one of these scripts to meet the requirements of your network environment.

For information about customizing this script using Python, see the Cisco Nexus 3000 Series NX-OS Python API Reference Guide at this URL: http://www.cisco.com/en/US/products/ps11541/products_programming_reference_guides_list.html.

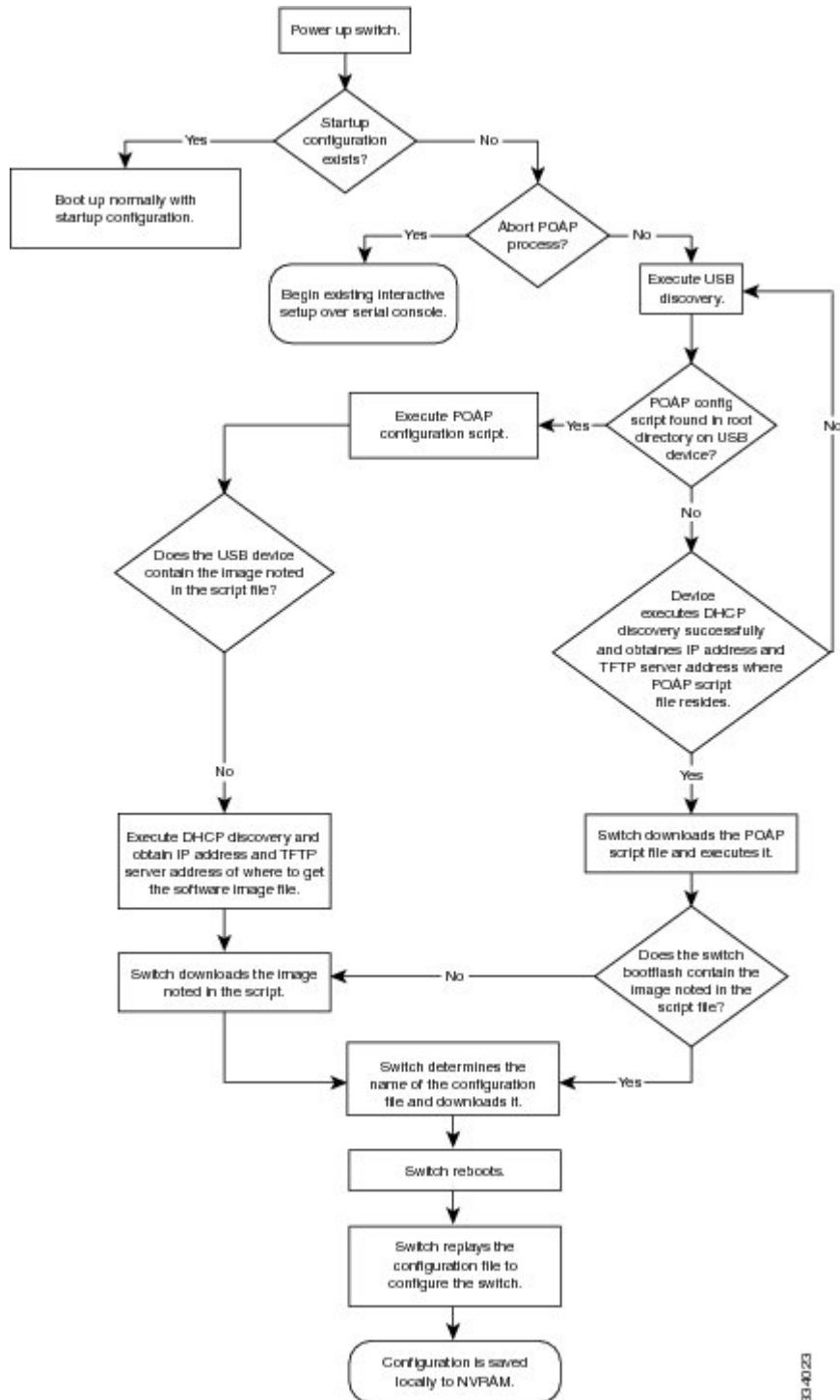
POAP Process

The POAP process has the following phases:

- 1 Power up
- 2 USB discovery
- 3 DHCP discovery
- 4 Script execution
- 5 Post-installation reload

Within these phases, other process and decision points occur. The following illustration shows a flow diagram of the POAP process.

Figure 2: POAP Process



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Power-Up Phase

When you power-up a switch for the first time, it loads the software image installed at manufacturing and tries to find a configuration file from which to boot. When no configuration file is found, POAP mode starts.

During startup, a prompt appears asking if you want to abort POAP and continue with normal setup. You can choose to exit or continue with POAP.

**Note**

No user intervention is required for POAP to continue. The prompt that asks if you want to abort POAP remains available until the POAP process is complete.

If you exit POAP mode, you enter the normal interactive setup script. If you continue in POAP mode, all the front-panel interfaces are set up in Layer 3 mode, which ensures that the device does not participate in any Layer 2 forwarding.

USB Discovery Phase

When POAP starts, the process searches the root directory of all accessible USB devices for the POAP configuration script file (either the Python script file, `poap_script.py`, or the Tcl script file, `poap_script.tcl`), configuration files, and system and kickstart images.

If the configuration script file is found on a USB device, POAP begins running the configuration script. If the configuration script file is not found on the USB device, POAP executes DHCP discovery. (When failures occur, the POAP process alternates between USB discovery and DHCP discovery, until POAP succeeds or you manually abort the POAP process.)

If the software image and switch configuration files specified in the configuration script are present, POAP uses those files to install the software and configure the switch. If the software image and switch configuration files are not on the USB device, POAP does some cleanup and starts DHCP phase from the beginning.

DHCP Discovery Phase

The switch sends out DHCP discover messages on all of the active interfaces (including the mgmt interface) soliciting DHCP offers from the DHCP server or servers. The DHCP client on the Cisco Nexus switch uses the switch serial number in the client-identifier option to identify itself to the DHCP server. The DHCP server can use this identifier to send information, such as the IP address and script file name, back to the DHCP client.

POAP requires a minimum DHCP lease period of 3600 seconds (1 hour). POAP checks the DHCP lease period. If the DHCP lease period is set to less than 3600 seconds (1 hour), POAP does not complete DHCP negotiation.

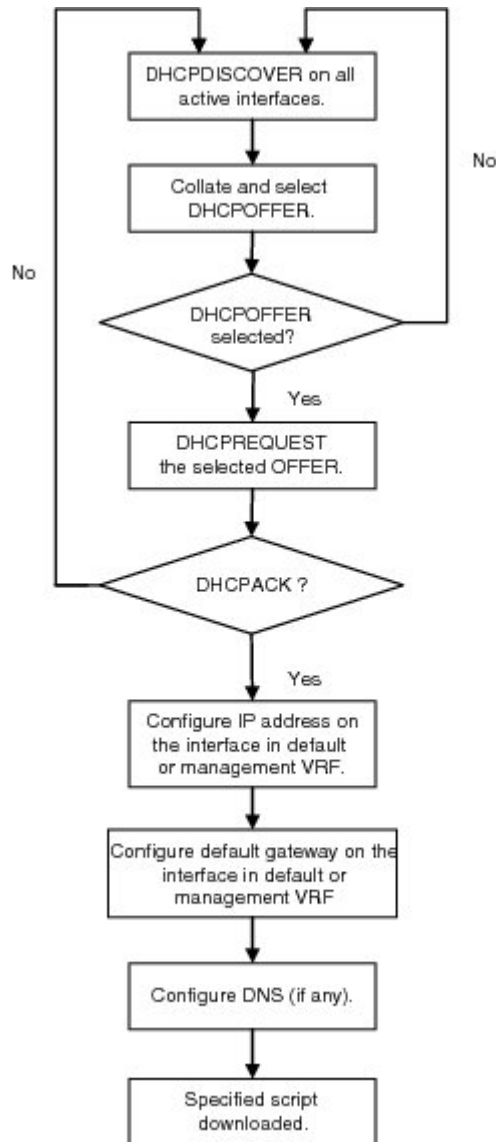
The DHCP discover message also solicits the following options from the DHCP server.

- TFTP server name or TFTP server address—The DHCP server relays the TFTP server name or TFTP server address to the DHCP client. The DHCP client uses this information to contact the TFTP server to obtain the script file.
- Bootfile name—The DHCP server relays the bootfile name to the DHCP client. The bootfile name includes the complete path to the bootfile on the TFTP server. The DHCP client uses this information to download the script file.

When multiple DHCP offers that meet the requirement are received, an offer is randomly chosen. The device completes the DHCP negotiation (request and acknowledgment) with the selected DHCP server, and the DHCP server assigns an IP address to the switch. If there is a failure in any of the subsequent steps in the POAP process, the IP address is released back to the DHCP server.

If no DHCP offers meet the requirements, the switch does not complete the DHCP negotiation (request and acknowledgment) and an IP address is not assigned.

Figure 3: DHCP Discovery Phase



Script Execution Phase

Once the device has bootstrapped itself using the information in the DHCP acknowledgement, the script file is downloaded from the TFTP server or the HTTP server.

The switch runs the configuration script, which downloads and installs the software image and downloads a switch-specific configuration file.

However, the configuration file is not applied to the switch at this point, because the software image currently running on the switch might not support all of the commands in the configuration file. After the switch reboots, it begins running the new software image, if one was installed. At that point, the configuration is applied to the switch.

**Note**

If the switch loses connectivity, the script stops, and the switch reloads its original software images and bootup variables.

Post-Installation Reload Phase

The switch restarts and applies (replays) the configuration on the upgraded software image. Afterward, the switch copies the running configuration to the startup configuration.

Guidelines and Limitations for POAP

- The Cisco Nexus switch software image must support POAP for this feature to function.
- POAP can be triggered even when the startup-config is present using the **boot poap enable** command.
- If a LACP Layer 3 port-channel is configured on an uplink device connected to the Cisco Nexus device that is being bootstrapped using POAP, the port-channel is not active because all the member links are in a suspended state. Therefore, the Cisco Nexus device that is being bootstrapped using POAP cannot reach the DHCP server or any other infrastructure device needed for POAP. To work around this issue, configure a static L3 port-channel on the uplink device connected to the Cisco Nexus device that is being bootstrapped using POAP.
- If you use POAP to bootstrap a Cisco Nexus device that is a part of a vPC pair using static port-channels on the VPC links, the Cisco Nexus device activates all of its links upon POAP startup. The dually connected device at the end of the VPC links might start sending some or all of its traffic to the port-channel member links connected to the Cisco Nexus device, and the traffic would be lost.
To work around this issue, you can configure LACP on the vPC links so that the links do not incorrectly start forwarding traffic to the Cisco Nexus device that is being bootstrapped using POAP.
- If you use POAP to bootstrap a Cisco Nexus device that is connected downstream to a Cisco Nexus Series 7000 device through a LACP port-channel, the Cisco Nexus 7000 Series device defaults to suspend its member port if it cannot bundle it as a part of a port-channel. To work around this issue, configure the Cisco Nexus 7000 Series device to not suspend its member ports using the `no lacp suspend-individual` command from interface configuration mode.
- Important POAP updates are logged in the syslog and are available from the serial console.
- Critical POAP errors are logged to the bootflash. The filename format is `date-time_poap_PID_[init,1,2].log`, where `date-time` is in the `YYYYMMDD_hhmmss` format and `PID` is the process ID.
- Script logs are saved in the bootflash directory. The filename format is `date-time_poap_PID_script.log`, where `date-time` is in the `YYYYMMDD_hhmmss` format and `PID` is the process ID.

- The Scheduler configuration cannot be replayed using POAP. The reason that the Scheduler configuration cannot be replayed is that it is associated with the user (for example "admin") that was logged in when the Scheduler configuration was created. Because the configuration replay using POAP is not associated with any specific user, the scheduler configuration cannot be replayed and fails.

Instead of configuring the Scheduler, configure the Embedded Event Manager (EEM). An EEM configuration can be downloaded and replayed using POAP.

Setting Up the Network Environment To Use POAP

Procedure

- Step 1** Modify the basic configuration script provided by Cisco or create your own script. For information, see the *Python Scripting and API Configuration Guide*.
- Step 2** Every time you make a change to the configuration script, ensure that you recalculate the MD5 checksum by running `# f=poap_fabric.py ; cat $f | sed '/^#md5sum/d' > $f.md5 ; sed -i "s/^#md5sum=.*/#md5sum=\"$ (md5sum $f.md5 | sed 's/ .*//')\"/" $f` using a bash shell. For more information, see the *Python API Reference Guide*.
- Step 3** (Optional) Put the POAP configuration script and any other desired software image and switch configuration files on a USB device accessible to the switch.
- Step 4** Deploy a DHCP server and configure it with the interface, gateway, and TFTP server IP addresses and a bootfile with the path and name of the configuration script file. (This information is provided to the switch when it first boots.)
You do not need to deploy a DHCP server if all software image and switch configuration files are on the USB device.
- Step 5** Deploy a TFTP or HTTP server to host the configuration script.
- Step 6** Deploy one or more servers to host the software images and configuration files.
-

Configuring a Switch Using POAP

Before You Begin

Make sure the network environment is set up to use POAP. For information, see the [Setting Up the Network Environment To Use POAP](#), on page 66 section.

Procedure

- Step 1** Install the switch in the network.
- Step 2** Power on the switch.
If no configuration file is found, the switch boots in POAP mode and displays a prompt asking if you want to abort POAP and continue with normal setup.

- Step 3** No entry is required to continue to boot in POAP mode. If you want to exit POAP mode and enter the normal interactive setup script, enter y (yes).
The switch boots, and the POAP process begins. For information, see the [POAP Process](#) section.

What to Do Next

Verify the configuration.

Verifying the Device Configuration

Use one of the following commands to verify the configuration after bootstrapping the device using POAP:

Command	Purpose
<code>show running-config</code>	Displays the running configuration.
<code>show startup-config</code>	Displays the startup configuration.

For detailed information about the fields in the output from these commands, see the *Cisco Nexus 3000 Series NX-OS Command Reference*.

Related Documents for POAP

Related Topic	Document Title
Configuration Script	<i>Cisco Nexus 3000 Series NX-OS Python API Reference Guide</i>
DHCP Options and BOOTP Vendor Extensions	RFC2132— http://tools.ietf.org/html/rfc2132
TFTP Server Address Option for DHCPv4	RFC5859— http://tools.ietf.org/html/rfc5859



Using the Device File Systems, Directories, and Files

This chapter describes how to use the files systems on the Cisco NX-OS device.

This chapter includes the following sections:

- [Information About the Device File Systems, Directories, and Files, page 69](#)
- [Licensing Requirements for File Systems, Directories, and Files, page 71](#)
- [Working with Directories, page 71](#)
- [Working with Files, page 73](#)
- [Working with Archive Files, page 78](#)
- [Examples of Using the File System, page 81](#)
- [Default Settings for File System Parameters, page 84](#)
- [Additional References for File Systems, page 84](#)

Information About the Device File Systems, Directories, and Files

This section describes file systems, directories, and files on the Cisco NX-OS device.

File Systems

The syntax for specifying a local file system is `filesystem:[/modules/]`. This table describes file systems that you can reference on your device.

Table 17: File System Syntax Components

File System Name	Module	Description
bootflash	sup-active sup-local	Internal CompactFlash memory located on the active supervisor module used for storing image files, configuration files, and other miscellaneous files. The initial default directory is bootflash.
	sup-standby sup-remote	Internal CompactFlash memory located on the standby supervisor module used for storing image files, configuration files, and other miscellaneous files.
volatile	—	Volatile random-access memory (VRAM) located on a supervisor module used for temporary or pending changes.
log	—	Memory on the active supervisor that stores logging file statistics.
system	—	Memory on a supervisor module used for storing the running-configuration file.
debug	—	Memory on a supervisor module used for debug logs.

Directories

You can create directories on bootflash: and external flash memory (slot0:, usb1:, and usb2:). You can navigate through these directories and use them for files.

Files

You create and access files on bootflash:, volatile:, slot0:, usb1:, and usb2: file systems. You can only access files on the system: file systems. You can use the debug: file system for debug log files specified in the **debug logfile** command.

You can download files, such as system image files, from remote servers using FTP, Secure Copy (SCP), Secure Shell FTP (SFTP), and TFTP. You can also copy files from an external server to the device, because the device can act as an SCP server.

Licensing Requirements for File Systems, Directories, and Files

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	Using the file systems, directories, and files requires no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the <i>Cisco NX-OS Licensing Guide</i> .

Working with Directories

This section describes how to work with directories on the Cisco NX-OS device.

Identifying the Current Directory

You can display the directory name of your current directory.

Procedure

	Command or Action	Purpose
Step 1	<p><code>pwd</code></p> <p>Example: switch# pwd</p>	Displays the name of your current directory.

Changing the Current Directory

You can change the current directory for file system operations. The initial default directory is bootflash:.

Procedure

	Command or Action	Purpose
Step 1	<p><code>pwd</code></p> <p>Example: switch# pwd</p>	(Optional) Displays the name of your current default directory.

	Command or Action	Purpose
Step 2	cd { <i>directory</i> <i>filesystem</i> : <i>[/module/][directory]}</i> Example: switch# cd slot0:	Changes to a new current directory. The file system, module, and directory names are case sensitive.

Creating a Directory

You can create directories in the bootflash: and flash device file systems.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	cd { <i>directory</i> <i>filesystem</i> : <i>[/module/][directory]}</i> Example: switch# cd slot0:	(Optional) Changes to a new current directory. The file system, module, and directory names are case sensitive.
Step 3	mkdir [<i>filesystem</i> : <i>[/module/]</i>] <i>directory</i> Example: switch# mkdir test	Creates a new directory. The <i>filesystem</i> argument is case sensitive. The <i>directory</i> argument is alphanumeric, case sensitive, and has a maximum of 64 characters.

Displaying Directory Contents

You can display the contents of a directory.

Procedure

	Command or Action	Purpose
Step 1	dir [<i>directory</i> <i>filesystem</i> : <i>[/module/][directory]</i>] Example: switch# dir bootflash:test	Displays the directory contents. The default is the current working directory. The file system and directory names are case sensitive.

Deleting a Directory

You can remove directories from the file systems on your device.

Before You Begin

Ensure that the directory is empty before you try to delete it.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	dir [<i>filesystem</i> :[// <i>module</i>]/][<i>directory</i>]] Example: switch# dir bootflash:test	(Optional) Displays the contents of the current directory. The file system, module, and directory names are case sensitive. If the directory is not empty, you must delete all the files before you can delete the directory.
Step 3	rmdir [<i>filesystem</i> :[// <i>module</i>]/] <i>directory</i> Example: switch# rmdir test	Deletes a directory. The file system and directory name are case sensitive.

Accessing Directories on the Standby Supervisor Module

You can access all file systems on the standby supervisor module (remote) from a session on the active supervisor module. This feature is useful when copying files to the active supervisor modules requires similar files to exist on the standby supervisor module. To access the file systems on the standby supervisor module from a session on the active supervisor module, you specify the standby supervisor module in the path to the file using either *filesystem://sup-remote/* or *filesystem://sup-standby/*.

Working with Files

This section describes how to work with files on the Cisco NX-OS device.

Moving Files

You can move a file from one directory to another directory.

**Caution**

If a file with the same name already exists in the destination directory, that file is overwritten by the moved file.

You can use the **move** command to rename a file by moving the file within the same directory.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	dir [<i>filesystem:[//module/][directory]</i>] Example: switch# dir bootflash	(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.
Step 3	move [<i>filesystem:[//module/][directory /] directory/</i>] <i>source-filename</i> { <i>{filesystem:[//module/][directory /] directory/}</i> }[<i>target-filename</i>] <i>target-filename</i> } Example: switch# move test old_tests/test1	Moves a file. The file system, module, and directory names are case sensitive. The <i>target-filename</i> argument is alphanumeric, case sensitive, and has a maximum of 64 characters. If the <i>target-filename</i> argument is not specified, the filename defaults to the <i>source-filename</i> argument value.

Copying Files

You can make copies of files, either within the same directory or on another directory.

**Note**

Use the **dir** command to ensure that enough space is available in the target file system. If enough space is not available, use the **delete** command to remove unneeded files.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.

	Command or Action	Purpose
Step 2	dir [<i>filesystem</i> :[// <i>module</i> /][<i>directory</i>]] Example: switch# dir bootflash	(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.
Step 3	copy [<i>filesystem</i> :[// <i>module</i> /][<i>directory</i> /] <i>directory</i> /] <i>source-filename</i> { <i>filesystem</i> :[// <i>module</i> /][<i>directory</i> /]} <i>directory</i> /} <i>target-filename</i> Example: switch# move test old_tests/test1	Copies a file. The file system, module, and directory names are case sensitive. The <i>source-filename</i> argument is alphanumeric, case sensitive, and has a maximum of 64 characters. If the <i>target-filename</i> argument is not specified, the filename defaults to the <i>source-filename</i> argument value. The copy command supports ftp, scp, sftp, tftp and http protocols.

Deleting Files

You can delete a file from a directory.

Procedure

	Command or Action	Purpose
Step 1	dir [<i>filesystem</i> :[// <i>module</i> /][<i>directory</i>]] Example: switch# dir bootflash	(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.
Step 2	delete { <i>filesystem</i> :[// <i>module</i> /][<i>directory</i> /] <i>directory</i> /} <i>filename</i> Example: switch# move test old_tests/test1	Deletes a file. The file system, module, and directory names are case sensitive. The <i>source-filename</i> argument is case sensitive. Caution If you specify a directory, the delete command deletes the entire directory and all its contents.

Displaying File Contents

You can display the contents of a file.

Procedure

	Command or Action	Purpose
Step 1	show file [<i>filesystem:[//module/]</i>][<i>directory/</i>] <i>filename</i> Example: switch# show file bootflash:test-results	Displays the file contents.

Displaying File Checksums

You can display checksums to check the file integrity.

Procedure

	Command or Action	Purpose
Step 1	show file [<i>filesystem:[//module/]</i>][<i>directory/</i>] <i>filename</i> { <i>cksum</i> <i>md5sum</i> } Example: switch# show file bootflash:trunks2.cfg cksum	Displays the checksum or MD5 checksum of the file.

Compressing and Uncompressing Files

You can compress and uncompress files on your Cisco NX-OS device using Lempel-Ziv 1977 (LZ77) coding.

Procedure

	Command or Action	Purpose
Step 1	dir [<i>filesystem:[//module/]</i>] <i>directory</i>] Example: switch# dir bootflash:	(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.
Step 2	gzip [<i>filesystem:[//module/]</i>][<i>directory/</i> <i>directory/</i>] <i>filename</i> Example: switch# gzip show_tech	Compresses a file. After the file is compressed, it has a .gz suffix.

	Command or Action	Purpose
Step 3	gunzip [<i>filesystem</i> : <i>//module/</i>][<i>directory/</i>] [<i>directory/</i>] <i>filename</i> .gz Example: switch# gunzip show_tech.gz	Uncompresses a file. The file to uncompress must have the .gz suffix. After the file is uncompressed, it does not have the .gz suffix.

Displaying the Last Lines in a File

You can display the last lines of a file.

Procedure

	Command or Action	Purpose
Step 1	tail [<i>filesystem</i> : <i>//module/</i>][<i>directory/</i>] <i>filename</i> [<i>lines</i>] Example: switch# tail ospf-gr.conf	Displays the last lines of a file. The default number of lines is 10. The range is from 0 to 80 lines.

Redirecting show Command Output to a File

You can redirect **show** command output to a file on bootflash:, slot0:, volatile:, or on a remote server. You can also specify the format for the command output.

Procedure

	Command or Action	Purpose
Step 1	terminal redirection-mode { <i>ascii</i> <i>zipped</i> } Example: switch# terminal redirection-mode zipped	(Optional) Set the redirection mode for the show command output for the user session. The default mode is ascii .
Step 2	<i>show-command</i> > [<i>filesystem</i> : <i>//module/</i>][<i>directory</i>] [<i>directory /</i>] <i>filename</i> Example: switch# show tech-support > bootflash:techinfo	Redirects the output from a show command to a file.

Finding Files

You can find the files in the current working directory and its subdirectories that have names that begin with a specific character string.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	cd {filesystem:[//module/][directory] directory} Example: switch# cd bootflash:test_scripts	(Optional) Changes the default directory.
Step 3	find filename-prefix Example: switch# find bgp_script	Finds all filenames in the default directory and in its subdirectories beginning with the filename prefix. The filename prefix is case sensitive.

Working with Archive Files

The Cisco NX-OS software supports archive files. You can create an archive file, append files to an existing archive file, extract files from an archive file, and list the files in an archive file.

Creating an Archive Files

You can create an archive file and add files to it. You can specify the following compression types:

- bzip2
- gzip
- Uncompressed

The default is gzip.

Procedure

	Command or Action	Purpose
Step 1	tar create {bootflash: volatile:}archive-filename	Creates an archive file and adds files to it. The filename is alphanumeric, not case sensitive, and has a maximum length of 240 characters.

Command or Action	Purpose
[absolute] [bz2-compress] [gz-compress] [remove] [uncompressed] [verbose] <i>filename-list</i>	<p>The absolute keyword specifies that the leading backslash characters (\) should not be removed from the names of the files added to the archive file. By default, the leading backslash characters are removed.</p> <p>The bz2-compress, gz-compress, and uncompressed keywords determine the compression utility used when files are added, or later appended, to the archive and the decompression utility to use when extracting the files. If you do not specify an extension for the archive file, the defaults are as follows:</p> <ul style="list-style-type: none"> • For bz2-compress, the extension is .tar.bz2. • For gz-compress, the extension is .tar.gz. • For uncompressed, the extension is .tar. <p>The remove keyword specifies that the Cisco NX-OS software should delete the files from the filesystem after adding them to the archive. By default, the files are not deleted.</p> <p>The verbose keyword specifies that the Cisco NX-OS software should list the files as they are added to the archive. By default, the files are listed as they are added.</p>

This example shows how to create a gzip compressed archive file:

```
switch# tar create bootflash:config-archive gz-compress bootflash:config-file
```

Appending Files to an Archive File

You can append files to an existing archive file on your Cisco NX-OS device.

Before You Begin

You have created an archive file on your Cisco NX-OS device.

Procedure

Command or Action	Purpose
Step 1 tar append { bootflash: volatile: } <i>archive-filename</i> [absolute] [remove] [verbose] <i>filename-list</i>	<p>Adds files to an existing archive file. The archive filename is not case sensitive.</p> <p>The absolute keyword specifies that the leading backslash characters (\) should not be removed from the names of the files added to the archive file. By default, the leading backslash characters are removed.</p> <p>The remove keyword specifies that the Cisco NX-OS software should delete the files from the filesystem after adding them to the archive. By default, the files are not deleted.</p>

	Command or Action	Purpose
		The verbose keyword specifies that the Cisco NX-OS software should list the files as they are added to the archive. By default, the files are listed as they are added.

This example shows how to append a file to an existing archive file:

```
switch# tar append bootflash:config-archive.tar.gz bootflash:new-config
```

Extracting Files from an Archive File

You can extract files to an existing archive file on your Cisco NX-OS device.

Before You Begin

You have created an archive file on your Cisco NX-OS device.

Procedure

	Command or Action	Purpose
Step 1	tar extract {bootflash: volatile;} <i>archive-filename</i> [keep-old] [screen] [to {bootflash: volatile;}[<i>directory-name</i>]] [verbose]	<p>Extracts files from an existing archive file. The archive filename is not case sensitive.</p> <p>The keep-old keyword indicates that the Cisco NX-OS software should not overwrite files with the same name as the files being extracted.</p> <p>The screen keyword specifies that the Cisco NX-OS software should display the contents of the extracted files to the terminal screen.</p> <p>The to keyword specifies the target filesystem. You can include a directory name. The directory name is alphanumeric, case sensitive, and has a maximum length of 240 characters.</p> <p>The verbose keyword specifies that the Cisco NX-OS software should display the names of the files as they are extracted.</p>

This example shows how to extract files from an existing archive file:

```
switch# tar extract bootflash:config-archive.tar.gz
```

Displaying the Filenames in an Archive File

You can display the names of the files in an archive files using the **tar list** command.

```
tar list {bootflash: | volatile;}archive-filename
```

The archive filename is not case sensitive.

```
switch# tar list bootflash:config-archive.tar.gz
config-file
new-config
```

Examples of Using the File System

This section includes example of using the file system on the Cisco NX-OS device.

Accessing Directories on Standby Supervisor Modules

This example shows how to list the files on the standby supervisor module:

```
switch# dir bootflash://sup-remote
12198912   Aug 27 16:29:18 2003  m9500-sflek9-kickstart-mzg.1.3.0.39a.bin
1864931   Apr 29 12:41:59 2003  dplug2
12288     Apr 18 20:23:11 2003  lost+found/
12097024  Nov 21 16:34:18 2003  m9500-sflek9-kickstart-mz.1.3.1.1.bin
41574014  Nov 21 16:34:47 2003  m9500-sflek9-mz.1.3.1.1.bin

Usage for bootflash://sup-remote
67747169 bytes used
116812447 bytes free
184559616 bytes total
```

This example shows how to delete a file on the standby supervisor module:

```
switch# delete bootflash://sup-remote/aOldConfig.txt
```

Moving Files

This example shows how to move a file on an external flash device:

```
switch# move slot0:samplefile slot0:mystorage/samplefile
```

This example shows how to move a file in the default file system:

```
switch# move samplefile mystorage/samplefile
```

Copying Files

This example shows how to copy the file called samplefile from the root directory of the slot0: file system to the mystorage directory:

```
switch# copy slot0:samplefile slot0:mystorage/samplefile
```

This example shows how to copy a file from the current directory level:

```
switch# copy samplefile mystorage/samplefile
```

This example shows how to copy a file from the active supervisor module bootflash to the standby supervisor module bootflash:

```
switch# copy bootflash:system_image bootflash://sup-2/system_image
```

You can also use the **copy** command to upload and download files from the slot0: or bootflash: file system to or from a FTP, TFTP, SFTP, or SCP server.

Deleting a Directory

You can remove directories from the file systems on your device.

Before You Begin

Ensure that the directory is empty before you try to delete it.

Procedure

	Command or Action	Purpose
Step 1	pwd Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	dir [<i>filesystem</i> :[<i>//module/</i>][<i>directory</i>]] Example: switch# dir bootflash:test	(Optional) Displays the contents of the current directory. The file system, module, and directory names are case sensitive. If the directory is not empty, you must delete all the files before you can delete the directory.
Step 3	rmdir [<i>filesystem</i> :[<i>//module/</i>]] <i>directory</i> Example: switch# rmdir test	Deletes a directory. The file system and directory name are case sensitive.

Displaying File Contents

This example displays the contents of a file on an external flash device:

```
switch# show file slot0:test
configure terminal
interface ethernet 1/1
no shutdown
end
show interface ethernet 1/1
```

This example displays the contents of a file residing in the current directory:

```
switch# show file myfile
```

Displaying File Checksums

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

```
switch# show file bootflash:trunks2.cfg cksum
583547619
```

This example shows how to display the MD5 checksum of a file:

```
switch# show file bootflash:trunks2.cfg md5sum
3b94707198aabefcf46459de10c9281c
```

Compressing and Uncompressing Files

This example shows how to compress a file:

```
switch# dir
 1525859      Jul 04 00:51:03 2003 Samplefile
...
switch# gzip volatile:Samplefile
switch# dir
 266069      Jul 04 00:51:03 2003 Samplefile.gz
...
```

This example shows how to uncompress a compressed file:

```
switch# dir
 266069      Jul 04 00:51:03 2003 Samplefile.gz
...
switch# gunzip samplefile
switch# dir
 1525859      Jul 04 00:51:03 2003 Samplefile
...
```

Redirecting show Command Output

This example shows how to direct the output to a file on the bootflash: file system:

```
switch# show interface > bootflash:switch1-intf.cfg
```

This example shows how to direct the output to a file on external flash memory:

```
switch# show interface > slot0:switch-intf.cfg
```

This example shows how to direct the output to a file on a TFTP server:

```
switch# show interface > tftp://10.10.1.1/home/configs/switch-intf.cfg
Preparing to copy...done
```

This example directs the output of the **show tech-support** command to a file:

```
switch# show tech-support > Samplefile
Building Configuration ...
switch# dir
 1525859      Jul 04 00:51:03 2003 Samplefile
```

```
Usage for volatile://
 1527808 bytes used
19443712 bytes free
20971520 bytes total
```

Finding Files

This example shows how to find a file in the current default directory:

```
switch# find smm_shm.cfg
/usr/bin/find: ../lost+found: Permission denied
./smm_shm.cfg
./newer-fs/isan/etc/routing-sw/smm_shm.cfg
./newer-fs/isan/etc/smm_shm.cfg
```

Default Settings for File System Parameters

This table lists the default settings for the file system parameters.

Table 18: Default File System Settings

Parameters	Default
Default filesystem	bootflash:

Additional References for File Systems

This section includes additional information related to the file systems.

Related Documents for File Systems

Related Topic	Document Title
Licensing	<i>Cisco NX-OS Licensing Guide</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference</i> <i>Cisco Nexus 3000 Series NX-OS Command Reference</i>



Working with Configuration Files

This chapter describes how to work with configuration files on the Cisco NX-OS device.

This chapter includes the following sections:

- [Information About Configuration Files, page 85](#)
- [Licensing Requirements for Configuration Files, page 86](#)
- [Managing Configuration Files, page 86](#)
- [Verifying the Device Configuration, page 96](#)
- [Examples of Working with Configuration Files, page 96](#)
- [Additional References for Configuration Files, page 97](#)

Information About Configuration Files

Configuration files contain the Cisco NX-OS software commands used to configure the features on a Cisco NX-OS device. Commands are parsed (translated and executed) by the Cisco NX-OS software when the system is booted (from the startup-config file) or when you enter commands at the CLI in a configuration mode.

To change the startup configuration file, you can either save the running-configuration file to the startup configuration using the **copy running-config startup-config** command or copy a configuration file from a file server to the startup configuration.

Types of Configuration Files

The Cisco NX-OS software has two types of configuration files, running configuration and startup configuration. The device uses the startup configuration (startup-config) during device startup to configure the software features. The running configuration (running-config) contains the current changes that you make to the startup-configuration file. The two configuration files can be different. You may want to change the device configuration for a short time period rather than permanently. In this case, you would change the running configuration by using commands in global configuration mode but not save the changes to the startup configuration.

To change the running configuration, use the **configure terminal** command to enter global configuration mode. As you use the Cisco NX-OS configuration modes, commands generally are executed immediately and are saved to the running configuration file either immediately after you enter them or when you exit a configuration mode.

To change the startup-configuration file, you can either save the running configuration file to the startup configuration or download a configuration file from a file server to the startup configuration.

Related Topics

[Saving the Running Configuration to the Startup Configuration, on page 86](#)

[Downloading the Startup Configuration From a Remote Server, on page 88](#)

Licensing Requirements for Configuration Files

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	Configuration files require no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the <i>Cisco NX-OS Licensing Guide</i> .

Managing Configuration Files

This section describes how to manage configuration files.

Saving the Running Configuration to the Startup Configuration

You can save the running configuration to the startup configuration to save your changes for the next time you that reload the device.

Procedure

	Command or Action	Purpose
Step 1	show running-config Example: switch# show running-config	(Optional) Displays the running configuration.
Step 2	copy running-config startup-config Example: switch# copy running-config startup-config	Copies the running configuration to the startup configuration.

Copying a Configuration File to a Remote Server

You can copy a configuration file stored in the internal memory to a remote server as a backup or to use for configuring other Cisco NX-OS devices.

Procedure

	Command or Action	Purpose
Step 1	copy running-config <i>scheme://server/[url /]filename</i> Example: <pre>switch# copy running-config tftp://10.10.1.1/sw1-run-config.bak</pre>	Copies the running-configuration file to a remote server. For the <i>scheme</i> argument, you can enter tftp: , ftp: , scp: , or sftp: . The <i>server</i> argument is the address or name of the remote server, and the <i>url</i> argument is the path to the source file on the remote server. The <i>server</i> , <i>url</i> , and <i>filename</i> arguments are case sensitive.
Step 2	copy startup-config <i>scheme://server/[url /]filename</i> Example: <pre>switch# copy startup-config tftp://10.10.1.1/sw1-start-config.bak</pre>	Copies the startup-configuration file to a remote server. For the <i>scheme</i> argument, you can enter tftp: , ftp: , scp: , or sftp: . The <i>server</i> argument is the address or name of the remote server, and the <i>url</i> argument is the path to the source file on the remote server. The <i>server</i> , <i>url</i> , and <i>filename</i> arguments are case sensitive.

Downloading the Running Configuration From a Remote Server

You can configure your Cisco NX-OS device by using configuration files that you created on another Cisco NX-OS device and uploaded to a remote server. You then download the file from the remote server to your device using TFTP, FTP, Secure Copy (SCP), or Secure Shell FTP (SFTP) to the running configuration.

Before You Begin

Ensure that the configuration file that you want to download is in the correct directory on the remote server.

Ensure that the permissions on the file are set correctly. Permissions on the file should be set to world-read.

Ensure that your Cisco NX-OS device has a route to the remote server. The Cisco NX-OS device and the remote server must be in the same subnetwork if you do not have a router or a default gateway to route traffic between subnets.

Check connectivity to the remote server using the **ping** or **ping6** command.

Procedure

	Command or Action	Purpose
Step 1	copy <i>scheme://server[<i>url</i>]/filename</i> running-config Example: <pre>switch# copy tftp://10.10.1.1/my-config running-config</pre>	Downloads the running-configuration file from a remote server. For the <i>scheme</i> argument, you can enter tftp: , ftp: , scp: , or sftp: . The <i>server</i> argument is the address or name of the remote server, and the <i>url</i> argument is the path to the source file on the remote server. The <i>server</i> , <i>url</i> , and <i>filename</i> arguments are case sensitive.
Step 2	show running-config Example: <pre>switch# show running-config</pre>	(Optional) Displays the running configuration.
Step 3	copy running-config startup-config Example: <pre>switch# copy running-config startup-config</pre>	(Optional) Copies the running configuration to the startup configuration.
Step 4	show startup-config Example: <pre>switch# show startup-config</pre>	(Optional) Displays the startup configuration.

Related Topics

[Copying Files, on page 81](#)

Downloading the Startup Configuration From a Remote Server

You can configure your Cisco NX-OS device by using configuration files that you created on another Cisco NX-OS device and uploaded to a remote server. You then download the file from the remote server to your device using TFTP, FTP, Secure Copy (SCP), or Secure Shell FTP (SFTP) to the startup configuration.

**Caution**

This procedure disrupts all traffic on the Cisco NX-OS device.

Before You Begin

Log in to a session on the console port.

Ensure that the configuration file that you want to download is in the correct directory on the remote server.

Ensure that the permissions on the file are set correctly. Permissions on the file should be set to world-read.

Ensure that your Cisco NX-OS device has a route to the remote server. The Cisco NX-OS device and the remote server must be in the same subnetwork if you do not have a router or a default gateway to route traffic between subnets.

Check connectivity to the remote server using the **ping** or **ping6** command.

Procedure

	Command or Action	Purpose
Step 1	write erase Example: <pre>switch# write erase</pre>	Erases the startup configuration file.
Step 2	reload Example: <pre>switch# reload This command will reboot the system. (y/n)? [n] y ... Enter the password for "admin": <password> Confirm the password for "admin": <password> ... Would you like to enter the basic configuration dialog (yes/no): n switch#</pre>	Reloads the Cisco NX-OS device. Note Do not use the setup utility to configure the device.
Step 3	copy <i>scheme://server[/url /]filename</i> running-config Example: <pre>switch# copy tftp://10.10.1.1/my-config running-config</pre>	Downloads the running configuration file from a remote server. For the <i>scheme</i> argument, you can enter tftp: , ftp: , scp: , or sftp: . The <i>server</i> argument is the address or name of the remote server, and the <i>url</i> argument is the path to the source file on the remote server. The <i>server</i> , <i>url</i> , and <i>filename</i> arguments are case sensitive.
Step 4	copy running-config startup-config Example: <pre>switch# copy running-config startup-config</pre>	Saves the running configuration file to the startup configuration file.
Step 5	show startup-config Example: <pre>switch# show startup-config</pre>	(Optional) Displays the running configuration.

Related Topics

[Copying Files, on page 81](#)

Copying Configuration Files to an External Flash Memory Device

You can copy configuration files to an external flash memory device as a backup for later use.

Before You Begin

Insert the external Flash memory device into the active supervisor module.

Procedure

	Command or Action	Purpose
Step 1	<code>dir {slot0: usb1: usb2:}[directory/]</code>	(Optional) Displays the files on the external flash memory device.
Step 2	<code>copy running-config {slot0: usb1: usb2:}[directory/]filename</code> Example: <pre>switch# copy running-config slot0:dsn-running-config.cfg</pre>	Copies the running configuration to an external flash memory device. The <i>filename</i> argument is case sensitive.
Step 3	<code>copy startup-config {slot0: usb1: usb2:}[directory/]filename</code> Example: <pre>switch# copy startup-config slot0:dsn-startup-config.cfg</pre>	Copies the startup configuration to an external flash memory device. The <i>filename</i> argument is case sensitive.

Related Topics

[Copying Files, on page 81](#)

Copying the Running Configuration From an External Flash Memory Device

You can configure your Cisco NX-OS device by copying configuration files created on another Cisco NX-OS device and saved to an external flash memory device.

Before You Begin

Insert the external flash memory device into the active supervisor module.

Procedure

	Command or Action	Purpose
Step 1	dir {slot0: usb1: usb2:}[<i>directory</i>] Example: switch# dir slot0:	(Optional) Displays the files on the external flash memory device.
Step 2	copy {slot0: usb1: usb2:}[<i>directory</i>]/ <i>filename</i> running-config Example: switch# copy slot0:dsn-config.cfg running-config	Copies the running configuration from an external flash memory device. The <i>filename</i> argument is case sensitive.
Step 3	show running-config Example: switch# show running-config	(Optional) Displays the running configuration.
Step 4	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.
Step 5	show startup-config Example: switch# show startup-config	(Optional) Displays the startup configuration.

Related Topics

[Copying Files, on page 81](#)

Copying the Startup Configuration From an External Flash Memory Device

You can recover the startup configuration on your Cisco NX-OS device by downloading a new startup configuration file saved on an external flash memory device.

Before You Begin

Insert the external flash memory device into the active supervisor module.

Procedure

	Command or Action	Purpose
Step 1	<code>dir {slot0: usb1: usb2:}[directory/]</code>	(Optional) Displays the files on the external flash memory device.
Step 2	<code>copy {slot0: usb1: usb2:}[directory /]filename startup-config</code> Example: switch# copy slot0:dsn-config.cfg startup-config	Copies the startup configuration from an external flash memory device. The <i>filename</i> argument is case sensitive.
Step 3	<code>show startup-config</code> Example: switch# show startup-config	(Optional) Displays the startup configuration.

Related Topics

[Copying Files, on page 81](#)

Copying Configuration Files to an Internal File System

You can copy configuration files to the internal memory as a backup for later use.

Procedure

	Command or Action	Purpose
Step 1	<code>copy running-config [filesystem:][directory/] [directory/]filename</code> Example: switch# copy running-config bootflash:sw1-run-config.bak	Copies the running-configuration file to internal memory. The <i>filesystem</i> , <i>directory</i> , and <i>filename</i> arguments are case sensitive.
Step 2	<code>copy startup-config [filesystem:][directory/] [directory/]filename</code> Example: switch# copy startup-config bootflash:sw1-start-config.bak	Copies the startup-configuration file to internal memory. The <i>filesystem</i> , <i>directory</i> , and <i>filename</i> arguments are case sensitive.

Related Topics

[Copying Files, on page 74](#)

Rolling Back to a Previous Configuration

Problems, such as memory corruption, can occur that make it necessary for you to recover your configuration from a backed up version.



Note

Each time that you enter a **copy running-config startup-config** command, a binary file is created and the ASCII file is updated. A valid binary configuration file reduces the overall boot time significantly. A binary file cannot be uploaded, but its contents can be used to overwrite the existing startup configuration. The **write erase** command clears the binary file.

Procedure

	Command or Action	Purpose
Step 1	write erase Example: switch# write erase	Clears the current configuration of the switch.
Step 2	reload Example: switch# reload	Restarts the device. You will be prompted to provide a kickstart and system image file for the device to boot and run.
Step 3	copy configuration_file running-configuration Example: switch# copy bootflash:start-config.bak running-configuration	Copies a previously saved configuration file to the running configuration. Note The <i>configuration_file</i> filename argument is case-sensitive.
Step 4	copy running-config startup-config Example: switch# copy running-config startup-config	Copies the running configuration to the start-up configuration.

Removing the Configuration for a Missing Module

When you remove an I/O module from the chassis, you can also remove the configuration for that module from the running configuration.



Note

You can only remove the configuration for an empty slot in the chassis.

Before You Begin

Remove the I/O module from the chassis.

Procedure

	Command or Action	Purpose
Step 1	show hardware Example: switch# show hardware	(Optional) Displays the installed hardware for the device.
Step 2	purge module <i>slot</i> running-config Example: switch# purge module 3 running-config	Removes the configuration for a missing module from the running configuration.
Step 3	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Erasing a Configuration

You can erase the configuration on your device to return to the factory defaults.

You can erase the following configuration files saved in the persistent memory on the device:

- Startup
- Boot
- Debug

**Note**

The **write erase** command erases the entire startup configuration , except for the following:

- Boot variable definitions
- The IPv4 configuration on the mgmt0 interface, including the following:
 - Address
 - Subnet mask

To remove the boot variable definitions and the IPv4 configuration on the mgmt0 interface, use the **write erase boot** command.

Procedure

	Command or Action	Purpose
Step 1	write erase [boot debug] Example: <pre>switch# write erase Warning: This command will erase the startup-configuration. Do you wish to proceed anyway? (y/n) [n] y</pre>	Erases configurations in persistent memory. The default action erases the startup configuration. The boot option erases the boot variable definitions and the IPv4 configuration on the mgmt0 interface. The debug option erases the debugging configuration. Note The running configuration file is not affected by this command.

Clearing Inactive Configurations

You can clear inactive QoS and/or ACL configurations.

Procedure

	Command or Action	Purpose
Step 1	show running-config type inactive-if-config Example: <pre># show running-config ipqos inactive-if-config</pre>	(Optional) Displays any inactive ACL or QoS configurations. The values for the <i>type</i> argument are aclmgr and ipqos . <ul style="list-style-type: none"> • aclmgr: Display any inactive configurations for aclmgr. • ipqos: Display any inactive configurations for qosmgr.
Step 2	clear inactive-config policy Example: <pre># clear inactive-config qos clear qos inactive config Inactive if config for QoS manager is saved at/bootflash/qos_inactive_if_config.cfg for vdc default & for other than default vdc: /bootflash/vdc_x/qos_inactive_if_config.cfg (where x is vdc number) you can see the log file @ show inactive-if-config log</pre>	Clears inactive configurations. The values for the <i>policy</i> argument are qos and acl . The following describes the values: <ul style="list-style-type: none"> • qos: Clear inactive QoS configurations. • acl: Clear inactive ACL configurations. • acl qos: Clear inactive ACL configurations and inactive QoS configurations.

	Command or Action	Purpose
Step 3	show inactive-if-config log Example: # show inactive-if-config log	(Optional) Displays the commands that were used to clear the inactive configurations.

Verifying the Device Configuration

Use one of the following commands to verify the configuration after bootstrapping the device using POAP:

Command	Purpose
show running-config	Displays the running configuration.
show startup-config	Displays the startup configuration.

For detailed information about the fields in the output from these commands, see the *Cisco Nexus 3000 Series NX-OS Command Reference*.

Examples of Working with Configuration Files

This section includes examples of working with configuration files.

Copying Configuration Files

This example shows how to copy a running configuration to the bootflash: file system:

Backing Up Configuration Files

This example shows how to back up the startup configuration to the bootflash: file system (ASCII file):

```
switch# copy startup-config bootflash:my-config
```

This example shows how to back up the startup configuration to the TFTP server (ASCII file):

```
switch# copy startup-config tftp://172.16.10.100/my-config
```

This example shows how to back up the running configuration to the bootflash: file system (ASCII file):

```
switch# copy running-config bootflash:my-config
```

Rolling Back to a Previous Configuration

To roll back your configuration to a snapshot copy of a previously saved configuration, you need to perform the following steps:

- 1 Clear the current running image with the **write erase** command.
- 2 Restart the device with the **reload** command.
- 3 Copy the previously saved configuration file to the running configuration with the **copy configuration_file running-configuration** command.
- 4 Copy the running configuration to the start-up configuration with the **copy running-config startup-config** command.

Additional References for Configuration Files

This section includes additional information related to managing configuration files.

Related Documents for Configuration Files

Related Topic	Document Title
Licensing	<i>Cisco NX-OS Licensing Guide</i>
Command reference	<i>Cisco Nexus 3000 Series NX-OS Command Reference</i>



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