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Preface

The Preface contains the following sections:

- Audience, page xi
- Document Conventions, page xi
- Documentation Feedback, page xiii
- Obtaining Documentation and Submitting a Service Request, page xiii

Audience

This publication is for network administrators who configure and maintain Cisco Nexus devices and Cisco Nexus 2000 Series Fabric Extenders.

Document Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bold</strong></td>
<td>Bold text indicates the commands and keywords that you enter literally as shown.</td>
</tr>
<tr>
<td><em>Italic</em></td>
<td>Italic text indicates arguments for which the user supplies the values.</td>
</tr>
<tr>
<td>[x]</td>
<td>Square brackets enclose an optional element (keyword or argument).</td>
</tr>
</tbody>
</table>

Note

As part of our constant endeavor to remodel our documents to meet our customers' requirements, we have modified the manner in which we document configuration tasks. As a result of this, you may find a deviation in the style used to describe these tasks, with the newly included sections of the document following the new format.

Command descriptions use the following conventions:
### Document Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x</td>
<td>y]</td>
</tr>
<tr>
<td>{x</td>
<td>y}</td>
</tr>
<tr>
<td>[x {y</td>
<td>z}]</td>
</tr>
<tr>
<td>variable</td>
<td>Indicates a variable for which you supply values, in context where italics cannot be used.</td>
</tr>
<tr>
<td>string</td>
<td>A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.</td>
</tr>
</tbody>
</table>

Examples use the following conventions:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>screen font</td>
<td>Terminal sessions and information the switch displays are in screen font.</td>
</tr>
<tr>
<td>boldface screen font</td>
<td>Information you must enter is in boldface screen font.</td>
</tr>
<tr>
<td>italic screen font</td>
<td>Arguments for which you supply values are in italic screen font.</td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>Nonprinting characters, such as passwords, are in angle brackets.</td>
</tr>
<tr>
<td>[ ]</td>
<td>Default responses to system prompts are in square brackets.</td>
</tr>
<tr>
<td>!, #</td>
<td>An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.</td>
</tr>
</tbody>
</table>

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.
Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to: ciscodfa-docfeedback@cisco.com.

We appreciate your feedback.

Obtaining Documentation and Submitting a Service Request


Subscribe to What's New in Cisco Product Documentation, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.
New and Changed Information

This chapter contains the following sections:

- 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 guide or of the new features in this release.

Table 1: New Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Where Documented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power On Auto-Provisioning</td>
<td>Power On Auto Provisioning (POAP) automates the process of upgrading software images and installing configuration files on Nexus switches that are being deployed in the network for the first time.</td>
<td>Using PowerOn Auto Provisioning, on page 27</td>
</tr>
</tbody>
</table>
New and Changed Information for this Release
Overview

This chapter contains the following sections:

- Fibre Channel over Ethernet, page 3
- Data Center I/O Consolidation, page 4
- Virtual Interfaces, page 4
- Typical Deployment Topologies, page 5
- Supported Standards, page 11

Fibre Channel over Ethernet

Fibre Channel over Ethernet (FCoE) allows Fibre Channel traffic to be encapsulated over a physical Ethernet link. FCoE frames use a unique EtherType so that FCoE traffic and standard Ethernet traffic can be carried on the same link.

Classic Ethernet is a best-effort protocol; in the event of congestion, Ethernet will discard packets, relying on higher level protocols to provide retransmission and other reliability mechanisms. Fibre Channel traffic requires a lossless transport layer; as a data storage protocol, it is unacceptable to lose a single data packet. Native Fibre Channel implements a lossless service at the transport layer using a buffer-to-buffer credit system.

For FCoE traffic, the Ethernet link must provide a lossless service. Ethernet links on Cisco Nexus devices provide two mechanisms to ensure lossless transport for FCoE traffic: link-level flow control and priority flow control.

IEEE 802.3x link-level flow control allows a congested receiver to signal the far end to pause the data transmission for a short period of time. The pause functionality is applied to all the traffic on the link.

The priority flow control (PFC) feature applies pause functionality to specific classes of traffic on the Ethernet link. For example, PFC can provide lossless service for the FCoE traffic and best-effort service for the standard Ethernet traffic. PFC can provide different levels of service to specific classes of Ethernet traffic (using IEEE 802.1p traffic classes).
Data Center I/O Consolidation

I/O consolidation allows a single network technology to carry IP, SAN, and IPC traffic. FCoE is the single network technology that allows I/O consolidation. The upper Fibre Channel layers are unchanged, so the Fibre Channel operational model is maintained. FCoE network management and configuration is similar to a native Fibre Channel network.

Cisco Nexus devices use FCoE to carry Fibre Channel and Ethernet traffic on the same physical Ethernet connection between the switch and the server. At the server, the connection terminates to a converged network adapter (CNA). The adapter presents two interfaces to the server’s operating system (OS): one Ethernet NIC interface and one Fibre Channel host bus adapter (HBA) interface.

The server OS is not aware of the FCoE encapsulation (see the following figure). At the switch, the incoming Ethernet port separates the Ethernet and Fibre Channel traffic (using EtherType to differentiate the frames). Ethernet frames and Fibre Channel frames are switched to their respective network-side interfaces.

Figure 1: I/O Consolidation

![Diagram of I/O Consolidation]

Cisco Nexus devices provide quality of service (QoS) capabilities to ensure lossless or best-effort service across the switch. For Fibre Channel traffic (FCoE) you should apply the lossless QoS classes. By default, best-effort service is applied to all of the Ethernet traffic. You can configure different QoS levels for specific classes of Ethernet traffic.

Virtual Interfaces

When FCoE is enabled, a physical Ethernet cable carries traffic for a logical Fibre Channel connection.
The Cisco Nexus device uses virtual interfaces to represent the logical Fibre Channel connections. For configuration purposes, virtual Fibre Channel interfaces are implemented as Layer 2 subinterfaces of the physical Ethernet interface.

Ethernet features (such as the link debounce timer and VLAN membership) are configured on the physical Ethernet interface. Logical Fibre Channel features (such as VSAN membership) are configured on the virtual Fibre Channel interfaces.

Typical Deployment Topologies

Ethernet Switching

Cisco Nexus devices are Layer 2 devices, which run Cisco NX-OS.

Cisco Nexus devices are designed to support high-density, high-performance Ethernet systems and provide the following Ethernet switching features:

- IEEE 802.1D-2004 Rapid and Multiple Spanning Tree Protocols (802.1w and 802.1s)
- IEEE 802.1Q VLANs and trunks
- IEEE 802.3ad link aggregation
- Private VLANs
- EtherChannels and virtual port channels (vPCs)
- Traffic suppression (unicast, multicast, and broadcast)

FCoE and Fibre Channel Switching

Cisco Nexus devices support data center I/O consolidation by providing FCoE interfaces (to the servers) and native Fibre Channel interfaces (to the SAN).

FCoE and Fibre Channel switching includes the following features:

- Cisco fabric services
- N-port virtualization
- VSANs and VSAN trunking
- Zoning
- Distributed device alias service
- SAN port channels

QoS

Cisco Nexus devices provide quality of service (QoS) capabilities such as traffic prioritization and bandwidth allocation on egress interfaces.
The default QoS configuration on the switch provides lossless service for Fibre Channel and FCoE traffic. QoS must be configured to use native FC or FCoE or FC and FCoE.

The following commands will enable the default QoS configuration which must be configured for native FC or FCoE or FC and FCoE:

```
switch(config)# system qos
switch(config-sys-qos)# service-policy type queuing input fcoe-default-in-policy
switch(config-sys-qos)# service-policy type queuing output fcoe-default-out-policy
switch(config-sys-qos)# service-policy type qos input fcoe-default-in-policy
switch(config-sys-qos)# service-policy type network-qos fcoe-default-nq-policy
```

Before enabling FCoE on the Cisco Nexus 5500 Series device, you must attach the pre-defined FCoE policy maps to the type qos, type network-qos, and type queuing policy maps.

### Virtual Port Channels

A virtual port channel (vPC) allows links that are physically connected to two different Cisco Nexus devices or Cisco Nexus 2000 Series Fabric Extenders to appear as a single port channel. A vPC can provide multipathing, which allows you to create redundancy by enabling multiple parallel paths between nodes and load balancing traffic where alternative paths exist.

### Serviceability

The Cisco Nexus device serviceability functions provide data for network planning and help to improve problem resolution time.

### Switched Port Analyzer

The switched port analyzer (SPAN) feature allows an administrator to analyze all traffic between ports by nonintrusively directing the SPAN session traffic to a SPAN destination port that has an external analyzer attached to it.

### Ethanalyzer

Ethanalyzer is a Cisco NX-OS protocol analyzer tool based on the Wireshark (formerly Ethereal) open source code. Ethanalyzer is a command-line version of Wireshark for capturing and decoding packets. You can use Ethanalyzer to troubleshoot your network and analyse the control-plane traffic.

### Call Home

The Call Home feature continuously monitors hardware and software components to provide e-mail-based notification of critical system events. A versatile range of message formats is available for optimal compatibility with pager services, standard e-mail, and XML-based automated parsing applications. The feature offers alert grouping capabilities and customizable destination profiles. This feature can be used, for example, to directly page a network support engineer, send an e-mail message to a network operations center (NOC), and employ Cisco AutoNotify services to directly generate a case with the Cisco Technical Assistance Center (TAC). This
feature is a step toward autonomous system operation, which enables networking devices to inform IT when a problem occurs and helps to ensure that the problem is resolved quickly.

**Online Diagnostics**

Cisco generic online diagnostics (GOLD) is a suite of diagnostic facilities to verify that hardware and internal data paths are operating as designed. Boot-time diagnostics, continuous monitoring, and on-demand and scheduled tests are part of the Cisco GOLD feature set. GOLD allows rapid fault isolation and continuous system monitoring.

**Switch Management**

**Simple Network Management Protocol**

Cisco NX-OS is compliant with Simple Network Management Protocol (SNMP) version 1, version 2, and version 3. A full set of Management Information Bases (MIBs) is supported.

**Role-Based Access Control**

With role-based access control (RBAC), you can limit access to switch operations by assigning roles to users. Administrators can customize access and restrict it to the users who require it.

**Configuration Methods**

**Configuring with CLI, XML Management Interface, or SNMP**

You can configure Cisco Nexus devices using the command-line interface (CLI), the XML management interface over SSH, or SNMP as follows:

- **CLI** — You can configure switches using the CLI from an SSH session, a Telnet session, or the console port. SSH provides a secure connection to the device.
- **XML Management Interface over SSH** — You can configure switches using the XML management interface, which is a programming interface based on the NETCONF protocol that complements the CLI functionality. For more information, see the *Cisco NX-OS XML Interfaces User Guide*.
- **SNMP** — SNMP allows you to configure switches using Management Information Bases (MIBs).

**Configuring with Cisco Data Center Network Manager**

You can configure Cisco Nexus Series switches using the Data Center Network Manager (DCNM) client, which runs on a local PC and uses the DCNM server.

For more information, see the *Cisco DCNM Configuration Guides*.
Configuring with Cisco MDS Fabric Manager

You can configure Cisco Nexus Series switches using the Fabric Manager client, which runs on a local PC and uses the Fabric Manager server.

For more information, see the Cisco Nexus Fabric Manager Software guide for your device.

Network Security Features

Cisco NX-OS includes the following security features:

- Authentication, authorization, and accounting (AAA) and TACACS+
- RADIUS
- Secure Shell (SSH) Protocol Version 2
- Simple Network Management Protocol Version 3 (SNMPv3)
- MAC ACLs and IP ACLs, including port-based ACLs (PACLs) and VLAN-based ACLs (VACLs).

Virtual Device Contexts

Cisco NX-OS can segment operating system and hardware resources into virtual device contexts (VDC) that emulate virtual devices. The Cisco Nexus device does not support multiple VDCs. All switch resources are managed in the default VDC.

For more information, see the Cisco Nexus 7000 Series NX-OS Getting Started with Virtual Device Contexts.

Licensing

The Cisco Nexus device is shipped with its licenses installed. The switch provides commands to manage the licenses and install additional licenses.

Ethernet TOR Switch Topology

The Cisco Nexus device can be deployed as a 10-Gigabit Ethernet top-of-rack (TOR) switch, with uplinks to the data center LAN distribution layer switches. An example configuration in shown in the following figure.

In this example, the blade server rack incorporates blade switches that support 10-Gigabit Ethernet uplinks to the Cisco Nexus device. The blade switches do not support FCoE, so there is no FCoE traffic and no Fibre Channel ports on the Cisco Nexus device.
In the example configuration, the Cisco Nexus device has Ethernet uplinks to two Catalyst switches. If STP is enabled in the data center LAN, the links to one of the switches will be STP active and the links to the other switch will be STP blocked.

*Figure 2: Ethernet TOR Switch Topology*

All of the server-side ports on the Cisco Nexus device are running standard Ethernet. FCoE is not required, so the server ports are connected using 10-Gigabit Ethernet NICs.

The servers are connected to the data center SAN through MDS 9134 SAN switches. The server Fibre Channel ports require standard Fibre Channel HBAs.
Fabric Extender Deployment Topology

The following figure shows a simplified configuration using the Cisco Nexus 2000 Series Fabric Extender in combination with the Cisco Nexus device to provide a simplified and cost-effective 1-Gigabit TOR solution.

**Figure 3: Fabric Extender Deployment Topology**

In the example configuration, the Fabric Extender top-of-rack units provide 1-Gigabit host interfaces connected to the servers. The Fabric Extender units are attached to their parent Cisco Nexus devices with 10-Gigabit fabric interfaces.

Each Fabric Extender acts as a Remote I/O Module on the parent Cisco Nexus device. All device configurations are managed on the Cisco Nexus device and configuration information is downloaded using inband communication to the Fabric Extender.

See the *Cisco Nexus 2000 Series Fabric Extender Software Configuration Guide* for an overview of the Fabric Extender and configuration details.
Data Center I/O Consolidation Topology

The following figure shows a typical I/O consolidation scenario for the Cisco Nexus device.

Figure 4: I/O Consolidation Topology

The Cisco Nexus device connects to the server ports using FCoE. Ports on the server require converged network adapters. For redundancy, each server connects to both switches. Dual-port CNA adapters can be used for this purpose. The CNA is configured in active-passive mode, and the server needs to support server-based failover.

On the Cisco Nexus device, the Ethernet network-facing ports are connected to two Catalyst 6500 Series switches. Depending on required uplink traffic volume, there may be multiple ports connected to each Catalyst 6500 Series switch, configured as port channels. If STP is enabled in the data center LAN, the links to one of the switches will be STP active and the links to the other switch will be STP blocked.

The SAN network-facing ports on the Cisco Nexus device are connected to Cisco MDS 9000 Family switches. Depending on the required traffic volume, there may be multiple Fibre Channel ports connected to each MDS 9000 Family switch, configured as SAN port channels.

Supported Standards

The following table lists the standards supported by the Cisco Nexus devices.
Table 2: IEEE Compliance

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.1D</td>
<td>MAC Bridges</td>
</tr>
<tr>
<td>802.1s</td>
<td>Multiple Spanning Tree Protocol</td>
</tr>
<tr>
<td>802.1w</td>
<td>Rapid Spanning Tree Protocol</td>
</tr>
<tr>
<td>802.3ad</td>
<td>Link aggregation with LACP</td>
</tr>
<tr>
<td>802.3ae</td>
<td>10-Gigabit Ethernet</td>
</tr>
<tr>
<td>802.1Q</td>
<td>VLAN Tagging</td>
</tr>
<tr>
<td>802.1p</td>
<td>Class of Service Tagging for Ethernet frames</td>
</tr>
</tbody>
</table>
CHAPTER 3

Using the Cisco NX-OS Setup Utility

This chapter contains the following sections:

- Configuring the Switch, page 13

Configuring the Switch

Image Files on the Switch

The Cisco Nexus devices have the following images:

- BIOS and loader images combined in one file
- Kickstart image
- System image that includes a BIOS image that can be upgraded

The switch has flash memory that consists of two separate flash parts:

- A 2 MB flash part holds two BIOS and loader images.
- A 1 GB flash part holds configuration files, kickstart images, systems images, and other files.

The upgradeable BIOS and the golden BIOS are programmed onto the 2 MB flash part. You cannot upgrade the golden BIOS.

When you download a new pair of kickstart and system images, you also get a new BIOS image because it is included in the system image. You can use the install all command to upgrade the kickstart, system, and upgradeable BIOS images.

Starting the Switch

A Cisco Nexus switch starts its boot process as soon as its power cord is connected to an A/C source. The switch does not have a power switch.
Boot Sequence

When the switch boots, the golden BIOS validates the checksum of the upgradeable BIOS. If the checksum is valid, then control is transferred to the upgradeable BIOS image. The upgradeable BIOS launches the kickstart image, which then launches the system image. If the checksum of the upgradeable BIOS is not valid, then the golden BIOS launches the kickstart image, which then launches the system image.

You can force the switch to bypass the upgradeable BIOS and use the golden BIOS instead. If you press **Ctrl-Shift-6** within two seconds of when power is supplied to the switch, the golden BIOS will be used to launch the kickstart image, even if the checksum of the upgradeable BIOS is valid.

When you press **Ctrl-Shift-6**, the console settings must be set to their defaults: 9600 baud, 8 data bits, no parity, and 1 stop bit.

Before the boot sequence starts, the BIOS performs internal tests on the switch. If the tests fail, then the loader does not gain control. Instead, the BIOS image retains control and prints a message to the console at 9600 baud every 30 seconds that indicates a failure.

The following figure shows the normal and recovery boot sequence.

*Figure 5: Boot Sequence*
For additional information, see *Troubleshooting*.

**Console Settings**

The loader, kickstart, and system images have the following factory default console settings:

- **Speed**—9600 baud
- **Databits**—8 bits per byte
- **Stopbits**—1 bit
- **Parity**—none

These settings are stored on the switch, and all three images use the stored console settings.

To change a console setting, use the `line console` command in configuration mode. The following example configures a line console and sets the options for that terminal line:

```bash
switch# configure terminal
switch(config)# line console
switch(config-console)# databits 7
switch(config-console)# exec-timeout 30
switch(config-console)# parity even
switch(config-console)# stopbits 2
```

You cannot change the BIOS console settings. These are the same as the default console settings.

**Upgrading the Switch Software**

**Note**

You must have the network-admin role before you can upgrade the software image on the switch.

You must log in to the switch on its console port connection.

To upgrade the software on the switch, follow these steps:

**Procedure**

**Step 1** Log in to Cisco.com to access the Software Download Center. To log in to Cisco.com, go to the URL [http://www.cisco.com/](http://www.cisco.com/) and click **Log In** at the top of the page. Enter your Cisco username and password.

**Note** Unregistered Cisco.com users cannot access the links provided in this document.

**Step 2** Access the Software Download Center using this URL: [http://www.cisco.com/cisco/web/download/index.html](http://www.cisco.com/cisco/web/download/index.html)

**Step 3** Navigate to the software downloads for Cisco Nexus devices. You see links to the download images for the switch.

**Step 4** Read the release notes for the related image file.

**Step 5** Select and download the kickstart and system software files to a local server.

**Step 6** Ensure that the required space is available in the bootflash: directory for the image file(s) to be copied.
Example:

```
switch# dir bootflash:
  4681 Nov 24 02:43:52 2008 config
13176836 Nov 24 07:19:36 2008 gdb.1
  49152 Jan 12 18:38:36 2009 lost+found/
310556 Dec 23 02:53:28 2008 n1
20058112 Nov 07 02:35:22 2008 n5000-uk9-kickstart.4.0.1a.N1.0.62.bin
20217856 Jan 12 18:26:54 2009 n5000-uk9-kickstart.4.0.1a.N2.0.140.bin
76930262 Nov 07 02:35:22 2008 n5000-uk9-4.0.1a.N1.0.62.bin
103484727 Jan 12 18:29:08 2009 n5000-uk9.4.0.1a.N2.0.140.bin
```

Usage for bootflash://sup-local

- 74934272 bytes used
- 5550080 bytes free
- 80484352 bytes total

**Caution** We recommend that you keep the kickstart and system image files for at least one previous software release to use if the new image files do not load successfully.

**Step 7** If you need more space on the active supervisor module bootflash, delete unnecessary files to make space available.

Example:

```
switch# delete bootflash:n5000-uk9-kickstart.4.0.1a.N1.0.62.bin
switch# delete bootflash:n5000-uk9.4.0.1a.N1.0.62.bin
```

**Step 8** Copy the kickstart and system images to the switch bootflash using a transfer protocol. You can use `ftp`, `tftp`, `scp`, or `sftp`. The examples in this procedure use `scp`.

Example:

```
switch# copy scp://user@scpserver.cisco.com/downloads/n5000-uk9.4.1.3.N1.0.96.bin
  bootflash:n5000-uk9.4.1.3.N1.0.96.bin
switch# copy scp://user@scpserver.cisco.com/downloads/n5000-uk9-kickstart.4.1.3.N1.0.96.bin
  bootflash:n5000-uk9-kickstart.4.1.3.N1.0.96.bin
```

**Step 9** Install the new images, specifying the new image names that you downloaded in the previous step.

Example:

```
switch# install all kickstart bootflash:n5000-uk9-kickstart.4.1.3.N1.0.96.bin system
  bootflash:n5000-uk9.4.1.3.N1.0.96.bin
```

The `install all` command performs the following actions:

- Performs compatibility checks (equivalent to the `show incompatibility` command) for the images that you have specified. If there are compatibility issues, an error message is displayed and the installation does not proceed.
- Displays the compatibility check results and displays whether the installation is disruptive.
- Provides a prompt to allow you to continue or abort the installation.

**Caution** After completing the installation, all traffic through the switch is disrupted while the switch reboots.

- Updates the boot variables to reference the specified images and saves the configuration to the startup configuration file.

**Step 10** After the switch completes the installation, log in and verify that the switch is running the required software version.
Example:

```
switch# show version
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 herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available at
```

Software
- BIOS: version 1.2.0
- loader: version N/A
- kickstart: version 4.1(3)N1(1) [build 4.1(3)N1(0.96)]
- system: version 4.1(3)N1(1) [build 4.1(3)N1(0.96)]
- BIOS compile time: 06/19/08
- kickstart compile time: 7/14/2009 4:00:00 [07/14/2009 04:27:38]
- system compile time: 7/14/2009 4:00:00 [07/14/2009 05:20:12]

Hardware
- cisco Nexus5020 Chassis ("40x10GE/Supervisor")
- Intel(R) Celeron(R) M CPU with 2074240 kB of memory.
- Processor Board ID JAB1232002F

```
Device name: switch
bootflash: 1003520 kB
Kernel uptime is 13 day(s), 23 hour(s), 25 minute(s), 5 second(s)
Last reset at 720833 usecs after Tue Jul 14 11:18:32 2009
Reason: Reset by installer
System version: 4.1(3)N1(0.96)
```

```
Service:
plugin
    Core Plugin, Ethernet Plugin
```

## Downgrading from a Higher Release

The procedure to downgrade the switch is identical to a switch upgrade, except that the image files to be loaded are for an earlier release than the image currently running on the switch.

**Note**

Prior to downgrading to a specific release, check the release notes for the current release installed on the switch, to ensure that your hardware is compatible with the specific release. There are special caveats you must be aware of before you downgrade the switch software to a 4.0(0)-based release. See the Cisco Nexus release notes for your device for details.

### Procedure

**Step 1** Locate the image files you will use for the downgrade by entering the `dir bootflash:` command.
If the image files are not stored on the bootflash memory, download the files from Cisco.com:

a) Log in to Cisco.com to access the Software Download Center. To log in to Cisco.com, go to the URL http://www.cisco.com/ and click Log In at the top of the page. Enter your Cisco username and password. 

   Note Unregistered Cisco.com users cannot access the links provided in this document.

b) Access the Software Download Center using this URL: http://www.cisco.com/cisco/web/download/index.html

c) Navigate to the software downloads for Cisco Nexus Series switches.

   You see links to the download images for the switch.

d) Read the release notes for the related image file then select and download the kickstart and system software files to a local server

e) Ensure that the required space is available in the bootflash: directory for the image file(s) to be copied.

   Caution We recommend that you keep the kickstart and system image files for at least one previous software release to use if the new image files do not load successfully.

f) Copy the kickstart and system images to the switch bootflash using a transfer protocol. You can use ftp, tftp, scp, or sftp.

Step 2 Install the new images.

Example:

switch# install all kickstart bootflash:n5000-uk9-kickstart.4.0.1a.N1.0.62.bin system

bootflash:n5000-uk9.4.0.1a.N1.0.62.bin

The install all command performs the following actions:

• Performs compatibility checks (equivalent to the show incompatibility command) for the images that you have specified. If there are compatibility issues, an error message is displayed and the installation does not proceed.

• Displays the compatibility check results and displays whether the installation is disruptive.

• Provides a prompt to allow you to continue or abort the installation.

   Note A disruptive installation causes traffic disruption while the switch reboots.

• Updates the boot variables to reference the specified images and saves the configuration to the startup configuration file.

Step 3 After the switch completes the installation, log in and verify that the switch is running the required software version.

Example:

switch# show version
Initial Configuration

Configuration Prerequisites

The following procedure is a review of the tasks you should have completed during hardware installation. These tasks must be completed before you can configure the switch.

Procedure

Step 1  Verify the following physical connections for the new Cisco Nexus device:

- The console port is physically connected to a computer terminal (or terminal server).
- The management Ethernet port (mgmt0) is connected to an external hub, switch, or router.

Refer to the Cisco Nexus Hardware Installation guide for your device for more information.

Tip  Save the host ID information for future use (for example, to enable licensed features). The host ID information is provided in the Proof of Purchase document that accompanies the switch.

Step 2  Verify that the default console port parameters are identical to those of the computer terminal (or terminal server) attached to the switch console port:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

Initial Setup

The first time that you access a switch in your Cisco Nexus series, it runs a setup program that prompts you for the IP address and other configuration information necessary for the switch to communicate over the Ethernet interface. This information is required to configure and manage the switch.

Note  The IP address can only be configured from the CLI. When the switch powers up for the first time, you should assign the IP address. After you perform this step, the Cisco MDS 9000 Family Fabric Manager can reach the switch through the console port.

Preparing to Configure the Switch

Before you configure Cisco Nexus device for the first time, you need the following information:

- Administrator password.
Note
If a password is weak (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password.

- If you are using an IPv4 address for the management interface, you need the following information:
  - IPv4 subnet mask for the switch’s management interface.
  - IPv4 address of the default gateway (optional).
- SSH service on the switch (optional).
  To enable this service, select the type of SSH key (dsa/rsa/rsa1) and number of SSH key bits (768 to 2048).
- NTP server IPv4 address (optional).
- SNMP community string (optional).
- Switch name (optional).
  This is your switch prompt.
- An additional login account and password (optional).

Note
If you are using IPv4, be sure to configure the IPv4 route, the IPv4 default network address, and the IPv4 default gateway address to enable SNMP access.

Default Login

The switch has the network administrator as a default user (admin). You cannot change the default user at any time.

There is no default password so you must explicitly configure a strong password. If a password is trivial (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password. If you configure and subsequently forget this new password, you have the option to recover this password.

Note
If you enter the write erase command and reload the switch, you must reconfigure the default user (admin) password using the setup procedure.

Configuring the Switch

This section describes how to initially configure the switch.
Press Ctrl-C at any prompt to skip the remaining configuration options and proceed with what you have configured up to that point. However, entering the new password for the administrator is a requirement and cannot be skipped.

If you do not want to answer a previously configured question, or if you want to skip answers to any questions, press Enter. If a default answer is not available (for example, switch name), the switch uses what was previously configured and skips to the next question.

To configure the switch for first time, follow these steps:

**Procedure**

**Step 1**
Ensure that the switch is on. Switches in the Cisco Nexus series boot automatically.

**Step 2**
Enter the new password for the administrator.

**Example:**
Enter the password for admin: <password>

**Note**
Clear text passwords cannot contain dollar signs ($) or spaces anywhere in the password. Also, they cannot include these special characters at the beginning of the password: quotation marks (" or '), vertical bars (|), or right angle brackets (>).

**Tip**
If a password is weak (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password. Passwords are case-sensitive.

**Step 3**
Enter yes to enter the setup mode.

**Example:**
This setup utility will guide you through the basic configuration of the system. Setup configures only enough connectivity for management of the system.

*Note: setup is mainly used for configuring the system initially, when no configuration is present. So setup always assumes system defaults and not the current system configuration values.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): yes

The setup utility guides you through the basic configuration process. Press Ctrl-C at any prompt to end the configuration process.

**Step 4**
Enter the new password for the administrator (admin is the default).

**Example:**
Enter the password for admin: admin

**Step 5**
Enter yes (no is the default) to create additional accounts.
Example:
Create another login account (yes/no) [n]: yes

While configuring your initial setup, you can create an additional user account (in the network-admin role) besides the administrator’s account.
a) Enter the user login ID.

Example:
Enter the user login ID: user_name

b) Enter the user password.

Example:
Enter the password for user_name: user-password

Step 6 Enter yes (yes is the default) to create an SNMP read-only community string.

Example:
Configure read-only SNMP community string (yes/no) [n]: yes
SNMP community string: snmp_community

Step 7 Enter a name for the switch.
Note Starting with Cisco NX-OS Release 7.3(0)N1(1), the character limit of a switch name is increased from 32 to 63 alphanumeric characters. Also, 63 characters is the maximum length limit for setting hostname using SNMP. The default name is switch.

Example:
Enter the switch name: switch_name

Step 8 Enter yes (yes is the default) to configure out-of-band management and enter the mgmt0 IPv4 address.

Example:
Continue with Out-of-band (mgmt0) management configuration? [yes/no]: yes
Mgmt0 IPv4 address: ip_address

Step 9 Enter yes (yes is the default) to configure the IPv4 default gateway (recommended) and enter the IPv4 address for the default gateway.

Example:
Configure the default-gateway: (yes/no) [y]: yes
IPv4 address of the default-gateway: default_gateway

Step 10 Enter yes (yes is the default) to enable the Telnet service.

Example:
Enable the telnet service? (yes/no) [y]: yes

Step 11 Enter yes (no is the default) to enable the SSH service.
**Example:**
Enabled SSH service? (yes/no) [n]: yes

a) Enter the SSH key type that you would like to generate.

**Example:**
Type the SSH key you would like to generate (dsa/rsa/rsa1)? dsa

b) Enter the number of key bits within the specified range.

**Example:**
Enter the number of key bits? (768 to 2048): 768

**Step 12** Enter yes (no is the default) to configure the NTP server and enter the IPv4 address for the NTP server.

**Example:**
Configure NTP server? (yes/no) [n]: yes
NTP server IP address: ntp_server_IP_address

**Step 13** Enter yes (yes is the default) to configure basic Fibre Channel configurations.

**Example:**
Enter basic FC configurations (yes/no) [n]: yes

**Step 14** Enter shut (shut is the default) to configure the default Fibre Channel switch port interface to the shut (disabled) state.

**Example:**
Configure default physical FC switchport interface state (shut/noshut) [shut]: shut

**Step 15** Enter on (on is the default) to configure the switch port trunk mode.

**Example:**
Configure default physical FC switchport trunk mode (on/off/auto) [on]: on

**Step 16** Enter permit (deny is the default) to deny a default zone policy configuration.

**Example:**
Configure default zone policy (permit/deny) [deny]: permit
Permits traffic flow to all members of the default zone.

**Note** If you are executing the setup script after entering a write erase command, you explicitly must change the default zone policy to permit for VSAN 1 after finishing the script using the following command:

Configure read-only SNMP community string (yes/no) [n]: zone default-zone permit vsan 1

**Step 17** Enter yes (no is the default) to enable a full zone set distribution.

**Example:**
Enable full zoneset distribution (yes/no) [n]: yes
Overrides the switch-wide default for the full zone set distribution feature.

**Step 18** You see the new configuration. Review and edit the configuration that you have just entered. Enter no (no is the default) if you are satisfied with the configuration.

**Example:**
The following configuration will be applied:

```plaintext
username admin password <user-password> role network-admin
snmp-server community snmp_community ro
switchname switch
feature telnet
ssh key dsa 768 force
feature ssh
system default switchport shutdown aan
system default switchport trunk mode on
system default zone default-zone permit
system default zone distribute full
```

Would you like to edit the configuration? (yes/no) [n]: no

**Step 19** Enter yes (yes is default) to use and save this configuration:

**Example:**

Use this configuration and save it? (yes/no) [y]: yes

**Caution**
If you do not save the configuration at this point, none of your changes are updated the next time the switch is rebooted. Type yes to save the new configuration. This operation ensures that the kickstart and system images are also automatically configured.

---

**Changing the Initial Configuration**

To make changes to the initial configuration at a later time, enter the `setup` command in EXEC mode:

```
switch# setup
---- Basic System Configuration Dialog ----
This setup utility will guide you through the basic configuration of the system. Setup configures only enough connectivity for management of the system.
*Note: setup is mainly used for configuring the system initially, when no configuration is present. So setup always assumes system defaults and not the current system configuration values. Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining dialogs.
Would you like to enter the basic configuration dialog (yes/no): yes
```

The setup utility guides you through the basic configuration process.

---

**Management Interface Configuration**

The management interface on the switch allows multiple simultaneous Telnet, SSH, or SNMP sessions. You can remotely configure the switch through the management interface (mgmt0), but first you must configure some IP parameters so that the switch is reachable. You can manually configure the management interface from the CLI through the console port.
About the mgmt0 Interface

The mgmt0 interface on a Cisco Nexus device provides out-of-band management, which enables you to manage the switch by its IPv4 or IPv6 address. The mgmt0 interface is a 10/100/1000 Ethernet port.

Note

Before you begin to configure the management interface manually, obtain the switch’s IP address and subnet mask. Also make sure that the console cable is connected to the console port.

Configuring the Management Interface

To configure the management (mgmt0) Ethernet interface to connect over IP, perform this task:

Procedure

Step 1  switch# configure terminal
Enters configuration mode.

Step 2  switch(config)# interface mgmt 0
Selects the management Ethernet interface on the switch and enters interface configuration submode.

Step 3  Configure the IP address for IPv4 or IPv6:
  a)  switch(config-if)# ip address ipv4-address[/ length]
      Configures the IPv4 address and its subnet mask.
  b)  switch(config-if)# ip address ipv4-address [subnet-mask]
      An alternative method that configures the IPv4 address and its subnet mask.
  c)  switch(config-if)# ipv6 address ipv6-address[/ length]
      Configures the IPv6 address and its subnet mask.

Step 4  switch(config-if)# no shutdown
Enables the interface.

Step 5  switch(config-if)# exit
Returns to configuration mode.

Step 6  switch(config)# vrf context management
Enters VRF context management configuration mode.

Step 7  Configure the IP address (IPv4 or IPv6) for the next hop:
  a)  switch(config-vrf)# ip route ipv4-prefix[/ length] ipv4-nexthop-address
      Configures the IPv4 address of the next hop.
  b)  switch(config-vrf)# ipv6 route ipv6-prefix[/ length] ipv6-nexthop-address
      Configures the IPv6 address of the next hop.

Step 8  switch(config-vrf)# end
Returns to EXEC mode.

Step 9  (Optional) switch# copy running-config startup-config
Saves your configuration changes to the file system.

In some cases, a switch interface might be administratively shut down. You can check the status of an interface at any time by using the `show interface mgmt 0` command.

### Displaying Management Interface Configuration

To display the management interface configuration, use the `show interface mgmt 0` command.

```
switch# show interface mgmt0
mgmt0 is up
Hardware is GigabitEthernet, address is 000d.ec8f.cb00 (bia 000d.ec8f.cb00)
Internet Address is 172.16.131.202/24
MTU 1500 bytes, BW 0 Kbit, DLY 0 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
full-duplex, 1000 Mb/s
Input flow-control is off, output flow-control is off
8540 packets input, 2835036 bytes
5202 multicast frames, 0 compressed
0 input errors, 0 frame, 0 overrun, 0 fifo
570 packets output, 85555 bytes
0 underrun, 0 output errors, 0 collisions
0 fifo, 0 carrier errors
```

### Shutting Down the Management Interface

To shut down the management interface (mgmt0), you use the `shutdown` command. A system prompt requests you confirm your action before it executes the command. You can use the force option to bypass this confirmation.

The following example shuts down the interface without using the force option:

```
switch# configure terminal
switch(config)# interface mgmt 0
switch(config-if)# shutdown
Shutting down this interface will drop all telnet sessions.
Do you wish to continue (y/n)? y
```

The following example shuts down the interface using the force option:

```
switch# configure terminal
switch(config)# interface mgmt 0
switch(config-if)# shutdown force
```
Using PowerOn Auto Provisioning

This chapter contains the following sections:

- Information About PowerOn Auto Provisioning, page 27
- Guidelines and Limitations for POAP, page 32
- Setting Up the Network Environment To Use POAP, page 33
- Configuring a Switch Using POAP, page 33
- Verifying the Device Configuration, page 34
- Related Documents for POAP, page 34

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 5000 switch with the POAP feature boots and does not find the startup configuration, it enters POAP mode and locates a DHCP server. Later it 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 POAP over DHCP is the only supported method in the Cisco Nexus 5000 switch.

Network Requirements for POAP

POAP requires the following network infrastructure:

- A DHCP server to bootstrap the interface IP address, gateway address, DNS server, and log 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 6: POAP Network Infrastructure**

---

**POAP Configuration Script**

The reference script supplied by Cisco supports the following functionality:

• Downloads the configuration file based on the switch's serial number, hostname, MAC address, or location.

• 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 NX-OS Python API Reference Guide* for your platform.
POAP Process

The POAP process has the following phases:

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

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

*Figure 7: POAP Process*
**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 to apply after the switch boots. 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 2 mode, which ensures that the device does not participate in any Layer 2 forwarding.

---

**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 or its MAC address 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 mandates some of the options and solicits these options from the DHCP server after receiving the DHCP OFFER from the DHCP server.

- **Option 66 (TFTP server name)** or **Option 150 (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.
- **IP address**
- **Default gateway**
- **Option 67 (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. The POAP process is reinitiated until it succeeds or you manually abort the POAP process.

**Figure 8: DHCP Discovery Phase**

---

**Script Execution Phase**

Once the device has bootstrapped itself using the information in the DHCP acknowledgement, the switch downloads the script file 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 YYYYMMDDD_hhmms 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 YYYYMMDDD_hhmms 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.

- You can bypass password and basic POAP configuration by using the skip option at the POAP prompt. When you use the skip option, no password will be configured for the admin user. The copy running-config startup-config command will be blocked until a valid password is set for the admin user.

- DHCP for NX-Os will be successful, if the DHCP response is set to IP address 255.255.255.255. Since not all the DHCP server including IOS DHCP server sends the DHCP responses to 255.255.255.255, NX-Os is unable to get an IP address as a result POAP does not succeed.

### Setting Up the Network Environment To Use POAP

#### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Modify the basic configuration script provided by Cisco or create your own script.</td>
</tr>
<tr>
<td>2</td>
<td>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.)</td>
</tr>
<tr>
<td>3</td>
<td>Deploy a TFTP or HTTP server to host the configuration script.</td>
</tr>
<tr>
<td>4</td>
<td>Deploy one or more servers to host the software images and configuration files.</td>
</tr>
</tbody>
</table>

### Configuring a Switch Using POAP

#### Before You Begin

Make sure that the network environment is set up to use POAP. For more information, see the Setting Up the Network Environment To Use POAP, on page 33 section immediately preceeding this section.

#### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install the switch in the network.</td>
</tr>
<tr>
<td>2</td>
<td>Power on the switch. If no configuration file is found, the switch boots in POAP mode and displays a prompt that asks if you want to abort POAP and continue with a normal setup. No entry is required to continue to boot in POAP mode.</td>
</tr>
<tr>
<td>3</td>
<td>(Optional) 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 more information, see the POAP Process section.</td>
</tr>
</tbody>
</table>
What to Do Next
Verify the configuration.

Verifying the Device Configuration
To verify the configuration after bootstrapping the device using POAP, use one of the following commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show running-config</code></td>
<td>Displays the running configuration.</td>
</tr>
<tr>
<td><code>show startup-config</code></td>
<td>Displays the startup configuration.</td>
</tr>
</tbody>
</table>

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

Related Documents for POAP

<table>
<thead>
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<th>Document Title</th>
</tr>
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<tbody>
<tr>
<td>Configuration Script</td>
<td>Cisco Nexus 3000 Series NX-OS Python API Reference Guide</td>
</tr>
</tbody>
</table>
CHAPTER 5

Understanding the Command-Line Interface

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Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information" chapter.

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
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```
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>

Example:

```
switch# configure terminal
switch(config)#
```

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 Cisco Nexus interfaces guide for your device.

Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
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<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>

Example:

```
switch# configure terminal
switch(config)#
```

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 2</strong> interface type number</td>
<td>Specifies the interface that you want to configure.</td>
</tr>
</tbody>
</table>

Example:

```
interface type number
```

The CLI places you into interface configuration mode for the specified interface.
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 Cisco Nexus interfaces guide for your device. For details about the subinterface commands, see the command reference guide for your device.

Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch(config)# interface ethernet 2/2 switch(config-if)#</td>
<td>The CLI prompt changes to indicate that you are in interface configuration mode.</td>
</tr>
</tbody>
</table>

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

Saving and Restoring a Command Mode

The Cisco NX-OS software allows you to save the 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.

This 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**

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>exit</td>
<td>Exits from the current configuration command mode and returns to the previous configuration command mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config-if)# exit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>end</td>
<td>Exits from the current configuration command mode and returns to EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config-if)# end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch#</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>Ctrl-Z</td>
<td>(Optional) Exits the current configuration command mode and returns to EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config-if)# ^Z</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch#</td>
<td></td>
</tr>
<tr>
<td>Caution</td>
<td>If you press 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.</td>
<td></td>
</tr>
</tbody>
</table>

**Command Mode Summary**

This table summarizes information about the main command modes.
### Table 3: Command Mode Summary

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

### 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>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>Percent</td>
</tr>
<tr>
<td>#</td>
<td>Pound, hash, or number</td>
</tr>
<tr>
<td>...</td>
<td>Ellipsis</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>Less than or greater than</td>
</tr>
<tr>
<td>[ ]</td>
<td>Brackets</td>
</tr>
<tr>
<td>Character</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>{}</td>
<td>Braces</td>
</tr>
</tbody>
</table>

**Keystroke Shortcuts**

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

*Table 5: Keystroke Shortcuts*

<table>
<thead>
<tr>
<th>Keystrokes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctrl-A</td>
<td>Moves the cursor to the beginning of the line.</td>
</tr>
<tr>
<td>Ctrl-B</td>
<td>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.</td>
</tr>
<tr>
<td>Ctrl-C</td>
<td>Cancels the command and returns to the command prompt.</td>
</tr>
<tr>
<td>Ctrl-D</td>
<td>Deletes the character at the cursor.</td>
</tr>
<tr>
<td>Ctrl-E</td>
<td>Moves the cursor to the end of the line.</td>
</tr>
<tr>
<td>Ctrl-F</td>
<td>Moves the cursor one character to the right.</td>
</tr>
<tr>
<td>Ctrl-G</td>
<td>Exits to the previous command mode without removing the command string.</td>
</tr>
<tr>
<td>Ctrl-K</td>
<td>Deletes all characters from the cursor to the end of the command line.</td>
</tr>
<tr>
<td>Ctrl-L</td>
<td>Redisplays the current command line.</td>
</tr>
<tr>
<td>Ctrl-N</td>
<td>Displays the next command in the command history.</td>
</tr>
<tr>
<td>Ctrl-O</td>
<td>clears the terminal screen.</td>
</tr>
<tr>
<td>Ctrl-P</td>
<td>Displays the previous command in the command history.</td>
</tr>
<tr>
<td>Ctrl-R</td>
<td>Redisplays the current command line.</td>
</tr>
<tr>
<td>Keystrokes</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Ctrl-T</td>
<td>Transposes the character under the cursor with the character located to the right of the cursor. The cursor is then moved one character to the right.</td>
</tr>
<tr>
<td>Ctrl-U</td>
<td>Deletes all characters from the cursor to the beginning of the command line.</td>
</tr>
<tr>
<td>Ctrl-V</td>
<td>Removes any special meaning for the following keystroke. For example, press Ctrl-V before entering a question mark (?) in a regular expression.</td>
</tr>
<tr>
<td>Ctrl-W</td>
<td>Deletes the word to the left of the cursor.</td>
</tr>
<tr>
<td>Ctrl-X, H</td>
<td>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.</td>
</tr>
<tr>
<td>Ctrl-Y</td>
<td>Recalls the most recent entry in the buffer (press keys simultaneously).</td>
</tr>
<tr>
<td>Ctrl-Z</td>
<td>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.</td>
</tr>
<tr>
<td>Up arrow key</td>
<td>Displays the previous command in the command history.</td>
</tr>
<tr>
<td>Down arrow key</td>
<td>Displays the next command in the command history.</td>
</tr>
<tr>
<td>Right arrow key</td>
<td>Moves your cursor through the command string, either forward or backward, allowing you to edit the current command.</td>
</tr>
<tr>
<td>Left arrow key</td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>Displays a list of available commands.</td>
</tr>
</tbody>
</table>
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.
### 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, and 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 feature 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 submode hierarchy nested more than one level. In these cases, you can display information about your present working context (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)`.
### Configuring Persistent CLI Variables

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

#### Procedure

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>cli var name</strong></td>
<td>Configures the CLI session variable. The <em>variable-name</em> argument is alphanumeric, case sensitive, and has a maximum length of 31 characters. The <em>variable-text</em> argument is alphanumeric, case sensitive, can contain spaces, and has a maximum length of 200 characters.</td>
</tr>
<tr>
<td></td>
<td><em>variable-name</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>variable-text</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# cli var name testinterface ethernet 2/1</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>show cli variables</strong></td>
<td>Displays the CLI variable configuration.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# show cli variables</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>exit</strong></td>
<td>Exits global configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)# exit</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch#</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>show cli variables</strong></td>
<td>Displays the CLI variable configuration.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# show cli variables</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 5</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>copy running-config startup-config</strong></td>
<td>Copies the running configuration to the startup configuration.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)# copy running-config startup-config</code></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
</tbody>
</table>
Purpose

Command or Action | Purpose
---|---
Step 2 | 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.
cli alias name alias-name alias-text | 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.
Example: | switch(config)# cli alias name ethint interface ethernet

Step 3 | Exits global configuration mode.
exit | Exits global configuration mode.
Example: | switch(config)# exit

Step 4 | Displays the command alias configuration.
alias | Displays the command alias configuration.
Example: | switch# alias

Step 5 | Copies the running configuration to the startup configuration.
copy running-config startup-config | Copies the running configuration to the startup configuration.
Example: | switch# copy running-config startup-config

Configuring Command Aliases for a User Session

You can create a command alias for the current user session that 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
Step 1 | Configures a command alias for the current user session. Use the persist keyword to save the alias for future use by the user account.
terminal alias [persist] alias-name command -string | Configures a command alias for the current user session. Use the persist keyword to save the alias for future use by the user account.
Example: | switch# terminal alias shintbr show interface brief

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.

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.

<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command or Action</strong></td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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 7: Formatting Options for the echo Command**

<table>
<thead>
<tr>
<th>Formatting Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\b</td>
<td>Inserts back spaces.</td>
</tr>
<tr>
<td>\c</td>
<td>Removes the new line character at the end of the text string.</td>
</tr>
<tr>
<td>\f</td>
<td>Inserts a form feed character.</td>
</tr>
<tr>
<td>\n</td>
<td>Inserts a new line character.</td>
</tr>
<tr>
<td>\r</td>
<td>Returns to the beginning of the text line.</td>
</tr>
<tr>
<td>\t</td>
<td>Inserts a horizontal tab character.</td>
</tr>
<tr>
<td>\v</td>
<td>Inserts a vertical tab character.</td>
</tr>
<tr>
<td>\</td>
<td>Displays a backslash character.</td>
</tr>
</tbody>
</table>
### Formatting Option

<table>
<thead>
<tr>
<th>Formatting Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n)</td>
<td>Displays the corresponding ASCII octal character.</td>
</tr>
</tbody>
</table>

### Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>echo [backslash-interpret] [text]</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>switch# echo This is a test. This is a test.</code></td>
</tr>
</tbody>
</table>

The `backslash-interpret` keyword indicates that the text string contains formatting options. The `text` 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>sleep seconds</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>switch# sleep 30</code></td>
</tr>
</tbody>
</table>

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 8: Context-Sensitive Help Example

<table>
<thead>
<tr>
<th>Example Outputs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch# clock ?</td>
<td>Displays the command syntax for the <strong>clock</strong> command in EXEC mode. The switch output shows that the <strong>set</strong> keyword is required for using the <strong>clock</strong> command.</td>
</tr>
<tr>
<td>set    HH:MM:SS Current Time</td>
<td></td>
</tr>
<tr>
<td>switch# clock set ?</td>
<td>Displays the command syntax for setting the time. The help output shows that the current time is required for setting the clock and how to format the time.</td>
</tr>
<tr>
<td>WORD   HH:MM:SS Current Time</td>
<td></td>
</tr>
<tr>
<td>switch# clock set 13:32:00&lt;CR&gt;</td>
<td>Adds the current time. The CLI indicates the command is incomplete.</td>
</tr>
<tr>
<td>% Incomplete command</td>
<td></td>
</tr>
<tr>
<td>switch# &lt;Ctrl-P&gt;</td>
<td>Displays the previous command that you entered.</td>
</tr>
<tr>
<td>switch# clock set 13:32:00</td>
<td>Displays the additional arguments for the <strong>clock set</strong> command.</td>
</tr>
<tr>
<td>switch# clock set 13:32:00 ?</td>
<td>Displays the additional arguments for the <strong>clock set</strong> command.</td>
</tr>
<tr>
<td>&lt;1-31&gt;   Day of the month</td>
<td></td>
</tr>
<tr>
<td>switch# clock set 13:32:00 18&lt;CR&gt;</td>
<td>Displays the date to the clock setting. The CLI indicates an error with the caret symbol (^) at 08.</td>
</tr>
<tr>
<td>% Invalid input detected at '^' marker.</td>
<td></td>
</tr>
<tr>
<td>switch# clock set 13:32:00 18 April 08&lt;CR&gt;</td>
<td>Displays the correct arguments for the year.</td>
</tr>
<tr>
<td>% Enter the year (no abbreviation)</td>
<td></td>
</tr>
<tr>
<td>switch# clock set 13:32:00 18 April &lt;2000-2030&gt;</td>
<td>Displays the correct arguments for the year.</td>
</tr>
<tr>
<td>switch# clock set 13:32:00 18 April</td>
<td>Enters the correct syntax for the <strong>clock set</strong> command.</td>
</tr>
<tr>
<td>switch# clock set 13:32:00 18 April 2008&lt;CR&gt;</td>
<td></td>
</tr>
<tr>
<td>switch#</td>
<td></td>
</tr>
</tbody>
</table>

Cisco Nexus 5000 Series NX-OS Fundamentals Configuration Guide, Release 5.1(3)N2(1)
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 9: Special Characters with Special Meaning

<table>
<thead>
<tr>
<th>Character</th>
<th>Special Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>Matches any single character, including white space.</td>
</tr>
<tr>
<td>*</td>
<td>Matches 0 or more sequences of the pattern.</td>
</tr>
<tr>
<td>+</td>
<td>Matches 1 or more sequences of the pattern.</td>
</tr>
<tr>
<td>?</td>
<td>Matches 0 or 1 occurrences of the pattern.</td>
</tr>
<tr>
<td>^</td>
<td>Matches the beginning of the string.</td>
</tr>
<tr>
<td>$</td>
<td>Matches the end of the string.</td>
</tr>
<tr>
<td>_ (underscore)</td>
<td>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 BGP related commands.</td>
</tr>
</tbody>
</table>

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 10: Special Characters Used for Anchoring**

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>^</td>
<td>Matches the beginning of the string.</td>
</tr>
<tr>
<td>$</td>
<td>Matches the end of the string.</td>
</tr>
</tbody>
</table>

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 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
```
### 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 11: Filtering and Searching Keywords

<table>
<thead>
<tr>
<th>Keyword Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>begin string</code></td>
<td>Starts displaying at the line that contains the text that matches the search string. The search string is case sensitive. Example: `show version</td>
</tr>
<tr>
<td><code>count</code></td>
<td>Displays the number of lines in the command output. Example: `show running-config</td>
</tr>
<tr>
<td>`cut [-d character] [-b</td>
<td>-c</td>
</tr>
<tr>
<td><code>end string</code></td>
<td>Displays all lines up to the last occurrence of the search string. Example: `show running-config</td>
</tr>
<tr>
<td><code>exclude string</code></td>
<td>Displays all lines that do not include the search string. The search string is case sensitive. Example: `show interface brief</td>
</tr>
<tr>
<td><code>head [lines lines]</code></td>
<td>Displays the beginning of the output for the number of lines specified. The default number of lines is 10. Example: `show logging logfile</td>
</tr>
</tbody>
</table>
### diff Utility

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

**diff-clean [all-session] [all-users]**

This table describes the keywords for the diff utility.

<table>
<thead>
<tr>
<th><strong>Keyword Syntax</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>human</strong></td>
<td>Displays the output in normal format if you have previously set the output format to XML using the <code>terminal output xml</code> command. <strong>Note</strong> The <code>terminal output xml</code> command, having 1.0 and 6.x / 7.x versions is used to set the schema (.xsd) file while validating xml. Setting 1.0, the switch will validate <code>/isan/etc/schema/&lt;comp&gt;.xsd</code> file, and if 6.x / 7.x the switch validates <code>/isan/etc/schema/6.x/&lt;comp&gt;.xsd</code> file and <code>/isan/etc/schema/7.x/&lt;comp&gt;.xsd</code> file accordingly based on the version of the image, the switch is running.</td>
</tr>
<tr>
<td><strong>include string</strong></td>
<td>Displays all lines that include the search string. The search string is case sensitive. <strong>Example:</strong> `show interface brief</td>
</tr>
<tr>
<td><strong>last [lines]</strong></td>
<td>Displays the end of the output for the number of lines specified. The default number of lines is 10. <strong>Example:</strong> `show logging logfile</td>
</tr>
<tr>
<td><strong>no-more</strong></td>
<td>Displays all the output without stopping at the end of the screen with the —More— prompt. <strong>Example:</strong> `show interface brief</td>
</tr>
<tr>
<td><strong>sscp SSH-connection-name filename</strong></td>
<td>Redirects the output using streaming secure copy (sscp) to a named SSH connection. You can create the SSH named connection using the <code>ssh name</code> command. <strong>Example:</strong> `show version</td>
</tr>
<tr>
<td>**wc [bytes</td>
<td>lines</td>
</tr>
<tr>
<td><strong>xml</strong></td>
<td>Displays the output in XML format. <strong>Example:</strong> `show version</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>count</td>
<td>Displays only the total count of matched lines.</td>
</tr>
<tr>
<td>ignore-case</td>
<td>Specifies to ignore the case difference in matched lines.</td>
</tr>
<tr>
<td>invert-match</td>
<td>Displays lines that do not match the expression.</td>
</tr>
<tr>
<td>line-exp</td>
<td>Displays only lines that match a complete line.</td>
</tr>
<tr>
<td>line-number</td>
<td>Specifies to display the line number before each matched line.</td>
</tr>
<tr>
<td>next lines</td>
<td>Specifies the number of lines to display after a matched line. The default is 0. The range is from 1 to 999.</td>
</tr>
<tr>
<td>prev lines</td>
<td>Specifies the number of lines to display before a matched line. The default is 0. The range is from 1 to 999.</td>
</tr>
</tbody>
</table>
**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:

```
```

This table describes the sort utility parameters.

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

**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**

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[lines]&lt;space&gt;</td>
<td>Displays output lines for either the specified number of lines or the current screen size.</td>
</tr>
<tr>
<td>[lines]z</td>
<td>Displays output lines for either the specified number of lines or the current screen size. If you use the lines argument, that value becomes the new default screen size.</td>
</tr>
<tr>
<td>[lines]&lt;return&gt;</td>
<td>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 lines argument, that value becomes the new default number of lines to display for this command.</td>
</tr>
<tr>
<td>[lines]d or [lines]Ctrl+shift+D</td>
<td>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 lines argument, that value becomes the new default number of lines to display for this command.</td>
</tr>
<tr>
<td>q or Q or Ctrl-C</td>
<td>Exits the --More-- prompt.</td>
</tr>
</tbody>
</table>
### Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>([lines]s)</td>
<td>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.</td>
</tr>
<tr>
<td>([lines]f)</td>
<td>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.</td>
</tr>
<tr>
<td>=</td>
<td>Displays the current line number.</td>
</tr>
<tr>
<td>([count]/expression)</td>
<td>Skips to the line that matches the regular expression and displays a screen of output lines. Use the optional count 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.</td>
</tr>
<tr>
<td>([count]n)</td>
<td>Skips to the next line that matches the current regular expression and displays a screen of output lines. Use the optional count argument to skip past matches.</td>
</tr>
<tr>
<td>(!</td>
<td>:![shell-cmd]})</td>
</tr>
<tr>
<td>.</td>
<td>Repeats the previous command.</td>
</tr>
</tbody>
</table>

### 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:

```plaintext
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td><code>[no] terminal history no-exec-in-config</code></td>
<td>Configures the CLI history to remove the EXEC commands when you use the recall keystroke shortcuts in a configuration mode. The default recalls EXEC commands. You can revert to the default using the <code>no</code> form of the command.</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td><code>[no] terminal edit-mode vi</code></td>
<td>Changes the CLI edit mode to vi for the user session. The <code>persist</code> keyword makes the setting persistent across sessions for the current username. Use the <code>no</code> to revert to using emacs.</td>
</tr>
</tbody>
</table>

### 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**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> [no] terminal dont-ask [persist]</td>
<td>Disables the CLI confirmation prompt. The <code>persist</code> keyword makes the setting persistent across sessions for the current username. The default is enabled. Use the <code>no</code> form of the command to enable the CLI confirmation prompts.</td>
</tr>
</tbody>
</table>

| Example: | switch# terminal dont-ask |

### 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 of the previous command failed.
• The user input displays in blue.
• The command output displays in the default color.

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

### Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td>terminal color [evening] [persist]</td>
<td>Sets the CLI display colors for the terminal session. The <strong>evening</strong> keyword is not supported. The <strong>persist</strong> keyword makes the setting persistent across sessions for the current username. The default setting is not persistent.</td>
</tr>
</tbody>
</table>

### 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 separated by a space. 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 supported only on the supervisor module session.

The following examples show how to display and filter module information:

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

This 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)]
```
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>

For information on how to load the Cisco NX-OS software from the <loader> prompt, see the Cisco Nexus troubleshooting guide for your device.

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
Using the System-Defined Timestamp Variable

This example uses $(TIMESTAMP) when redirecting the 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
```
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 egress 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

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS Licensing</td>
<td>Cisco NX-OS Licensing Guide</td>
</tr>
<tr>
<td>Command reference</td>
<td>Cisco Nexus 5000 Series NX-OS Command Reference</td>
</tr>
</tbody>
</table>
CHAPTER 6

Configuring Terminal Settings and Sessions

This chapter contains the following sections:

• Finding Feature Information, page 67
• Information About Terminal Settings and Sessions, page 67
• Licensing Requirements for Terminal Settings and Sessions, page 69
• Configuring the Console Port, page 69
• Configuring the COM1 Port, page 71
• Configuring Virtual Terminals, page 72
• Configuring Modem Connections, page 74
• Clearing Terminal Sessions, page 78
• Displaying Terminal and Session Information, page 79
• Default Settings for File System Parameters, page 79
• Additional References for Terminal Settings and Sessions, page 80

Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information" chapter.

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.

COM1 Port

A COM1 port is an RS-232 port with a DB-9 interface that enables you to connect to an external serial communication device such as a modem. You can configure the following parameters for the COM1 port:

**Data bits**
Specifies the number of bits in an 8-bit byte that is used for data.
Hardware flowcontrol
Enables the flow-control hardware.

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.

Licensing Requirements for Terminal Settings and Sessions
The following table shows the licensing requirements for this feature:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>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 Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch# configure terminal switch(config)#</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><code>line console</code></td>
<td>Enters console configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch# line console switch(config-console)#</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><code>databits bits</code></td>
<td>Configures the number of data bits per byte. The range is from 5 to 8. The default is 8.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# databits 7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><code>exec-timeout minutes</code></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# exec-timeout 30</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>`parity {even</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# parity even</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>`speed {300</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# speed 115200</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>`stopbits {1</td>
<td>2}`</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# stopbits 2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td><code>exit</code></td>
<td>Exits console configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config-console)# exit switch(config)#</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><code>show line console</code></td>
<td>(Optional) Displays the console settings.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch(config)# show line console</td>
<td></td>
</tr>
</tbody>
</table>
### Configuring the COM1 Port

You can set the following characteristics for the COM1 port:

- Data bits
- Flow control on the hardware
- Parity
- Speed
- Stop bits

**Before You Begin**

Log in to the console port or COM1 port.

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>line com1</td>
<td>Enters COM1 configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch# line com1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config-com1)#</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>databits <em>bits</em></td>
<td>Configures the number of data bits per byte. The range is from 5 to 8. The default is 8.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config-com1)# databits 7</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>flowcontrol hardware</td>
<td>Enables flow control on the hardware. The default is enabled. Use the no flowcontrol hardware command to disable flow control on the hardware.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config-com1)# flowcontrol hardware</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> parity {even</td>
<td>none</td>
<td>odd}</td>
</tr>
<tr>
<td>Example: switch(config-com1)# parity even</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong> speed {300</td>
<td>1200</td>
<td>2400</td>
</tr>
<tr>
<td>Example: switch(config-com1)# speed 115200</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong> stopbits {1</td>
<td>2}</td>
<td>Configures the stop bits. The default is <em>1</em>.</td>
</tr>
<tr>
<td>Example: switch(config-com1)# stopbits 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong> exit</td>
<td>Exits COM1 configuration mode.</td>
<td></td>
</tr>
<tr>
<td>Example: switch(config-com1)# exit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>switch(config)#</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong> show line com1</td>
<td>(Optional) Displays the COM1 port settings.</td>
<td></td>
</tr>
<tr>
<td>Example: switch(config)# show line com1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 10</strong> copy running-config startup-config</td>
<td>(Optional) Copies the running configuration to the startup configuration.</td>
<td></td>
</tr>
<tr>
<td>Example: switch(config)# copy running-config startup-config</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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.
### Configuring Terminal Settings and Sessions

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td><code>line vty</code></td>
<td>Enters line configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# line vty</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config-line)#</code></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td><code>exec-timeout minutes</code></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config-line)# exec-timeout 30</code></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td><code>exit</code></td>
<td>Exits line configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config-line)# exit</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td>Step 5</td>
<td>`show running-config all</td>
<td>begin vty`</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>`switch(config)# show running-config all</td>
<td>begin vty`</td>
</tr>
<tr>
<td>Step 6</td>
<td><code>copy running-config startup-config</code></td>
<td>(Optional) Copies the running configuration to the startup configuration.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)# copy running-config startup-config</code></td>
<td></td>
</tr>
</tbody>
</table>

### Configuring the Session Limit

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

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>2</td>
<td><code>line vty</code></td>
<td>Enters line configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> <code>switch# line vty</code>&lt;br&gt;<code>switch(config-line)#</code></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><code>session-limit sessions</code></td>
<td>Configures the maximum number of virtual sessions for the Cisco NX-OS device. The range is from 1 to 60. The default is 32.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> <code>switch(config-line)# session-limit 10</code></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><code>exit</code></td>
<td>Exits line configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> <code>switch(config-line)# exit</code>&lt;br&gt;<code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>`show running-config all</td>
<td>being vty`</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> <code>switch(config)# show running-config all</code>&lt;br&gt;`</td>
<td>begin vty`</td>
</tr>
<tr>
<td>6</td>
<td><code>copy running-config startup-config</code></td>
<td>(Optional) Copies the running configuration to the startup configuration.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> <code>switch(config)# copy running-config startup-config</code></td>
<td></td>
</tr>
</tbody>
</table>

### Configuring Modem Connections

You can connect a modem to either the COM1 port or the console port.  
We recommend that you use the COM1 port to connect the modem.

### 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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>
| Example: | | switch# configure terminal  
switch(config)# |

| Step 2 | Enter one of the following commands: | Enters COM1 configuration mode or console configuration mode. |
| Command | Purpose |
| line com1 | Enters COM1 configuration mode. |
| line console | Enters console configuration mode. |

| Example: | | switch# line com1  
switch(config-com1)# |

| Step 3 | modem in | Enables modem input on the COM1 or console port. |
| Example: | | switch(config-com1)# modem in |

| Step 4 | exit | Exits COM1 or console configuration mode. |
| Example: | | switch(config-com1)# exit  
switch(config)# |

| Step 5 | show line | (Optional) Displays the console and COM1 settings. |
| Example: | | switch(config)# show line |

| Step 6 | copy running-config startup-config | (Optional) Copies the running configuration to the startup configuration. |
| Example: | | switch(config)# copy running-config startup-config |

### 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# configure terminal</td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Enter one of the following commands:</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>line com1</td>
<td>Enters COM1 configuration mode.</td>
</tr>
<tr>
<td>line console</td>
<td>Enters console configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# line com1</td>
</tr>
<tr>
<td></td>
<td>switch(config-com1)#</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>modem init-string default</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config-com1)# modem init-string default</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>exit</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config-com1)# exit</td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>show line</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config)# show line</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>copy running-config startup-config</td>
</tr>
<tr>
<td>Example:</td>
<td>switch(config)# copy running-config</td>
</tr>
<tr>
<td></td>
<td>startup-config</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>
| Example: | switch# configure terminal  
  switch(config)# | |

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Enter one of the following commands:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Option</strong></td>
</tr>
<tr>
<td></td>
<td>line com 1</td>
</tr>
<tr>
<td></td>
<td>line console</td>
</tr>
</tbody>
</table>
| Example: | switch# line com1  
  switch(config-com1)# | |

**Step 3**
modem set-string **user-input** *string*

Example:
switch(config-com1)# modem set-string  
user-input ATE0Q1&02&01S0-3\015

Sets the user-specified initialization string for the COM1 or 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.

<table>
<thead>
<tr>
<th>Step 4</th>
<th>modem init-string <strong>user-input</strong></th>
</tr>
</thead>
</table>
| Example: | switch(config-com1)# modem init-string  
  user-input | |

Writes the user-specified initialization string to the modem connected to the COM1 or console port.

<table>
<thead>
<tr>
<th>Step 5</th>
<th>exit</th>
</tr>
</thead>
</table>
| Example: | switch(config-com1)# exit  
  switch(config)# | |

Exits COM1 or console configuration mode.
### 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 COM1 port or the console port on the device.

Enable the modem connection on the port.

#### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>`modem connect line {com1</td>
<td>console}`</td>
</tr>
</tbody>
</table>

**Example:**

```
switch# modem connect line com1
```

#### Related Topics

- Enabling a Modem Connection, on page 74

## Clearing Terminal Sessions

You can clear terminal sessions on the Cisco NX-OS device.
### Displaying Terminal and Session Information

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>show terminal</td>
<td>Displays terminal settings.</td>
</tr>
<tr>
<td>show line</td>
<td>Displays the COM1 and console ports settings.</td>
</tr>
<tr>
<td>show users</td>
<td>Displays virtual terminal sessions.</td>
</tr>
<tr>
<td>show running-config [all]</td>
<td>Displays the user account configuration in the running configuration. The all keyword displays the default values for the user accounts.</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Parameters</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default filesystem</td>
<td>bootflash:</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>Cisco NX-OS Licensing Guide</td>
</tr>
<tr>
<td>Command reference</td>
<td>Cisco Nexus 5000 Series Command Reference</td>
</tr>
</tbody>
</table>
CHAPTER 7

Basic Device Management

This chapter contains the following sections:

• Finding Feature Information, page 81
• Information About Basic Device Management, page 82
• Licensing Requirements for Basic Device Management, page 83
• Changing the Device Hostname, page 83
• Configuring the MOTD Banner, page 84
• Configuring the EXEC Banner, page 85
• Configuring the Time Zone, page 86
• Configuring Summer Time (Daylight Saving Time), page 87
• Manually Setting the Device Clock, page 88
• Setting the Clock Manager, page 88
• Managing Users, page 89
• Verifying the Device Configuration, page 90
• Default Settings for Basic Device Parameters, page 90
• Additional References for Basic Device Management, page 91

Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information" chapter or the Feature History table below.
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.

EXEC Banner

Starting with the Cisco NX-OS Release, the EXEC banner is displayed after a user logs in to a switch. This banner can be used to post reminders to your network administrators.

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 Cisco Nexus 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 line cards) 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 Cisco Nexus security configuration guide for your device.

Licensing Requirements for Basic Device Management

The following table shows the licensing requirements for this feature:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>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 Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>

Changing the Device Hostname

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

Procedure

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>

Example:

```
switch# configure terminal
switch(config)#
```

Step 2

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>name</td>
</tr>
</tbody>
</table>

Example:

Using the hostname command:

```
switch(config)# hostname Engineering1
Engineering1(config)#
```

Using the switchname command:

```
Engineering1(config)# switchname Engineering2
Engineering2(config)#
```

Note The switchname command performs the same function as the hostname command.
### 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>banner motd delimiting-character message delimiting-character</code></td>
<td>Configures the MOTD banner. Do not use the delimiting-character in the message text.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)# banner motd #Welcome to the Switch#</code></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>Do not use &quot; or % as a delimiting character.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Exits global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)# exit</code></td>
<td></td>
</tr>
<tr>
<td><code>switch#</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td></td>
</tr>
<tr>
<td><code>show banner motd</code></td>
<td>(Optional) Displays the configured MOTD banner.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# show banner motd</code></td>
<td></td>
</tr>
</tbody>
</table>
### Configuring the EXEC Banner

You can configure the EXEC banner to display a message when a user logs in to a device. The EXEC banner has the following characteristics:

- Maximum of 254 characters per line including the delimiting characters
- Maximum of 40 lines

### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>banner exec delimiting-character message delimiting-character</td>
<td>Configures the EXEC banner. Do not use the delimiting-character in the message text.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)# banner exec #Welcome to the Test#</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)#</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>no banner exec</td>
<td>(Optional) Resets the value of EXEC banner to the default value. Note: The default value of the EXEC banner is blank.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)# no banner exec</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>exit</td>
<td>Exits global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch(config)# exit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch#</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>show banner exec</td>
<td>(Optional) Displays the configured EXEC banner.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch# show banner exec</td>
<td></td>
</tr>
</tbody>
</table>
### Configuring the EXEC Banner

This example shows how to configure the EXEC banner.

```bash
# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# banner exec Unauthorized access to this device is prohibited!
switch(config)# exit
switch# show banner exec
Unauthorized access to this device is prohibited!
```

### Configuring the Time Zone

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

#### Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# configure terminal</code></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)#</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>clock timezone zone-name offset-hours offset-minutes</code></td>
<td>Configures the time zone. The <code>zone-name</code> argument is a 3-character string for the time zone acronym (for example, PST or EST). The <code>offset-hours</code> argument is the offset from the UTC and the range is from –23 to 23 hours. The range for the <code>offset-minutes</code> argument is from 0 to 59 minutes.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)# clock timezone EST -5 0</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Exits global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch(config)# exit</code></td>
<td></td>
</tr>
<tr>
<td><code>switch#</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td></td>
</tr>
<tr>
<td><code>show clock</code></td>
<td>(Optional) Displays the time and time zone.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# show clock</code></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td>switch# configure terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>switch(config)#</td>
</tr>
<tr>
<td>Step 2</td>
<td>clock summer-time zone-name start-week start-day start-month start-time end-week end-day end-month end-time offset-minutes</td>
<td>Configures summer time or daylight saving time. The zone-name argument is a three character string for the time zone acronym (for example, PST and EST). The values for the start-day and end-day arguments are Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday. The values for the start-month and end-month arguments are January, February, March, April, May, June, July, August, September, October, November, and December. The value for the start-time and end-time arguments are in the format hh:mm. The range for the offset-minutes argument is from 0 to 1440 minutes.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td>switch(config)# clock summer-time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PDT 1 Sunday March 02:00 1 Sunday November 02:00 60</td>
</tr>
<tr>
<td>Step 3</td>
<td>exit</td>
<td>Exits global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td>switch(config)# exit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>switch#</td>
</tr>
<tr>
<td>Step 4</td>
<td>show clock detail</td>
<td>(Optional) Displays the configured MOTD banner.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td>switch(config)# show clock detail</td>
</tr>
</tbody>
</table>

Example:

```
switch# copy running-config startup-config
switch(config)# exit
switch(config)# show clock detail
```
**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**

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

**Related Topics**

Configuring the Time Zone, on page 86

**Setting the Clock Manager**

You can configure the clock manager to synchronize all the clocks of the components in the Cisco Nexus chassis.
### Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Configures the clock manager.</td>
</tr>
<tr>
<td><code>clock protocol protocol vdc vdc-num</code></td>
<td>The values for the <code>protocol</code> argument are <code>ptp</code>, <code>ntp</code>, and <code>none</code>.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>The following describes the values:</td>
</tr>
<tr>
<td><code># clock protocol ptp vdc 2</code></td>
<td>- <strong>ptp</strong>—Synchronizes clocks with Precision Time Protocol (PTP) as described by IEEE 1588.</td>
</tr>
<tr>
<td></td>
<td>- <strong>ntp</strong>—Synchronizes clocks with Network Time Protocol (NTP).</td>
</tr>
<tr>
<td></td>
<td>- <strong>none</strong>—Use <code>clock set</code> to set supervisor clocks.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> When <code>none</code> is used, the clock in the specified VDC must be configured.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> Once the protocol is configured, the clock in the specified VDC must use that protocol.</td>
</tr>
<tr>
<td></td>
<td>For example, if the <code>clock protocol ptp vdc 2</code> command is entered, then PTP should be configured in VDC 2.</td>
</tr>
</tbody>
</table>

| **Step 2** | (Optional) Displays the configuration of the clock manager. |
| `show run clock_manager` | The range for the `vdc` argument is 1 to 8. |
| **Example:** | |
| `# show run clock_manager` | |

### 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Displays the user sessions.</td>
</tr>
<tr>
<td><code>show users</code></td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>switch# show users</code></td>
<td></td>
</tr>
</tbody>
</table>
Sending a Message to Users

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

### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>show users</td>
<td>(Optional) Displays the active user sessions.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# show users</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>send [session line] message-text</td>
<td>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.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# send Reload the device is 10 minutes!</td>
<td></td>
</tr>
</tbody>
</table>

---

## Verifying the Device Configuration

To verify the configuration after bootstrapping the device using POAP, use one of the following commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>show running-config</td>
<td>Displays the running configuration.</td>
</tr>
<tr>
<td>show startup-config</td>
<td>Displays the startup configuration.</td>
</tr>
</tbody>
</table>

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

---

## Default Settings for Basic Device Parameters

This table lists the default settings for basic device parameters.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTD banner text</td>
<td>User Access Verification</td>
</tr>
<tr>
<td>Clock time zone</td>
<td>UTC</td>
</tr>
</tbody>
</table>
## Additional References for Basic Device Management

You can find additional information related to basic device management.

### Related Documents for Basic Device Management

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>Cisco NX-OS Licensing Guide</td>
</tr>
<tr>
<td>Command reference</td>
<td>Cisco Nexus 7000 Series NX-OS Fundamentals Command ReferenceCisco Nexus 5000 Series NX-OS Command Reference</td>
</tr>
</tbody>
</table>
CHAPTER 8

Using the Device File Systems, Directories, and Files

This chapter contains the following sections:

- Finding Feature Information, page 93
- Information about the External Storage Devices, Device File Systems, Directories, and Files, page 93
- Licensing Requirements for File Systems, Directories, and Files, page 95
- Working with Directories, page 95
- Working with Files, page 98
- Working with Archive Files, page 102
- Examples of Using the File System, page 105
- Default Settings for File System Parameters, page 108
- Additional References for File Systems, page 108

Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information" chapter or the Feature History table below.

Information about the External Storage Devices, 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**

<table>
<thead>
<tr>
<th>File System Name</th>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bootflash</td>
<td>sup-active</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>sup-local</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sup-standby</td>
<td>Internal CompactFlash memory located on the standby supervisor module used for storing image files, configuration files, and other miscellaneous files.</td>
</tr>
<tr>
<td></td>
<td>sup-remote</td>
<td></td>
</tr>
<tr>
<td>volatile</td>
<td>—</td>
<td>Volatile random-access memory (VRAM) located on a supervisor module used for temporary or pending changes.</td>
</tr>
<tr>
<td>log</td>
<td>—</td>
<td>Memory on the active supervisor that stores logging file statistics.</td>
</tr>
<tr>
<td>system</td>
<td>—</td>
<td>Memory on a supervisor module used for storing the running-configuration file.</td>
</tr>
<tr>
<td>debug</td>
<td>—</td>
<td>Memory on a supervisor module used for debug logs.</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>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 Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td>pwd</td>
<td>Displays the name of your current directory.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# pwd</td>
<td></td>
</tr>
</tbody>
</table>

Changing the Current Directory

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

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.

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<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td>pwd</td>
<td>Displays the name of your current directory.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# pwd</td>
<td></td>
</tr>
</tbody>
</table>

Changing the Current Directory

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

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

### Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><strong>pwd</strong></td>
<td>(Optional) Displays the name of your current default directory.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch# pwd</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td><strong>cd</strong> `{directory</td>
<td>filesystem:/[module]/[directory]}`</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch# cd slot0:</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td><strong>mkdir</strong> <code>{filesystem:/[module]/}[directory]</code></td>
<td>Creates a new directory. The <code>filesystem</code> argument is case sensitive. The <code>directory</code> argument is alphanumeric, case sensitive, and has a maximum of 64 characters.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> switch# mkdir test</td>
<td></td>
</tr>
</tbody>
</table>

Displaying Directory Contents

You can display the contents of a directory.
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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>dir [directory</td>
<td>Displays the directory contents. The default is the filesystem:[//module[///directory]] current working directory. The file system and directory names are case sensitive.</td>
</tr>
<tr>
<td></td>
<td>filesystem:[//module[///directory]]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example: switch# dir bootflash:test</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>dir [filesystem ://module[///directory]]</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td>Example: switch# dir bootflash:test</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>rmdir [filesystem ://module[///directory]]</td>
<td>Deletes a directory. The file system and directory name are case sensitive.</td>
</tr>
<tr>
<td></td>
<td>Example: switch# rmdir test</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
</tbody>
</table>
| `pwd`             | (Optional)  
| **Example:**      | Displays the name of your current default directory. |
| `switch# pwd`     |         |
| **Step 2**        |         |
| `dir [filesystem://module[/directory]]` | (Optional)  
| **Example:**      | Displays the contents of the current directory. The file system and directory name are case sensitive. |
| `switch# dir bootflash` |         |
| **Step 3**        |         |
| `move [filesystem://module[/directory/][source-filename]
  [filesystem://module[/directory/][source-filename]
| **Example:**      | The file system, module, and directory names are case sensitive. |
| `switch# move test old_tests/test1` |         |
| **Note**          |         |

Copying Files

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

Caution

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><code>pwd</code></td>
<td>(Optional) Displays the name of your current default directory.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# pwd</code></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td><code>dir [filesystem://module/][directory]</code></td>
<td>(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# dir bootflash</code></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>`copy [filesystem://module/][directory/]</td>
<td>directory/][source-filename]</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# copy test old_tests/test1</code></td>
<td></td>
</tr>
</tbody>
</table>

### Deleting Files

You can delete a file from a directory.

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><code>dir [filesystem://module/][directory]</code></td>
<td>(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# dir bootflash</code></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>`delete [filesystem://module/][directory/]</td>
<td>directory/][filename]`</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# delete test old_tests/test1</code></td>
<td></td>
</tr>
</tbody>
</table>
### Displaying File Contents

You can display the contents of a file.

**Procedure**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> show file filesystem://module//directory//filename</td>
<td>Displays the file contents.</td>
</tr>
<tr>
<td>Example: switch# show file bootflash:test-results</td>
<td></td>
</tr>
</tbody>
</table>

### Displaying File Checksums

You can display checksums to check the file integrity.

**Procedure**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> show file filesystem://module//directory//filename {cksum</td>
<td>md5sum}</td>
</tr>
<tr>
<td>Example: switch# show file bootflash:trunks2.cfg cksum</td>
<td></td>
</tr>
</tbody>
</table>

### Compressing and Uncompressing Files

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

**Procedure**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> dir filesystem://module//directory</td>
<td>(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.</td>
</tr>
<tr>
<td>Example: switch# dir bootflash:</td>
<td></td>
</tr>
</tbody>
</table>
### Displaying the Last Lines in a File

You can display the last lines of a file.

**Procedure**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>tail [filesystem://module/][directory/]filename [lines]</code></td>
<td>Displays the last lines of a file. The default number of lines is 10. The range is from 0 to 80 lines.</td>
</tr>
</tbody>
</table>
| **Example:**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>switch# tail ospf-gr.conf</code></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>pwd</code></td>
<td>(Optional) Displays the name of your current default directory.</td>
</tr>
<tr>
<td>Example: <code>pwd</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>cd filesystem://module//directory</code></td>
<td>(Optional) Changes the default directory.</td>
</tr>
<tr>
<td>Example: <code>cd bootflash:test_scripts</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>find filename-prefix</code></td>
<td>Finds all filenames in the default directory and in its subdirectories beginning with the filename prefix. The filename prefix is case sensitive.</td>
</tr>
<tr>
<td>Example: <code>find bgp_script</code></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1 tar create `{bootflash: | volatile:}archive-filename [absolute] [bz2-compress] [gz-compress] [remove] [uncompressed] [verbose] filename-list` | Creates an archive file and adds files to it. The filename is alphanumeric, not case sensitive, and has a maximum length of 240 characters. 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. 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:

  • For `bz2-compress`, the extension is .tar.bz2.
  • For `gz-compress`, the extension is .tar.gz.
  • For `uncompressed`, the extension is .tar.

The `remove` keyword specifies that the Cisco NX-OS software should delete the files from the file system after adding them to the archive. By default, the files are not deleted.

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 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Step 1 tar append `{bootflash:</td>
<td>volatile:}archive-filename`</td>
</tr>
</tbody>
</table>
### 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**

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

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

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

---

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

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

---

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.

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.

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
```
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-sf1ek9-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-sf1ek9-kickstart-mz.1.3.1.1.bin
41574014 Nov 21 16:34:47 2003 m9500-sf1ek9-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**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>pwd</code></td>
<td>(Optional) Displays the name of your current default directory.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# pwd</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>dir [filesystem :///module][directory]</code></td>
<td>(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.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# dir bootflash:test</code></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>rmdir [filesystem :///module][directory]</code></td>
<td>Deletes a directory. The file system and directory name are case sensitive.</td>
</tr>
<tr>
<td>Example:</td>
<td><code>switch# rmdir test</code></td>
<td></td>
</tr>
</tbody>
</table>
Displaying File Contents

This example shows how to display 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 shows how to display the contents of a file that resides 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
3b94707198aabe5f46459de10c281c
```

Compressing and Uncompressing Files

This example shows how to compress a file:

```
switch# dir
   1525899    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
   1525899    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 shows how to direct 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**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default filesystem</td>
<td>bootflash:</td>
</tr>
</tbody>
</table>

Additional References for File Systems

This section includes additional information related to the file systems.
# Related Documents for File Systems

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>Cisco NX-OS Licensing Guide</td>
</tr>
<tr>
<td>Command reference</td>
<td>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference Cisco Nexus 5000 Series NX-OS Command Reference</td>
</tr>
</tbody>
</table>
CHAPTER 9

Working with Configuration Files

This chapter contains the following sections:

- Finding Feature Information, page 111
- Information About Configuration Files, page 111
- Licensing Requirements for Configuration Files, page 112
- Managing Configuration Files, page 112
- Verifying the Device Configuration, page 121
- Examples of Working with Configuration Files, page 122
- Additional References for Configuration Files, page 122

Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information" chapter or the Feature History table below.

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 might 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 112
- Downloading the Startup Configuration From a Remote Server, on page 115

Licensing Requirements for Configuration Files

The following table shows the licensing requirements for this feature:

<table>
<thead>
<tr>
<th>Product</th>
<th>License Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco NX-OS</td>
<td>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 Cisco NX-OS Licensing Guide.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>(Optional)</td>
</tr>
<tr>
<td><code>show running-config</code></td>
<td>Displays the running configuration.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# show running-config</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Copies the running configuration to the</td>
</tr>
<tr>
<td><code>copy running-config startup-config</code></td>
<td>startup configuration.</td>
</tr>
<tr>
<td>Example:</td>
<td>switch# copy running-config startup-config</td>
</tr>
</tbody>
</table>

### 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-NX-OS devices.

#### Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Copies the running-configuration file to a</td>
</tr>
<tr>
<td><code>copy running-config</code></td>
<td>remote server.</td>
</tr>
<tr>
<td><code>scheme://server[/url]filename</code></td>
<td>For the <code>scheme</code> argument, you can enter</td>
</tr>
<tr>
<td>Example:</td>
<td><code>tftp:</code>, <code>ftp:</code>, <code>scp:</code>, or <code>sftp:</code>. The</td>
</tr>
<tr>
<td></td>
<td><code>server</code> argument is the address or name of</td>
</tr>
<tr>
<td></td>
<td>the remote server, and the <code>url</code> argument is</td>
</tr>
<tr>
<td></td>
<td>the path to the source file on the remote</td>
</tr>
<tr>
<td></td>
<td>server. The <code>server</code>, <code>url</code>, and <code>filename</code></td>
</tr>
<tr>
<td></td>
<td>arguments are case sensitive.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Copies the startup-configuration file to a</td>
</tr>
<tr>
<td><code>copy startup-config</code></td>
<td>remote server.</td>
</tr>
<tr>
<td><code>scheme://server[/url]filename</code></td>
<td>For the <code>scheme</code> argument, you can enter</td>
</tr>
<tr>
<td>Example:</td>
<td><code>tftp:</code>, <code>ftp:</code>, <code>scp:</code>, or <code>sftp:</code>. The</td>
</tr>
<tr>
<td></td>
<td><code>server</code> argument is the address or name of</td>
</tr>
<tr>
<td></td>
<td>the remote server, and the <code>url</code> argument is</td>
</tr>
<tr>
<td></td>
<td>the path to the source file on the remote</td>
</tr>
<tr>
<td></td>
<td>server. The <code>server</code>, <code>url</code>, and <code>filename</code></td>
</tr>
<tr>
<td></td>
<td>arguments are case sensitive.</td>
</tr>
</tbody>
</table>

This example shows how to copy the bootflash file using FTP:

```bash
switch# copy ftp: bootflash:
Enter source filename: n5000-uk9-kickstart.5.0.2.N2.1.bin
Warning: There is already a file existing with this name. Do you want to
overwrite (y/n)?[n] y
Enter vrf (If no input, current vrf 'default' is considered): management
Enter hostname for the ftp server: 172.1.1.10
Enter username: xxx
Password:
```
***** Transfer of file Completed Successfully *****
Note: Boot variable kickstart is set to bootflash:n5000-uk9-kickstart.5.0.2.N2.1.bin

**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 subnet 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**

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> write erase</td>
<td>Erases the startup configuration file.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>switch# write erase</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> reload</td>
<td>Reloading the Cisco NX-OS device.</td>
</tr>
<tr>
<td>Example:</td>
<td>Do not use the setup utility to configure the device.</td>
</tr>
<tr>
<td>switch# reload</td>
<td></td>
</tr>
<tr>
<td>This command will reboot the system.</td>
<td></td>
</tr>
<tr>
<td>(y/n)? [n] y</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Enter the password for &quot;admin&quot;:</td>
<td></td>
</tr>
<tr>
<td>&lt;password&gt;</td>
<td></td>
</tr>
<tr>
<td>Confirm the password for &quot;admin&quot;:</td>
<td></td>
</tr>
<tr>
<td>&lt;password&gt;</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Would you like to enter the basic configuration dialog (yes/no):</td>
<td></td>
</tr>
<tr>
<td>yes/no: y</td>
<td></td>
</tr>
<tr>
<td>switch#</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> copy scheme://server[/url]filename running-config</td>
<td>Downloads the running configuration file from a remote server.</td>
</tr>
<tr>
<td>Example:</td>
<td>For the <code>scheme</code> argument, you can enter <code>tftp</code>, <code>ftp</code>, <code>scp</code>, or <code>sftp</code>. The <code>server</code> argument is the address or name of the remote server, and the <code>url</code> argument is the path to the source file on the remote server.</td>
</tr>
<tr>
<td>switch# copy tftp://10.10.1.1/my-config running-config</td>
<td></td>
</tr>
</tbody>
</table>
### 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

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** | dir \{slot0: | usb1: | usb2:\}[directory/]
Example: switch# dir slot0:
(Optional) Displays the files on the external flash memory device. |
| **Step 2** | copy \{slot0: | usb1: | usb2:\}[directory/]filename running-config
Example: switch# copy slot0:dsn-config.cfg running-config
Copies the running configuration from an external flash memory device. The filename 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. |

Copying Configuration Files to an Internal File System

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

Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** | copy running-config [filesystem:][directory/][directory/][filename]
Copies the running-configuration file to internal memory. |
### 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.

**Procedure**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>write erase</code></td>
<td>Clears the current configuration of the switch.</td>
</tr>
<tr>
<td><code>switch# write erase</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>reload</code></td>
<td>Restarts the device. You will be prompted to provide a kickstart and system image file for the device to boot and run.</td>
</tr>
<tr>
<td><code>switch# reload</code></td>
<td></td>
</tr>
</tbody>
</table>

**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.

```
Step 2
Example:
switch# copy startup-config [filesystem:] [directory/][directory/][filename]
Example:
switch# copy startup-config bootflash:sw1-start-config.bak
```

The `filesystem`, `directory`, and `filename` arguments are case sensitive.

**Related Topics**

- Copying Files, on page 98
Purpose

Command or Action | Purpose
--- | ---
**Step 3** | 
| *copy configuration_file running-configuration* | Copies a previously saved configuration file to the running configuration.  
**Note** | The *configuration_file* filename argument is case sensitive.

**Step 4** | 
| *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

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

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

Clearing Inactive Configurations

You can clear inactive Quality of Service (QoS) and/or access control list (ACL) configurations.
## Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>show running-config</strong> <em>type inactive-if-config</em></td>
<td>(Optional) Displays any inactive ACL or QoS configurations. The values for the <em>type</em> argument are <em>aclmgr</em> and <em>ipqos</em>.</td>
</tr>
<tr>
<td></td>
<td><strong>clear inactive-config</strong> <em>policy</em></td>
<td>Clears inactive configurations. The values for the <em>policy</em> argument are <em>qos</em> and <em>acl</em>. The following describes the values:</td>
</tr>
<tr>
<td></td>
<td><strong>show inactive-if-config log</strong></td>
<td>(Optional) Displays the commands that were used to clear the inactive configurations.</td>
</tr>
</tbody>
</table>

### Example:

- **Step 1**:  
  ```
  # show running-config ipqos inactive-if-config
  ```

- **Step 2**:  
  ```
  # 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
  ```

- **Step 3**:  
  ```
  # show inactive-if-config log
  ```

### Verifying the Device Configuration

To verify the configuration after bootstrapping the device using POAP, use one of the following commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>show running-config</strong></td>
<td>Displays the running configuration.</td>
</tr>
<tr>
<td><strong>show startup-config</strong></td>
<td>Displays the startup configuration.</td>
</tr>
</tbody>
</table>

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

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

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.

**Note**

By default, the `reload` command reloads the device from a binary version of the startup configuration. Beginning with Cisco NX-OS 6.2(2), you can use the `reload ascii` command to copy an ASCII version of the configuration to the start up configuration when reloading the device.

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

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
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<td>Licensing</td>
<td>Cisco NX-OS Licensing Guide</td>
</tr>
<tr>
<td>Command reference</td>
<td>Cisco Nexus 5000 Series NX-OS Command Reference</td>
</tr>
</tbody>
</table>
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