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Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.0

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New and Changed Information

This chapter provides release-specific information for each new and changed feature in the *Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.0*. The latest version of this document is available at the following Cisco website:

http://www.cisco.com/en/US/docs/switches/datacenter/sw/4_0/nx-os/security/configuration/guide/sec_nx-os_config.html

To check for additional information about Cisco NX-OS Release 4.0, see the *Cisco NX-OS Release Notes* available at the following Cisco website:

http://www.cisco.com/en/US/docs/switches/datacenter/sw/4_0/nx-os/release/notes/401_nx-os_release_note.html

Table 1 summarizes the new and changed features for the *Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.0*, and tells you where they are documented.

Table 1 ***New and Changed Features for Release 4.0***

Feature	Description	Changed in Release	Where Documented
Filtering and searching utilities	Changes keywords from Linux style to Cisco NX-OS style.	4.0(3)	Chapter 3, “Understanding the CLI”
grep and egrep utilities	Changes keywords from Linux style to Cisco NX-OS style.	4.0(3)	Chapter 3, “Understanding the CLI”
Text echoing	Changed echo command syntax from Linux style keyword to Cisco NX-OS style keyword.	4.0(3)	Chapter 3, “Understanding the CLI”

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Preface

This document, *Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.0*, is intended to provide fundamental NX-OS configuration information to get your system up and running.

This preface includes the following topics:

- [Audience, page xi](#)
- [Document Organization, page xi](#)
- [Document Conventions, page xii](#)
- [Related Documentation, page xii](#)
- [Obtaining Documentation and Submitting a Service Request, page xiii](#)

Audience

This guide is for experienced network system users.

Document Organization

This document is organized into the following chapters:

Chapter and Title	Description
New and Changed Information	Describes the new and changed information for the new Cisco NX-OS software releases.
Chapter 1, “Overview”	Provides an overview of the features included in NX-OS.
Chapter 2, “Using the Cisco Nexus 7000 Series NX-OS Setup Utility”	Provides a flowchart for setting up the NX-OS.
Chapter 3, “Understanding the CLI”	Describes the command line interface including command modes, special characters, and keystrokes.
Chapter 5, “Basic Device Management”	Describes basic system management, including setting the clock and configuring a message of the day.
Chapter 6, “Using the Device File Systems, Directories, and Files”	Describe how to configure and manage file systems, directories, and files on an NX-OS device.
Chapter 7, “Working with Configuration Files”	Describes the configuration files and how to manage them.

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Document Conventions

Command descriptions use these conventions:

boldface font	Commands and keywords are in boldface.
<i>italic font</i>	Arguments for which you supply values are in italics.
{ }	Elements in braces are required choices.
[]	Elements in square brackets are optional.
x y z	Alternative, mutually exclusive elements are separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Screen examples use these conventions:

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

This document uses the following conventions for notes and cautions:



Note

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



Caution

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

Related Documentation

The following Cisco NX-OS documents are published on Cisco.com:

Release Notes

Cisco Nexus 7000 Series NX-OS Release Notes, Release 4.0

NX-OS Configuration Guides

Cisco Nexus 7000 Series NX-OS Getting Started with Virtual Device Contexts, Release 4.0

Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.0

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Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Layer 2 Switching Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Quality of Service Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Multicast Routing Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Software Upgrade Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS High Availability and Redundancy Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS XML Management Interface User Guide, Release 4.0
Cisco Nexus 7000 Series NX-OS System Messages Reference
Cisco Nexus 7000 Series NX-OS MIB Quick Reference

NX-OS Command References

Cisco Nexus 7000 Series NX-OS Command Reference Master Index, Release 4.0
Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Interfaces Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Quality of Service Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Unicast Routing Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Multicast Routing Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Security Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS Virtual Device Context Command Reference, Release 4.0
Cisco Nexus 7000 Series NX-OS System Management Command Reference, Release 4.0

Other Software Document

Cisco Nexus 7000 Series NX-OS Troubleshooting Guide, Release 4.0

Obtaining Documentation and Submitting a Service Request

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

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

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CHAPTER 1

Overview

This chapter provides an overview of the NX-OS software and includes the following sections:

- [Software Compatibility, page 1-1](#)
- [Serviceability, page 1-3](#)
- [Manageability, page 1-4](#)
- [Traffic Routing, Forwarding, and Management, page 1-6](#)
- [Quality of Service, page 1-7](#)
- [Network Security, page 1-8](#)
- [Licensing, page 1-9](#)
- [Supported Standards, page 1-9](#)

Software Compatibility

The Cisco NX-OS software interoperates with Cisco products that run any variant of the Cisco IOS software. The Cisco NX-OS software also interoperates with any networking operating system that conforms to the networking standards listed as supported in the “[Supported Standards](#)” section on [page 1-9](#).

This section includes the following topics:

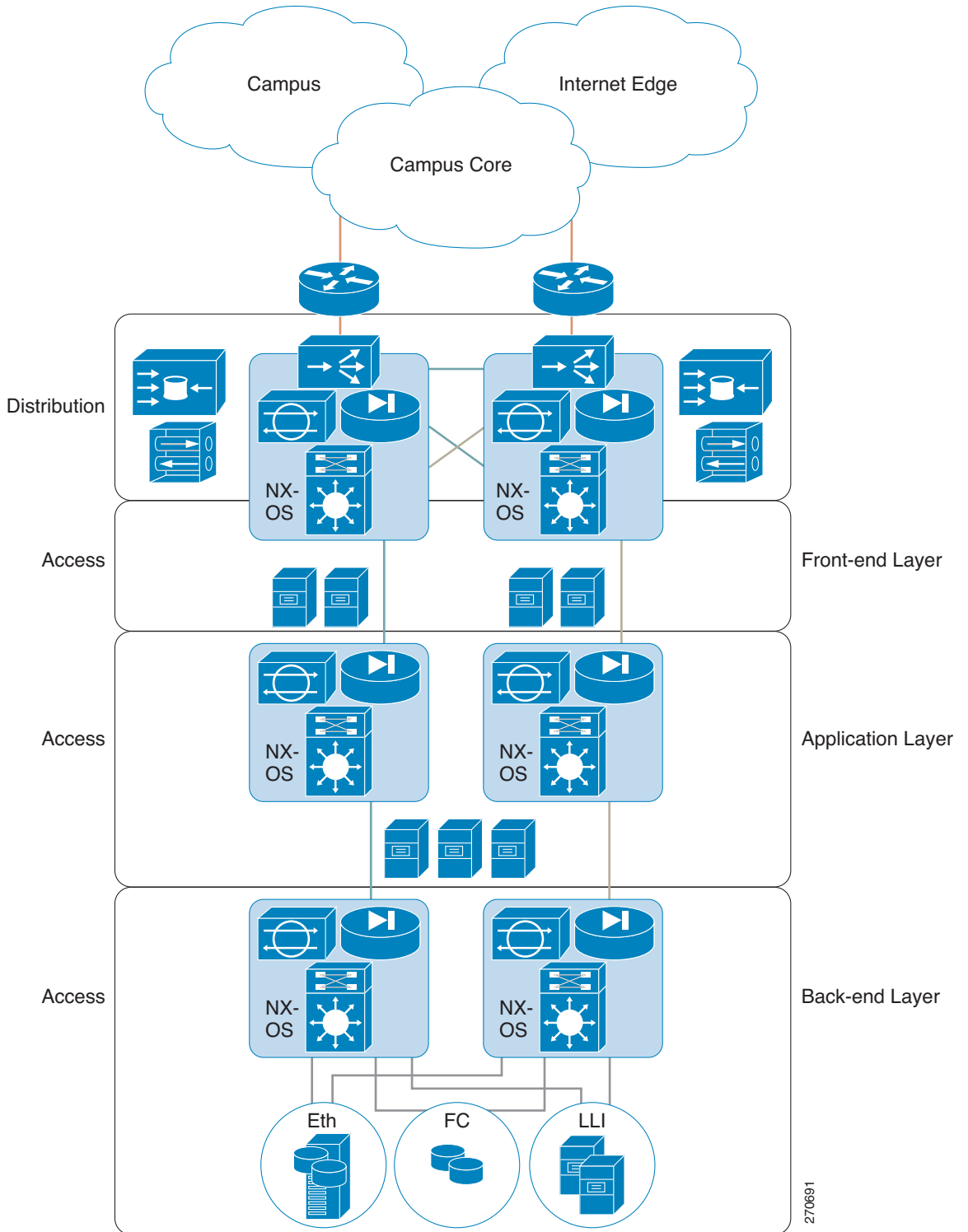
- [Common Software Throughout the Data Center, page 1-1](#)
- [Modular Software Design, page 1-3](#)
- [Virtual Device Contexts, page 1-3](#)

Common Software Throughout the Data Center

The Cisco NX-OS software provides a unified operating system that is designed to run all areas of the data center network including the LAN and Layer 4 through Layer 7 network services (see [Figure 1-1](#)).

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Figure 1-1 Cisco NX-OS in a Data Center



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Modular Software Design

The Cisco NX-OS software supports distributed multithreaded processing on symmetric multiprocessors (SMPs), multi-core CPUs, and distributed data module processors. The Cisco NX-OS software offloads computationally intensive tasks, such as hardware table programming, to dedicated processors distributed across the data modules. The modular processes are created on demand, each in a separate protected memory space. Processes are started and system resources are allocated only when you enable a feature. A real-time preemptive scheduler helps to ensure the timely processing of critical functions.

Virtual Device Contexts

The Cisco NX-OS software can segment system and hardware resources into virtual contexts that emulate virtual devices. Each virtual device context (VDC) has its own software processes, dedicated hardware resources (interfaces), and an independent management environment. With VDCs, you can consolidate separate networks onto a common infrastructure, which maintain the administrative boundary separation and fault isolation characteristics of physically separate networks, and provide many of the operational cost benefits of a single infrastructure. For more information, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*.

Serviceability

The Cisco NX-OS software has serviceability functions that allow the device to respond to network trends and events. These features help you with network planning and improving response times.

This section includes the following topics:

- [Switched Port Analyzer, page 1-3](#)
- [Ethanalyzer, page 1-4](#)
- [Call Home, page 1-4](#)
- [Online Diagnostics, page 1-4](#)
- [Embedded Event Manager, page 1-4](#)
- [NetFlow, page 1-4](#)

Switched Port Analyzer

The Switched Port Analyzer (SPAN) feature allows you to analyze all traffic between ports (called the SPAN source ports) by nonintrusively directing the SPAN session traffic to a SPAN destination port that has an external analyzer attached to it. For more information about SPAN, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

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Ethalyzer

Ethalyzer is a Cisco NX-OS protocol analyzer tool based on the Wireshark (formerly Ethereal) open source code. Ethalyzer is a command-line version of Wireshark for capturing and decoding packets. You can use Ethalyzer to troubleshoot your network and analyze the control-plane traffic. For more information about Ethalyzer, see the *Cisco Nexus 7000 Series NX-OS Troubleshooting Guide, Release 4.0*.

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. It offers alert grouping capabilities and customizable destination profiles. You can use this feature, 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). For more information about Call Home, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Online Diagnostics

Cisco generic online diagnostics (GOLD) 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. For information about configuring GOLD, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Embedded Event Manager

Cisco Embedded Event Manager (EEM) is a device and system management feature that helps you to customize behavior based on network events as they happen. For information about configuring EEM, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

NetFlow

The Cisco NX-OS NetFlow implementation supports version 5 and version 9 exports. It also supports the Flexible NetFlow configuration model and hardware-based Sampled NetFlow for enhanced scalability. For more information about NetFlow, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Manageability

This section includes the following topics:

- [Simple Network Management Protocol, page 1-5](#)
- [Configuration Verification and Rollback, page 1-5](#)

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- [Role-Based Access Control, page 1-5](#)
- [Connectivity Management Processor, page 1-5](#)
- [Cisco NX-OS Device Configuration Methods, page 1-5](#)

Simple Network Management Protocol

The Cisco NX-OS software is compliant with Simple Network Management Protocol (SNMP) version 1, version 2, and version 3. A large number of MIBs is supported. For more information about SNMP, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Configuration Verification and Rollback

The Cisco NX-OS software allows you to verify the consistency of a configuration and the availability of necessary hardware resources prior to committing the configuration. You can preconfigure a device and apply the verified configuration at a later time. Configurations also include checkpoints that allow you to roll back to a known good configuration as needed. For more information about rollback, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Role-Based Access Control

With role-based access control (RBAC), you can limit access to device operations by assigning roles to users. You can customize access and restrict it to the users who require it. For more information about RBAC, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

Connectivity Management Processor

The Cisco NX-OS software supports the use of a Connectivity Management Processor (CMP) for remote platform management. The CMP provides an out-of-band access channel to the NX-OS console. For more information about CMP, see the *Cisco Nexus 7000 Series Connectivity Management Processor Configuration Guide*.

Cisco NX-OS Device Configuration Methods

You can configure devices using the CLI from a Secure Shell (SSH) session or a Telnet session. SSH provides a secure connection to the device. The CLI configuration guides and command references are organized by feature. For more information, see the [Cisco NX-OS configuration guides](#) and the [Cisco NX-OS command references](#). For more information on SSH and Talent, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

You can also configure devices using the XML management interface, which is a programmatic method based on the NETCONF protocol that complements the CLI. For more information, see the *Cisco Nexus 7000 Series NX-OS XML Management Interface User Guide, Release 4.0*.

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Traffic Routing, Forwarding, and Management

This section includes the following topics:

- [Ethernet Switching, page 1-6](#)
- [IP Routing, page 1-6](#)
- [IP Services, page 1-7](#)
- [IP Multicast, page 1-7](#)

Ethernet Switching

The Cisco NX-OS software supports high-density, high-performance Ethernet systems and provides 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
- 16,000-subscriber VLANs
- IEEE 802.3ad link aggregation
- Private VLANs
- Cross-chassis private VLANs
- Unidirectional Link Detection (UDLD) in aggressive and standard modes

For more information, see the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0* and the *Cisco Nexus 7000 Series NX-OS Layer 2 Switching Configuration Guide, Release 4.0*.

IP Routing

The Cisco NX-OS software supports IP version 4 (IPv4) and IP version 6 (IPv6) and the following routing protocols:

- Open Shortest Path First (OSPF) Protocol Versions 2 (IPv4) and 3 (IPv6)
- Intermediate System-to-Intermediate System (IS-IS) Protocol
- Border Gateway Protocol (BGP)
- Enhanced Interior Gateway Routing Protocol (EIGRP)
- Routing Information Protocol Version 2 (RIPv2)

The NX-OS implementations of these protocols are fully compliant with the latest standards and include 4-byte autonomous system numbers (ASNs) and incremental shortest path first (SPF). All unicast protocols support Non-Stop Forwarding Graceful Restart (NSF-GR). All protocols support all interface types, including Ethernet interfaces, VLAN interfaces, subinterfaces, port channels, tunnel interfaces, and loopback interfaces.

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IP Services

The following IP services are available in the Cisco NX-OS software:

- Virtual Routing and Forwarding (VRF)
- Dynamic Host Configuration Protocol (DHCP) Helper
- Hot-Standby Routing Protocol (HSRP)
- Gateway Load Balancing Protocol (GLBP)
- Enhanced Object Tracking
- Policy-Based Routing (PBR)
- Unicast Graceful Restart for all protocols in IPv4 Unicast Graceful Restart for OPSFv3 in IPv6

For more information, see the *Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 4.0*.

IP Multicast

NX-OS Release 4.0 includes the following multicast protocols and functions:

- Protocol Independent Multicast (PIM) Version 2 (PIMv2)
- Source Specific Multicast (SSM)
- PIM sparse mode (Any-Source Multicast [ASM] for IPv4 and IPv6)



Note The Cisco NX-OS software does not support PIM dense mode.

- Bidirectional Protocol Independent Multicast (Bidir PIM)
- Anycast rendezvous point (Anycast-RP)
- Multicast NSF for IPv4 and IPv6
- RP-Discovery using bootstrap router (BSR) (Auto-RP and static)
- Internet Group Management Protocol (IGMP) Versions 1, 2, and 3 router role
- IGMPv2 host mode
- IGMP snooping
- Multicast Listener Discovery (MLD) Protocol Version 2 (for IPv6)
- Multicast Source Discovery Protocol (MSDP) (for IPv4 only)

For more information, see the *Cisco Nexus 7000 Series NX-OS Multicast Routing Configuration Guide, Release 4.0*.

Quality of Service

The Cisco NX-OS software supports Quality of Service (QoS) functions for classification, marking, queuing, policing, and scheduling. Modular QoS CLI (MQC) supports all QoS features. You can use MQC to provide uniform configurations across various Cisco platforms. For more information, see the *Cisco Nexus 7000 Series NX-OS Quality of Service Configuration Guide, Release 4.0*.

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Network Security

This section includes the following topics:

- [Cisco TrustSec, page 1-8](#)
- [Additional Network Security Features, page 1-8](#)

Cisco TrustSec

Cisco TrustSec security provides data confidentiality and integrity and supports standard IEEE 802.1AE link-layer cryptography with 128-bit Advanced Encryption Standard (AES) cryptography. Link-layer cryptography guarantees end-to-end data privacy while allowing the insertion of security service devices along the encrypted path. Cisco TrustSec uses security group access control lists (SGACLs), which are based on security group tags instead of IP addresses. SGACLs enable policies that are more concise and easier to manage due to their topology independence. For more information, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

Additional Network Security Features

In addition to Cisco TrustSec, Cisco NX-OS Release 4.0 includes the following security features:

- Data path intrusion detection system (IDS) for protocol conformance checks
- Control Plane Policing (CoPP)
- Message-digest algorithm 5 (MD5) routing protocol authentication
- Cisco integrated security features, including Dynamic Address Resolution Protocol (ARP) inspection (DAI), DHCP snooping, and IP Source Guard
- Authentication, authorization, and accounting (AAA)
- RADIUS and TACACS+
- SSH Protocol Version 2
- SNMPv3
- Port security
- IEEE 802.1X authentication
- Layer 2 Cisco Network Admission Control (NAC) LAN port IP
- Policies based on MAC and IPv4 addresses supported by named ACLs (port-based ACLs [PACLs], VLAN-based ACLs [VACLs], and router-based ACLs [RACLs])
- Traffic storm control (unicast, multicast, and broadcast)
- Unicast Reverse Path Forwarding (Unicast RPF)

For more information, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

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Licensing

The Cisco NX-OS licensing feature allows you to access premium features on the device after you install the appropriate license for that feature. Any feature not included in a license package is bundled with the Cisco NX-OS software and is provided to you at no extra charge.

You must purchase and install a license for each device.



Note

With the exception of the Cisco TrustSec feature, you can enable a feature without installing its license. The Cisco NX-OS software gives you a grace period during which time you can try out a feature before purchasing its license. You must install the Advanced Services license package to enable the Cisco TrustSec feature.

For detailed information about NX-OS Licensing, see the *Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0*.

For information about troubleshooting licensing issues, see the *Cisco Nexus 7000 Series NX-OS Troubleshooting Guide, Release 4.0*.

Supported Standards

Table 1-1 lists the IEEE compliance standards.

Table 1-1 IEEE Compliance

Standard	Description
802.1D	MAC Bridges
802.1s	Multiple Spanning Tree Protocol
802.1w	Rapid Spanning Tree Protocol
802.1AE	MAC Security (link layer cryptography)
802.3ad	Link aggregation with LACP
802.3ab	1000BaseT (10/100/1000 Ethernet over copper)
802.3ae	10 Gigabit Ethernet
802.1Q	VLAN Tagging
802.1p	Class of Service Tagging for Ethernet frames
802.1x	Port-based network access control

Table 1-2 lists the RFC compliance standards.

Table 1-2 RFC Compliance

Standard	Description
BGP	
RFC 1997	BGP Communities Attribute
RFC 2385	Protection of BGP Sessions via the TCP MD5 Signature Option

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Table 1-2 RFC Compliance (continued)

Standard	Description
RFC 2439	BGP Route flap damping
RFC 2519	A Framework for Inter-Domain Route Aggregation
RFC 2858	Multiprotocol Extensions for BGP-4
RFC 3065	Autonomous System Confederations for BGP
RFC 3392	Capabilities Advertisement with BGP-4
RFC 4271	BGP version 4
RFC 4273	BGP4 MIB - Definitions of Managed Objects for BGP-4
RFC 4456	BGP Route reflection
RFC 4486	Subcodes for BGP cease notification message
RFC 4724	Graceful Restart Mechanism for BGP
RFC 4893	BGP Support for Four-octet AS Number Space
ietf-draft	Bestpath transition avoidance (draft-ietf-idr-avoid-transition-05.txt)
ietf-draft	Peer table objects (draft-ietf-idr-bgp4-mib-15.txt)
ietf-draft	Dynamic Capability (draft-ietf-idr-dynamic-cap-03.txt)
OSPF	
RFC 2370	OSPF Opaque LSA Option
RFC 2328	OSPF Version 2
RFC 2740	OSPF for IPv6 (OSPF version 3)
RFC 3101	OSPF Not-So-Stubby-Area (NSSA) Option
RFC 3137	OSPF Stub Router Advertisement
RFC 3509	Alternative Implementations of OSPF Area Border Routers
RFC 3623	Graceful OSPF Restart
RFC 4750	OSPF Version 2 MIB
RIP	
RFC 1724	RIPv2 MIB extension
RFC 2082	RIPv2 MD5 Authentication
RFC 2453	RIP Version 2
IS-IS	
RFC 1142 (OSI 10589)	OSI 10589 Intermediate system to intermediate system intra-domain routing exchange protocol
RFC 1195	Use of OSI IS-IS for routing in TCP/IP and dual environment.
RFC 2763	Dynamic Hostname Exchange Mechanism for IS-IS
RFC 2966	Domain-wide Prefix Distribution with Two-Level IS-IS
RFC 2973	IS-IS Mesh Groups
RFC 3277	IS-IS Transient Blackhole Avoidance
RFC 3373	Three-Way Handshake for IS-IS Point-to-Point Adjacencies
RFC 3567	IS-IS Cryptographic Authentication

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Table 1-2 RFC Compliance (continued)

Standard	Description
RFC 3847	Restart Signaling for IS-IS
ietf-draft	Internet Draft Point-to-point operation over LAN in link-state routing protocols (draft-ietf-isis-igp-p2p-over-lan-06.txt)
IP Services	
RFC 768	UDP
RFC 783	TFTP
RFC 791	IP
RFC 792	ICMP
RFC 793	TCP
RFC 826	ARP
RFC 854	Telnet
RFC 959	FTP
RFC 1027	Proxy ARP
RFC 1305	NTP v3
RFC 1519	CIDR
RFC 1542	BootP relay
RFC 1591	DNS client
RFC 1812	IPv4 routers
RFC 2131	DHCP Helper
RFC 2338	VRRP
RFC 2784	Generic Routing Encapsulation (GRE)
IP-Multicast	
RFC 2236	Internet Group Management Protocol, Version 2
RFC 2710	Multicast Listener Discovery (MLD) for IPv6
RFC 3376	Internet Group Management Protocol, Version 3
RFC 3446	Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)
RFC 3569	An Overview of Source-Specific Multicast (SSM)
RFC 3618	Multicast Source Discovery Protocol (MSDP)
RFC 3810	Multicast Listener Discovery Version 2 (MLDv2) for IPv6
RFC 4601	ASM - Sparse Mode (PIM-SM): Protocol Specification (Revised)
RFC 4607	Source-Specific Multicast for IP
RFC 4610	Anycast-RP Using Protocol Independent Multicast (PIM)
ietf-draft	Mtrace server functionality, to process mtrace-requests, draft-ietf-idmr-traceroute-ipm-07.txt
ietf-draft	Bi-directional Protocol Independent Multicast (BIDIR-PIM), draft-ietf-pim-bidir-09.txt

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CHAPTER 2

Using the Cisco Nexus 7000 Series NX-OS Setup Utility

This chapter describes how to set up the basic Cisco NX-OS configuration after you have installed the hardware.

This chapter includes the following sections:

- [Information About the Cisco NX-OS Setup Utility, page 2-1](#)
- [Prerequisites for the Setup Utility, page 2-3](#)
- [Setting Up Your Cisco NX-OS Device, page 2-3](#)
- [Where to Go Next, page 2-6](#)
- [Additional References, page 2-7](#)

Information About the Cisco NX-OS Setup Utility

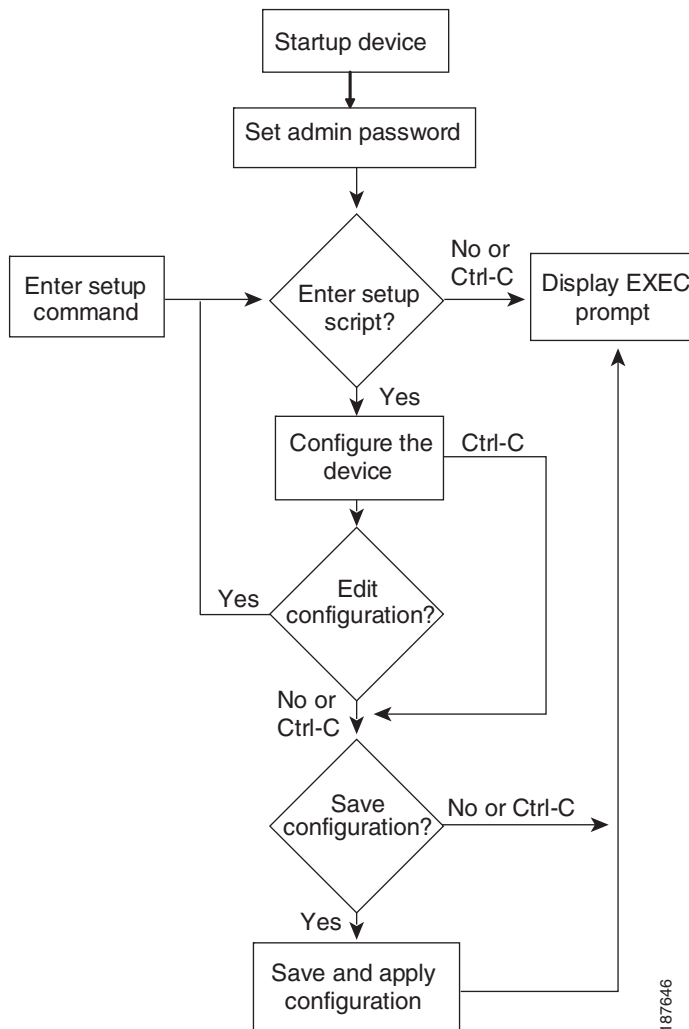
The Cisco NX-OS setup utility is an interactive command-line interface (CLI) mode that guides you through a basic (also called a startup) configuration of the system. The setup utility allows you to configure only enough connectivity for system management.

The setup utility allows you to build an initial configuration file using the System Configuration Dialog. The setup starts automatically when a device has no configuration file in NVRAM. The dialog guides you through initial configuration. After the file is created, you can use the CLI to perform additional configuration.

You can press **Ctrl-C** at any prompt to skip the remaining configuration options and proceed with what you have configured up to that point, except for the administrator password. If you want to skip answers to any questions, press **Enter**. If a default answer is not available (for example, an IP address), the setup utility uses what was previously configured and skips to the next question. [Figure 2-1](#) shows how to enter and exit the setup script.

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Figure 2-1 Setup Script Flow



You use the setup utility mainly for configuring the system initially, when no configuration is present. However, you can also use the setup utility at any time for basic device configuration by entering the **setup** command at the CLI in any command mode. The setup utility keeps the configured values when you skip steps in the script. For example, if you have already configured the mgmt0 interface, the setup utility does not change that configuration if you skip that step. However, if there is a default value for the step, the setup utility changes to configuration using that default, not the configured value. Be sure to carefully check the configuration changes before you save the configuration.



Note

Be sure to configure the IPv4 route, the default network IPv4 address, and the default gateway IPv4 address to enable SNMP access. If you enable IPv4 routing, the device uses the IPv4 route and the default network IPv4 address. If IPv4 routing is disabled, the device uses the default gateway IPv4 address.

The setup script only supports IPv4. For information on configuring IPv6, see the *Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 4.0*.

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Prerequisites for the Setup Utility

The setup utility has the following prerequisites:

- Have a password strategy for your network environment.
- Connect the console port on the supervisor module to the network. If you have dual supervisor modules, connect the console ports on both supervisor modules to the network.
- Connect the Ethernet management port on the supervisor module to the network. If you have dual supervisor modules, connect the Ethernet management ports on both supervisor modules to the network.

Setting Up Your Cisco NX-OS Device

To configure basic management of the Cisco NX-OS device using the setup utility, follow these steps:

Step 1 Power on the device.

Step 2 Enter the new password for the administrator.



Tip If a password is trivial (such as a short, easy-to-decipher password), your password configuration is rejected. Passwords are case-sensitive. Be sure to configure a strong password that are at least eight characters long, contain both upper- and lower-case letters, and contain numbers.

```
Enter the password for "admin": <password>
Confirm the password for "admin": <password>
```

```
---- Basic System Configuration Dialog VDC: 1 ----
```

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

Please register Cisco Nexus7000 Family devices promptly with your supplier. Failure to register may affect response times for initial service calls. Nexus7000 devices must be registered to receive entitled support services.

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

Step 3 Enter the setup mode by entering **yes**.

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

Step 4 Create additional accounts by entering **yes** (no is the default).

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



Note User login IDs must contain nonnumeric characters.

a. Enter the user login ID.

```
Enter the User login Id : user_login
```

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- b. Enter the user password.

```
Enter the password for "user1": user_password
Confirm the password for "user1": user_password
```

- c. Enter the default user role.

```
Enter the user role (network-operator|network-admin|vdc-operator|vdc-admin)
[network-operator]: default_user_role
```

For information on the default user roles, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

- Step 5** Configure an SNMP community string by entering **yes**.

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

For information on the SNMP, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

- Step 6** Enter a name for the device (the default name is switch).

```
Enter the switch name: switch_name
```

- Step 7** Enable the license grace period by entering **yes**.



Note Enabling the grace period allows users to test licensed features, except for Cisco TrustSec, which requires an Advanced Services license. The grace period is 120 days and starts when you first configure a licensed feature and stops when all features for a license are disabled. Once the grace period expires you must purchase the license to access the licensed features. For more information about licenses, see the *Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0*.

```
Enable license grace period? (yes/no) [n]: yes
```

- Step 8** Configure out-of-band management by entering **yes**. You can then enter the mgmt0 IPv4 address and subnet mask.



Note You can only configure IPv4 address in the setup utility. For information on configuring IPv6, see the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0*.

```
Continue with Out-of-band (mgmt0) management configuration? [yes/no]: yes
Mgmt0 IPv4 address: mgmt0_ip_address
Mgmt0 IPv4 netmask: mgmt0_subnet_mask
```

- Step 9** Configure the IPv4 default gateway (recommended) by entering **yes**. You can then enter its IP address.

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

- Step 10** Configure advanced IP options such as the static routes, default network, DNS, and domain name by entering **yes**.

```
Configure Advanced IP options (yes/no)? [n]: yes
```

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- Step 11** Configure a static route (recommended) by entering **yes**. You can then enter its destination prefix, destination prefix mask, and next hop IP address.

```
Configure static route: (yes/no) [y]: yes
Destination prefix: dest_prefix
Destination prefix mask: dest_mask
Next hop ip address: next_hop_address
```

- Step 12** Configure the default network (recommended) by entering **yes**. You can then enter its IPv4 address.



Note The default network IPv4 address is the same as the destination prefix in [Step 11](#).

```
Configure the default network: (yes/no) [y]: yes
Default network IP address [dest_prefix]: dest_prefix
```

- Step 13** Configure the DNS IPv4 address by entering **yes**. You can then enter the address.

```
Configure the DNS IP address? (yes/no) [y]: yes
DNS IP address: ipv4_address
```

- Step 14** Configure the default domain name by entering **yes**. You can then enter the name.

```
Configure the default domain name? (yes/no) [y]: yes
Default domain name: name
```

- Step 15** Enable the Telnet service by entering **yes**.

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

- Step 16** Enable the SSH service by entering **yes**. You can then enter the key type and number of key bits. For more information, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

```
Enable the ssh service? (yes/no) [y]: yes
Type of ssh key you would like to generate (dsa/rsa) : key_type
Number of key bits <768-2048> : number_of_bits
```

- Step 17** Configure the NTP server by entering **yes**. You can then enter its IP address. For more information, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

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

- Step 18** Specify a default interface layer (L2 or L3).

```
Configure default interface layer (L3/L2) [L3]: interface_layer
```

- Step 19** Enter the default switchport interface state (shutdown or no shutdown). A shutdown interface is in an administratively down state. For more information, see the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0*.

```
Configure default switchport interface state (shut/noshut) [shut]: default_state
```

- Step 20** Enter the best practices profile for control plane policing (CoPP). For more information, see the *Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

```
Configure best practices CoPP profile (strict/moderate/lenient/none) [strict]: policy
```

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- Step 21** Configure CMP for the current supervisor, and then enter the IP address, netmask, and default gateway IP by entering **yes**. For more information, see the *Cisco Nexus 7000 Series Connectivity Management Processor Configuration Guide*.

```
Configure CMP processor on current sup (slot 5)? (yes/no) [y]: yes
cmp-mgmt IPv4 address : IP_address
cmp-mgmt IPv4 netmask : net_mask
IPv4 address of the default gateway : default_gateway
```

- Step 22** Configure CMP for the redundant supervisor by entering **yes**. You can then enter the IP address, netmask, and default gateway IP.

```
Configure CMP processor on current sup (slot 6)? (yes/no) [y]: yes
cmp-mgmt IPv4 address : ip_address
cmp-mgmt IPv4 netmask : net_mask
IPv4 address of the default gateway : default_gateway
```

The system now summarizes the complete configuration and asks if you want to edit it.

- Step 23** Continue to the next step by entering **no**. If you enter **yes**, the setup utility returns to [Step 3](#) and repeat each step.

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

- Step 24** Use and save this configuration by entering **yes**.

```
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 part of the configuration the next time the device reboots. Type **yes** to save the new configuration. This ensures that the boot variables for the kickstart and system images are also automatically configured.



Note

You can reenter the setup utility at any time using the **setup** command in any command mode.

Where to Go Next

To become more familiar with the CLI, continue to [Chapter 3, “Understanding the CLI.”](#)

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Additional References

For additional information related to implementing Feature-1, see the following sections:

- [Related Documents, page 2-7](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>
CMP	<i>Cisco Nexus 7000 Series Connectivity Management Processor Configuration Guide</i>
SSH and Telnet	<i>Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0</i>
User roles	<i>Cisco Nexus 7000 Series NX-OS Security Configuration Guide, Release 4.0</i>
IPv4 and IPv6	<i>Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0</i>
SNMP and NTP	<i>Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0</i>

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CHAPTER 3

Understanding the CLI

This chapter describes the Cisco NX-OS software CLI.

This chapter includes the following sections:

- [Information About the CLI Prompt, page 3-1](#)
- [Command Modes, page 3-2](#)
- [Special Characters, page 3-7](#)
- [Keystroke Shortcuts, page 3-7](#)
- [Abbreviating Commands, page 3-9](#)
- [Identifying Your Location in the Command Hierarchy, page 3-9](#)
- [Using the no Form of a Command, page 3-10](#)
- [Configuring CLI Variables, page 3-11](#)
- [Command Scripts, page 3-14](#)
- [Context-Sensitive Help, page 3-16](#)
- [Understanding Regular Expressions, page 3-17](#)
- [Searching and Filtering show Command Output, page 3-20](#)
- [BIOS Loader> Prompt, page 3-23](#)
- [Examples Using the CLI, page 3-23](#)
- [Additional References, page 3-26](#)

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 (see [Example 3-1](#)).

Example 3-1 Initial CLI Prompt

```
User Access Verification
login: admin
Password: <password>
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2008, Cisco Systems, Inc. All rights reserved.
```

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switch#

You can change the default device hostname (see the “[Changing the Device Hostname](#)” section on [page 5-5](#)).

From the CLI prompt, you can do the following:

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

Command Modes

This section includes the following topics:

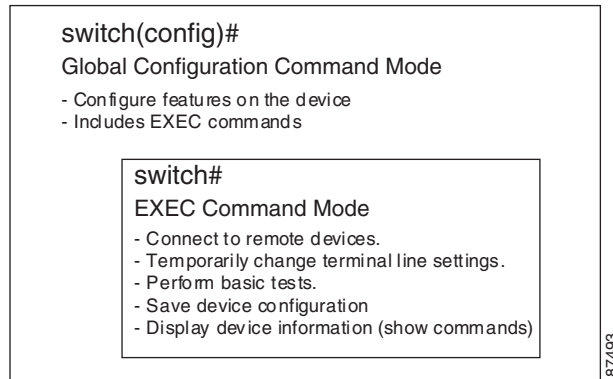
- [About Command Modes, page 3-2](#)
- [EXEC Command Mode, page 3-3](#)
- [Global Configuration Command Mode, page 3-3](#)
- [Interface Configuration Command Mode, page 3-3](#)
- [Subinterface Configuration Command Mode, page 3-4](#)
- [Exiting a Configuration Command Mode, page 3-5](#)
- [Command Mode Summary, page 3-6](#)

About Command Modes

The Cisco NX-OS CLI is divided into command modes, which define the actions available to the user. Command modes are “nested” and must be accessed in sequence. As you navigate from one command mode to another, an increasingly larger set of commands become available. All commands in a higher command mode are accessible from lower command modes. For example, the **show** commands are available from any configuration command mode. [Figure 3-1](#) shows how command access builds from EXEC mode to global configuration mode.

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Figure 3-1 Command Modes



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 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 “global” 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.

To access the global configuration mode, follow this step:

	Command	Purpose
Step 1	configure terminal	Enters global configuration mode.
	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 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0*.

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For more information about interface commands, see the *Cisco Nexus 7000 Series NX-OS Interfaces Command Reference, Release 4.0*.

SUMMARY STEPS

1. **configure terminal**
2. **interface type number**

DETAILED STEPS

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

Subinterface Configuration Command Mode

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

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

For more information about configuring subinterfaces, see the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0*.

For more information about subinterface commands, see the *Cisco Nexus 7000 Series NX-OS Interfaces Command Reference, Release 4.0*.

SUMMARY STEPS

1. **configure terminal**
2. **interface type number.subint**


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DETAILED STEPS

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

Exiting a Configuration Command Mode

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

Command	Purpose
exit Example: switch(config-if)# exit switch(config)#	Exits from the current configuration command mode and return to the previous configuration command mode.
end Example: switch(config)# end switch#	Exits from the configuration command mode and returns to EXEC mode.
Ctrl-z Example: switch(config)# ^z switch#	Exits the current configuration command mode and returns to EXEC mode.  Caution If you use Ctrl-Z at the end of a command line in which a valid command has been typed, the CLI adds the command to the running configuration file. We recommend that you exit a configuration mode using the exit or end command.

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Command Mode Summary

Table 3-1 summarizes information about the main command modes.

Table 3-1 Command Mode Summary

Mode	Access Method	Prompt	Exit Method
EXEC	From the login prompt, enter your username and password.	switch#	To exit to the login prompt, use the exit command.
Global configuration	From EXEC mode, use the configure terminal command.	switch(config)#	To exit to EXEC mode, use the end or exit command or press Ctrl-Z .
Interface configuration	From global configuration mode, use an interface command and specify an interface with an interface command.	switch(config-if)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the end command or press Ctrl-Z .
Subinterface configuration	From global configuration mode, specify a subinterface with an interface command.	switch(config-subif)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the end command or press Ctrl-Z .
VDC configuration	From global configuration mode, use the vdc command and specify a VDC name.	switch(config-vdc)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the end command or press Ctrl-Z .
VRF configuration	From global configuration mode, use the vrf command and specify a routing protocol.	switch(config-vrf)#	To exit to global configuration mode, use the exit command. To exit to EXEC mode, use the end command or press Ctrl-Z .
EXEC for a nondefault VDC	From EXEC mode, use the switchto vdc command and specify a VDC.	switch-vdc2#	To exit to the default VDC, use the exit command or the switchback command.
EXEC for a nondefault VRF	From EXEC mode, use the routing-context vrf command and specify a VRF.	switch%red#	To exit to the default VRF, use the routing-context vrf default command.

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Special Characters

Table 3-2 lists the characters that have special meaning in Cisco NX-OS text strings and should be used only in regular expressions or other special contexts.

Table 3-2 Special Characters

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

Keystroke Shortcuts

Table 3-3 lists command key combinations that can be used in both EXEC and configuration modes:

Table 3-3 Keystroke Shortcuts

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

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Table 3-3 Keystroke Shortcuts (continued)

Key(s)	Description
Ctrl-U	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-V	Removes any special meaning for the following keystroke. For example, press Ctrl-V before entering a question mark (?) in a regular expression.
Ctrl-W	Deletes the word to the left of the cursor.
Ctrl-X, H	Lists the history of commands you have entered. When using this key combination, press and release the Ctrl and X keys together before pressing H.
Ctrl-Y	Recalls the most recent entry in the buffer (press keys simultaneously).
Ctrl-Z	Ends a configuration session, and returns you to EXEC mode. When used at the end of a command line in which a valid command has been typed, the resulting configuration is first added to the running configuration file.
↑	Displays the previous command in the command history.
↓	Displays the next command in the command history.
→ ←	Moves your cursor through the command history, either forward or backwards, to locate a command string.
?	Displays a list of available commands.
Tab	<p>Completes the word for you after entering the first characters of the word, and then pressing the Tab key. All options that match are presented.</p> <p>Use tabs to complete the following items:</p> <ul style="list-style-type: none"> • Command names • Scheme names in the file system • Server names in the file system • Filenames in the file system <p>Example</p> <pre>switch(config)# xm<Tab> switch(config)# xml <Tab> switch(config)# xml server</pre> <p>Example</p> <pre>switch(config)# c<Tab> callhome class-map clock cts cdp cli control-plane</pre> <p>switch(config)# cl<Tab> class-map cli clock switch(config)# cla<Tab> switch(config)# class-map</p>

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Table 3-3 Keystroke Shortcuts (continued)

Key(s)	Description
	<p>Example</p> <pre>switch# cd bootflash:<Tab> bootflash: bootflash://sup-1/ bootflash://sup-remote/ bootflash://sup-2/ bootflash:/// bootflash://sup-standby/ bootflash://sup-standby/ bootflash://module-5/ bootflash://module-5/ bootflash://module-6/ bootflash://module-6/ bootflash://sup-local/</pre> <p>Example</p> <pre>switch# cd bootflash://mo<Tab> bootflash://module-5/ bootflash://module-6/ cvswitch# cd bootflash://module-</pre>

Abbreviating Commands

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

Table 3-4 lists examples of command abbreviations.

Table 3-4 Examples of Command Abbreviations

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

Identifying Your Location in the Command Hierarchy

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

SUMMARY STEPS

1. where detail

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DETAILED STEPS

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

Using the no Form of a Command

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

This example shows how to disable a feature:

```
switch# configure terminal
switch(config)# feature bgp
switch(config)# no feature bgp
```

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)# role feature-group name security
switch(config-role-featuregrp)# feature aaa
switch(config-role-featuregrp)# feature radius
switch(config-role-featuregrp)# feature tacacs
switch(config-role-featuregrp)# exit
switch(config)# show role feature-group

feature group: L3
feature: router-bgp
feature: router-eigrp
feature: router-isis
feature: router-ospf
feature: router-rip

feature group: security
feature: aaa
feature: radius
feature: tacacs
switch(config)# no role feature-group name security
```

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```
switch(config)# show role feature-group
```

```
feature group: L3
feature: router-bgp
feature: router-eigrp
feature: router-isis
feature: router-ospf
feature: router-rip
```

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

```
switch# system standby manual-boot
system standby manual-boot option enabled
switch# system no standby manual-boot
system standby manual-boot option disabled
```

Configuring CLI Variables

This section includes the following topics:

- [About CLI Variables, page 3-11](#)
- [Configuring CLI Variables, page 3-11](#)

About CLI Variables

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

You can use 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 (see the [“Running a Command Script” section on page 3-14](#)).

CLI variables have the following characteristics:

- Cannot have nested references through another variable
- Can exist only for the current session

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



Note

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

Configuring CLI 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)$.

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SUMMARY STEPS

1. `cli var name` *variable-name* *variable-text*
2. `show cli variables`

DETAILED STEPS

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

Command Aliases

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



Note

The Cisco NX-OS software provides one default alias, **alias**, which displays all user-defined aliases.

This section includes the following topics:

- [About Command Aliases, page 3-12](#)
- [Defining Command Aliases, page 3-13](#)

About Command Aliases

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.
- You cannot delete or change the default command alias **alias**, which aliases the **show cli alias** command.
- 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.

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- 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.

Defining Command Aliases

You can define command aliases for commonly used commands.

SUMMARY STEPS

1. **configure terminal**
2. **cli alias name** *alias-name alias-text*
3. **exit**
4. **alias**
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	cli alias name <i>alias-name alias-text</i> Example: switch(config)# cli alias name ethint interface ethernet	Configures the command alias. The alias name is an alphanumeric string that is not case sensitive and must begin with an alphabetic character. The maximum length is 30 characters.
Step 3	exit Example: switch(config)# exit switch#	Exits global configuration mode.
Step 4	alias Example: switch# alias	(Optional) Displays the command alias configuration.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

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Command Scripts

You can create scripts of commands to perform multiple tasks.

This section includes the following topics:

- [Running a Command Script, page 3-14](#)
- [Echoing Information to the Terminal, page 3-14](#)
- [Echoing Information to the Terminal, page 3-14](#)

Running a Command Script

You can create a list of command in a file and execute them from the CLI. You can use CLI variables in the command script (see the “[Configuring CLI Variables](#)” section on page 3-11).



Note

You cannot create the script files at the CLI prompt. You can create the script file on a remote device and copy it to the Cisco NX-OS device. This section assumes that the script file resides in the bootflash:.

SUMMARY STEPS

1. `run-script filename`

DETAILED STEPS

	Command	Purpose
Step 1	<code>run-script filename</code> Example: <code>switch# run-script testfile</code>	Executes the commands in the file.

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. [Table 3-5](#) lists the formatting options you can insert in the text.

Table 3-5 *Formatting Options for the echo Command*

Formatting Option	Description
<code>\b</code>	Back spaces.
<code>\c</code>	Removes the new line character at the end of the text string.
<code>\f</code>	Inserts a form feed character.
<code>\n</code>	Inserts a new line character.
<code>\r</code>	Returns to the beginning of the text line.
<code>\t</code>	Inserts a horizontal tab character.

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Table 3-5 Formatting Options for the echo Command (continued)

Formatting Option	Description
\v	Inserts a vertical tab character.
\\	Displays a backslash character.
\nnn	Displays the corresponding ASCII octal character.

SUMMARY STEPS

1. `echo [-e] [text]`
`echo [backslash-interpret] [text]`

DETAILED STEPS

	Command	Purpose
Step 1	<code>echo [-e] [text]</code> Example: <pre>switch# echo This is a test. This is a test.</pre>	Displays information on the terminal. In Cisco NX-OS Release 4.0(2) and earlier releases, the -e keyword indicates that the text string contains formatting options (see Table 3-5). The <i>text</i> argument is alphanumeric, case sensitive and can contain blanks. The maximum length is 200 characters. The default is a blank line.
	<code>echo [backslash-interpret] [text]</code> Example: <pre>switch# echo This is a test. This is a test.</pre>	Displays information on the terminal. In Cisco NX-OS Release 4.0(3) and later releases, the backslash-interpret keyword indicates that the text string contains formatting options (see Table 3-5). The <i>text</i> argument is alphanumeric, case sensitive and can contain blanks. The maximum length is 200 characters. The default is a blank line.

Delaying Command Action

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

SUMMARY STEPS

1. `sleep seconds`

DETAILED STEPS

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

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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.

Table 3-6 shows how to use error isolation and context-sensitive help when setting the clock.

Table 3-6 Context-Sensitive Help Example

	Command	Purpose
Step 1	<p>clock ?</p> <p>Example: switch# clock ? set HH:MM:SS Current Time switch# clock</p>	<p>Displays the command syntax for the clock command in EXEC mode.</p> <p>The switch output shows that the set keyword is required for using the clock command.</p>
Step 2	<p>clock set ?</p> <p>Example: switch# clock set ? WORD HH:MM:SS Current Time switch# clock set</p>	<p>Displays the command syntax for setting the time.</p> <p>The help output shows that the current time is required for setting the clock and how to format the time.</p>
Step 3	<p>clock set HH:MM:SS</p> <p>Example: switch# clock set 13:32:00<CR> % Incomplete command switch#</p>	<p>Adds the current time.</p> <p>Switch indicates the command is incomplete.</p>
Step 4	<p>Ctrl-P or the Up Arrow</p> <p>Example: switch# <Ctrl-P> switch# clock set 13:32:00</p>	<p>Displays the previous command that you entered.</p>
Step 5	<p>clock set HH:MM:SS ?</p> <p>Example: switch# clock set 13:32:00 ? <1-31> Day of the month switch# clock set 13:32:00</p>	<p>Displays the additional arguments for the clock set command.</p>

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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. Table 3-7 lists the keyboard characters that have special meanings.

Table 3-7 Special Characters with Special Meaning

Character	Special Meaning
.	Matches any single character, including white space.
*	Matches 0 or more sequences of the pattern.
+	Matches 1 or more sequences of the pattern.
?	Matches 0 or 1 occurrences of the pattern.
^	Matches the beginning of the string.
\$	Matches the end of the string.
_ (underscore)	Matches a comma (,), left brace ({), right brace (}), left parenthesis ((), right parenthesis ()), the beginning of the string, the end of the string, or a space.

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:

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

Single-Character Patterns

The simplest regular expression is a single character that matches the same single character in the command output. You can use any letter (A–Z, a–z) or digit (0–9) as a single-character pattern. You can specify a range of single-character patterns to match against command output.

To specify a range of single-character patterns, enclose the single-character patterns in square brackets ([]). For example, you can create a regular expression that matches a string containing one of the following letters: a, e, i, o, or u. Only one of these characters must exist in the string for pattern matching to succeed. In this case, [aeiou] matches any one of the five vowels of the lowercase alphabet, while [abcdABCD] matches any one of the first four letters of the lowercase or uppercase alphabet. You can simplify ranges by entering only the endpoints of the range separated by a dash (-). Also, you can include a caret (^) at the start of the range to match strings that do not include the range of characters.

Table 3-8 shows examples of regular expressions with ranges of characters.

Table 3-8 Example Expressions with Ranges of Characters

Example	Description
[a-dA-D]	Matches the characters abcdABCD.
[a-dA-D-]	Matches the characters abcdABCD and hyphen (-).
[a-dA-D-\]]	Matches the characters abcdABDC, hyphen (-), and right square bracket (]).
[^a-dqsv]	Matches any letter except a-dqsv.
[^\]]d]	Matches anything except a right square bracket (]) or the letter d.

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Multiple-Character Patterns

You can also specify a pattern containing 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 shown in [Table 3-9](#).

Table 3-9 Special Characters Used for Anchoring

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

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



Note

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

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Searching and Filtering show Command Output

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

```
switch# show running-config | ?
  egrep      Egrep
   grep      Grep
  head      Stream Editor
  last      Display last lines
  less      Stream Editor
  no-more    Turn-off pagination for command output
  sed       Stream Editor
  wc        Count words, lines, characters
  begin     Begin with the line that matches
  count     Count number of lines
  exclude   Exclude lines that match
  include   Include lines that match
```

Filtering and Searching Keywords

The Cisco NX-OS CLI provides a set of keywords that you can use with the **show** commands to search and filter the command output (see [Table 3-10](#)).

Table 3-10 Filtering and Searching Keywords

Keyword Syntax	Description	Example
begin <i>string</i>	Starts displaying at the line that contains text that matches the search string. The search string is case sensitive.	show version begin Hardware
count	Displays the number of lines in the command output.	show running-config count
exclude <i>string</i>	Displays all lines that do not include the search string. The search string is case sensitive.	show interface brief exclude down
head [-n <i>lines</i>]	In Cisco NX-OS Release 4.0(2) and earlier releases, displays the beginning of the output for the number of lines specified. The default number of lines is 10.	show logging logfile head -n 50
head [<i>lines lines</i>]	In Cisco NX-OS Release 4.0(3) and later releases, displays the beginning of the output for the number of lines specified. The default number of lines is 10.	show logging logfile head lines 50
include <i>string</i>	Displays all lines that include the search string. The search string is case sensitive.	show interface brief include up
last [<i>lines</i>]	Displays the end of the output for the number of lines specified. The default number of lines is 10.	show logging logfile last lines 50

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Table 3-10 Filtering and Searching Keywords (continued)

Keyword Syntax	Description	Example
no-more	Displays all the output without stopping at the end of the screen with the <code>—More—</code> prompt.	show interface brief no-more
wc {-c -l -w}	In Cisco NX-OS Release 4.0(2) and earlier releases, displays counts of characters, lines, or words.	show file testoutput wc -c
wc {bytes lines words}	In Cisco NX-OS Release 4.0(3) and later releases, displays counts of characters, lines, or words.	show file testoutput wc bytes

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 as follows:

```
{grep | egrep} [-A lines] [-B lines] [-c] [-i] [-n] [-v] [-w] [-x] expression
```

Table 3-11 describes the grep and egrep parameters.

Table 3-11 grep and egrep Parameters in Cisco NX-OS 4.0(2) and Earlier Releases

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

Table 3-12 grep and egrep Parameters in Cisco NX-OS 4.0(3) and Later Releases

Parameter	Description
count	Displays only the total count of matched lines.
ignore-case	Specifies to ignore the case difference in matched lines.
invert-match	Displays lines that do not match the expression.
line-exp	Displays only lines that match a complete line.
line-number	Specifies to display the line number before each matched line.

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Table 3-12 *grep and egrep Parameters in Cisco NX-OS 4.0(3) and Later Releases (continued)*

Parameter	Description
next lines	Specifies the number of lines to display after a matched line. The default is 0. The range is from 1 to 999.
prev lines	Specifies the number of lines to display before a matched line. The default is 0. The range is from 1 to 999.
word-exp	Displays only lines that match a complete word.
<i>expression</i>	Specifies a regular expression for searching the output.

less Utility

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

sed Utility

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

sed command

The *command* argument contains sed utility commands.

Searching and Filtering from the --More-- Prompt

You can search and filter output from --More-- prompts. To search and filter the **show** command output from a --More-- prompt, use the commands described in [Table 3-13](#).

Table 3-13 *--More-- Prompt Commands*

Commands	Description
<i>[lines]</i> <space>	Displays output lines for either the specified number of lines or the current screen size.
<i>[lines]</i> z	Displays output lines for either the specified number of lines or the current screen size. If you use the <i>lines</i> argument, that value becomes the new default screen size.
<i>[lines]</i> <return>	Displays output lines for either the specified number of lines or the current default number of lines. The initial default is 1 line. If you use the optional <i>lines</i> argument, that value becomes the new default number of lines to display for this command.
<i>[lines]</i> d or <i>[lines]</i> Ctrl+shift+D	Scrolls through output lines for either the specified number of lines or the current default number of lines. The initial default is 11 lines. If you use the optional <i>lines</i> argument, that value becomes the new default number of lines to display for this command.
q or Q or Ctrl-C	Exits the --More-- prompt.

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Table 3-13 --More-- Prompt Commands (continued)

Commands	Description
[lines]s	Skips forward in the output for either the specified number of lines or the current default number of lines and displays a screen of lines. The default is 1 line.
[lines]f	Skips forward in the output for either the specified number of screens or the current default number of screens and displays a screen of lines. The default is 1 screen.
=	Displays the current line number.
[count]/expression	Skips to the line that matches the regular expression and displays a screen of output lines. Use the optional <i>count</i> argument to search for lines with multiple occurrences of the expression. This command sets the current regular expression that you can use in other commands.
[count]n	Skips to the next line that matches the current regular expression and displays a screen of output lines. Use the optional <i>count</i> argument to skip past matches.
{! :!} shell-cmd	Executes the command specified in the <i>shell-cmd</i> argument in a subshell.
.	Repeats the previous command.

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 7000 Series NX-OS Troubleshooting Guide, Release 4.0*.

Examples Using the CLI

This section includes the following topics:

- [Defining Command Aliases, page 3-23](#)
- [Using CLI Session Variables, page 3-24](#)
- [Using the System-Defined Timestamp Variable, page 3-24](#)
- [Running a Command Script, page 3-25](#)

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
```

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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.4da
c)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA
  auto-duplex, auto-speed
  Beacon is turned off
  Auto-Negotiation is turned on
  Input flow-control is off, output flow-control is off
  Auto-mdix is turned on
  Switchport monitor is off
  Last clearing of "show interface" counters never
  5 minute input rate 0 bytes/sec, 0 packets/sec
  5 minute output rate 0 bytes/sec, 0 packets/sec
  L3 in Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
  L3 out Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
  Rx
    0 input packets 0 unicast packets 0 multicast packets
    0 broadcast packets 0 jumbo packets 0 storm suppression packets
    0 bytes
  Tx
    0 output packets 0 multicast packets
    0 broadcast packets 0 jumbo packets
    0 bytes
    0 input error 0 short frame 0 watchdog
    0 no buffer 0 runt 0 CRC 0 ecc
    0 overrun 0 underrun 0 ignored 0 bad etype drop
    0 bad proto drop 0 if down drop 0 input with dribble
    0 input discard
    0 output error 0 collision 0 deferred
    0 late collision 0 lost carrier 0 no carrier
    0 babble
    0 Rx pause 0 Tx pause 0 reset
```

Using the System-Defined Timestamp Variable

This example uses `$(TIMESTAMP)` when redirecting `show` command output to a file.

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

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

Running a Command Script

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

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

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

```
switch# run-script testfile
`configure terminal`
`interface ethernet 2/1`
`no shutdown`
`end`
`show interface ethernet 2/1 `
Ethernet2/1 is down (Link not connected)
  Hardware is 10/100/1000 Ethernet, address is 0019.076c.4dac (bia 0019.076c.4dac)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA
  Port mode is trunk
  auto-duplex, auto-speed
  Beacon is turned off
  Auto-Negotiation is turned on
  Input flow-control is off, output flow-control is off
  Auto-mdix is turned on
  Switchport monitor is off
  Last clearing of "show interface" counters 1d26.2uh
  5 minute input rate 0 bytes/sec, 0 packets/sec
  5 minute output rate 0 bytes/sec, 0 packets/sec
Rx
  0 input packets 0 unicast packets 0 multicast packets
  0 broadcast packets 0 jumbo packets 0 storm suppression packets
  0 bytes
Tx
  0 output packets 0 multicast packets
  0 broadcast packets 0 jumbo packets
  0 bytes
  0 input error 0 short frame 0 watchdog
  0 no buffer 0 runt 0 CRC 0 ecc
  0 overrun 0 underrun 0 ignored 0 bad etype drop
  0 bad proto drop 0 if down drop 0 input with dribble
  0 input discard
  0 output error 0 collision 0 deferred
  0 late collision 0 lost carrier 0 no carrier
  0 babble
  0 Rx pause 0 Tx pause 0 reset
```

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Additional References

For additional information related to implementing Feature-1, see the following sections:

- [Related Documents, page 3-26](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>



CHAPTER 4

Configuring Terminal Settings and Sessions

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

This chapter includes the following sections:

- [Information About Terminal Settings and Sessions, page 4-1](#)
- [Licensing Requirements for Terminal Settings and Sessions, page 4-3](#)
- [Configuring the Terminal Settings, page 4-3](#)
- [Configuring the Console Port, page 4-4](#)
- [Configuring the COM1 Port, page 4-6](#)
- [Configuring Virtual Terminals, page 4-8](#)
- [Configuring Modem Connections, page 4-10](#)
- [Clearing Terminal Sessions, page 4-16](#)
- [Displaying Terminal and Session Information, page 4-16](#)
- [Default Settings, page 4-17](#)
- [Additional References, page 4-17](#)

Information About Terminal Settings and Sessions

This section includes the following topics:

- [Terminal Session Settings, page 4-2](#)
- [Console Port, page 4-2](#)
- [COM1 Port, page 4-2](#)
- [Virtual Terminals, page 4-2](#)
- [Modem Support, page 4-3](#)
- [Virtualization Support, page 4-3](#)

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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 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.

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Modem Support

You can connect a modem to the COM1 or console ports on the supervisor module. The following modems were tested on devices running the Cisco NX-OS software:

- MultiTech MT2834BA (<http://www.multitech.com/PRODUCTS/Families/MultiModemII/>)
- Hayes Accura V.92 (<http://www.hayesmicro.com/Products/accura-prod-v92.htm>)



Note

Do not connect a modem when the device is booting. Follow the procedure specified in the “[Initializing a Modem for a Powered-Up Device](#)” section on page 4-15.

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

- AT—Attention
- E0 (required)—No echo
- Q1—Result code on
- &D2—Normal data terminal ready (DTR) option
- &C1—Enable tracking the state of the data carrier
- S0=1—Pick up after one ring
- \015 (required)—Carriage return in octal

Virtualization Support

You can configure the COM1 and consoles ports on in the default VDC. You can configure terminal sessions and virtual terminals on both the default and nondefault VDCs. For more information on VDCs, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*.

Licensing Requirements for Terminal Settings and Sessions

The following table shows the licensing requirements for this feature:

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

Configuring the Terminal Settings

You can set the following terminal type and display characteristics for your terminal session:

- Terminal type
- Screen length
- Screen width

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- Inactive session timeout

**Note**

Any changes that you make to these settings exist only for the duration of the session.

SUMMARY STEPS

1. **terminal terminal-type** *type*
terminal length *lines*
terminal width *columns*
terminal session-timeout *minutes*
2. **show terminal**

DETAILED STEPS

	Command	Purpose
Step 1	terminal terminal-type <i>type</i> Example: switch# terminal terminal-type vt100	Sets the terminal type. The <i>terminal-type</i> string is case sensitive, must be a valid type (for example, vt100 or xterm), and has a maximum of 80 characters. The default type is ansi .
	terminal length <i>lines</i> Example: switch# terminal length 24	Sets the terminal length for displaying command output before pausing. The range is from 0 to 511 lines. Use 0 to not pause while displaying output. The initial default for the console is 0. The initial default for virtual terminal sessions is 31.
	terminal width <i>columns</i> Example: switch# terminal width 70	Sets the terminal width for displaying command output. The range is from 24 to 511 columns. The default is 80 characters.
	terminal session-timeout <i>minutes</i> Example: switch# terminal session-timeout 60	Sets the inactivity timeout for your terminal session. The range is from 0 to 525600 minutes (8760 hours). A value of 0 minutes disables the session timeout. The default is 0.
Step 2	show terminal Example: switch# show terminal	(Optional) Displays the terminal settings.

Configuring the Console Port

You can set the following characteristics for the console port:

- Data bits
- Inactive session timeout
- Parity

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- Speed
- Stop bits

BEFORE YOU BEGIN

Log in to the console port.

Ensure that you are in the default VDC.

SUMMARY STEPS

1. **configure terminal**
2. **line console**
3. **databits** *bits*
exec-timeout *minutes*
parity {*even* | *none* | *odd*}
speed {**300** | **1200** | **2400** | **4800** | **9600** | **38400** | **57600** | **115200**}
stopbits {**1** | **2**}
4. **exit**
5. **show line console**
6. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line console Example: switch# line console switch(config-console)#	Enters console configuration mode.

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

Configuring the 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.

Ensure that you are in the default VDC.

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SUMMARY STEPS

1. **configure terminal**
2. **line com1**
3. **databits *bits***
flowcontrol hardware
parity {even | none | odd}
speed {300 | 1200 | 2400 | 4800 | 9600 | 38400 | 57600 | 115200}
stopbits {1 | 2}
4. **exit**
5. **show line console**
6. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line com1 Example: switch# line com1 switch(config-com1)#	Enters COM1 configuration mode.
Step 3	databits <i>bits</i> Example: switch(config-com1)# databits 7	Configures the number of data bits per byte. The range is from 5 to 8. The default is 8.
	flowcontrol hardware Example: switch(config-com1)# flowcontrol hardware	Enables flow control on the hardware. The default is enabled. Use the no flowcontrol hardware command to disable flow control on the hardware.
	parity {even none odd} Example: switch(config-com1)# parity even	Configures the parity. The default is none .
	speed {300 1200 2400 4800 9600 38400 57600 115200} Example: switch(config-com1)# speed 115200	Configures the transmit and receive speed. The default is 9600 .
	stopbits {1 2} Example: switch(config-com1)# stopbits 2	Configures the stop bits. The default is 1 .

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	Command	Purpose
Step 4	exit Example: switch(config-com1)# exit switch(config)#	Exits COM1 configuration mode.
Step 5	show line console Example: switch(config)# show line console	(Optional) Displays the console settings.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring Virtual Terminals

This section includes the following topics:

- [Configuring the Inactive Session Timeout, page 4-8](#)
- [Configuring the Session Limit, page 4-9](#)

Configuring the Inactive Session Timeout

You can configure a timeout for inactive virtual terminal sessions on a VDC.

SUMMARY STEPS

1. **configure terminal**
2. **line vty**
3. **exec-session *minutes***
4. **exit**
5. **show running-config all | begin vty**
6. **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line vty Example: switch# line vty switch(config-line)#	Enters line configuration mode.
Step 3	exec-session <i>minutes</i> Example: switch(config-line)# exec-session 30	Configures the inactive session timeout for the VDC. The range is from 0 to 525600 minutes (8760 hours). A value of 0 minutes disables the timeout. The default value is 0.
Step 4	exit Example: switch(config-line)# exit switch(config)#	Exits line configuration mode.
Step 5	show running-config all begin vty Example: switch(config)# show running-config all begin vty	(Optional) Displays the virtual terminal configuration.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring the Session Limit

You can limit the number of virtual terminal sessions on your device.

SUMMARY STEPS

1. **configure terminal**
2. **line vty**
3. **session-limit** *sessions*
4. **exit**
5. **show running-config all | begin vty**
6. **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	<code>configure terminal</code> Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<code>line vty</code> Example: switch# line vty switch(config-line)#	Enters line configuration mode.
Step 3	<code>session-limit sessions</code> Example: switch(config-line)# session-limit 10	Configures the maximum number of virtual sessions for the VDC. The range is from 1 to 64. The default is 32.
Step 4	<code>exit</code> Example: switch(config-line)# exit switch(config)#	Exits line configuration mode.
Step 5	<code>show running-config all begin vty</code> Example: switch(config)# show running-config all begin vty	(Optional) Displays the virtual terminal configuration.
Step 6	<code>copy running-config startup-config</code> Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring Modem Connections

You can connect a modem to either the COM1 port or the console port.



Tip

We recommend that you use the COM1 port to connect the modem.

This section includes the following topics:

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- [Enabling a Modem Connection](#), page 4-11
- [Downloading the Default Initialization String](#), page 4-12
- [Configuring and Downloading a User-Specified Initialization String](#), page 4-14
- [Initializing a Modem for a Powered-Up Device](#), page 4-15

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.

SUMMARY STEPS

1. **configure terminal**
2. **line com1**
line console
3. **modem in**
4. **exit**
5. **show line**
6. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line com1 Example: switch# line com1 switch(config-com1)#	Enters COM1 configuration mode.
	line console Example: switch# line console switch(config-console)#	Enters console configuration mode.

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	Command	Purpose
Step 3	modem in Example: switch(config-com1)# modem in	Enables modem input on the COM1 port.
	modem in Example: switch(config-console)# modem in	Enables modem input on the console port.
Step 4	exit Example: switch(config-com1)# exit switch(config)#	Exits COM1 configuration mode.
	exit Example: switch(config-console)# exit switch(config)#	Exits console configuration mode.
Step 5	show line Example: switch(config)# show line	(Optional) Displays the console and COM1 settings.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Downloading the Default Initialization String

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

BEFORE YOU BEGIN

Log in to the console port.

SUMMARY STEPS

1. **configure terminal**
2. **line com1**
line console
3. **modem init-string default**
4. **exit**
5. **show line**
6. **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line com1 Example: switch# line com1 switch(config-com1)# line console Example: switch# line console switch(config-console)#	Enters COM1 configuration mode.
Step 3	modem init-string default Example: switch(config-com1)# modem init-string default modem init-string default Example: switch(config-console)# modem init-string default	Writes the default initialization string to the modem.
Step 4	exit Example: switch(config-com1)# exit switch(config)# exit Example: switch(config-console)# exit switch(config)#	Exits COM1 configuration mode.
Step 5	show line Example: switch(config)# show line	(Optional) Displays the console and COM1 settings.
Step 6	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

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Configuring and Downloading a User-Specified Initialization String

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

BEFORE YOU BEGIN

Log in to the console port.

SUMMARY STEPS

1. **configure terminal**
2. **line com1**
 line console
3. **modem set-string user-input *string***
4. **modem init-string user-input**
5. **exit**
6. **show line**
7. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	line com1 Example: switch# line com1 switch(config-com1)#	Enters COM1 configuration mode.
	line console Example: switch# line console switch(config-console)#	Enters console configuration mode.

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	Command	Purpose
Step 3	modem set-string user-input <i>string</i> Example: switch(config-com1)# modem set-string user-input ATE0Q1&D2&C1S0=3\015	Sets the user-specified initialization string for the COM1 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.
	modem set-string user-input <i>string</i> Example: switch(config-console)# modem set-string user-input ATE0Q1&D2&C1S0=3\015	Sets the user-specified initialization string for the console port. The initialization string is alphanumeric and case sensitive, can contain special characters, and has a maximum of 100 characters. Note You must first set the user-input string before initializing the string.
Step 4	modem init-string user-input Example: switch(config-com1)# modem init-string user-input	Writes the user-specified initialization string to the modem connected to the COM1 port.
	modem init-string user-input Example: switch(config-console)# modem init-string user-input	Writes the user-specified initialization string to the modem connected to the console port.
Step 5	exit Example: switch(config-com1)# exit switch(config)#	Exits COM1 configuration mode.
	exit Example: switch(config-console)# exit switch(config)#	Exits console configuration mode.
Step 6	show line Example: switch(config)# show line	(Optional) Displays the COM1 and console settings.
Step 7	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Initializing a Modem for a Powered-Up 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 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.

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Enable the modem connection on the port (see the “Enabling a Modem Connection” section on page 4-11).

SUMMARY STEPS

1. **modem connect line {com1 | console}**

DETAILED STEPS

	Command	Purpose
Step 1	<code>modem connect line {com1 console}</code> Example: <code>switch# modem connect line com1</code>	Initializes the modem connected to the device.

Clearing Terminal Sessions

You can clear terminal sessions on the device.

SUMMARY STEPS

1. `show users`
2. `clear line name`

DETAILED STEPS

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

Displaying Terminal and Session Information

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

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

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For detailed information about the fields in the output from these commands, see the *Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0*.

Default Settings

Table 4-1 lists the default settings for terminal displays and session parameters.

Table 4-1 Default Terminal Display and Session Parameters

Parameters	Default
Terminal type	ansi
Terminal length	0 lines for console sessions 31 lines for virtual terminal sessions
Terminal width	80 columns
Terminal inactive session timeout	Disabled (0 minutes)
Console session data bits	8
Console inactive session timeout	Disabled (0 minutes)
Console session parity	none
Console session speed	11520 bps
Console session stop bits	1
COM1 session data bits	8
COM1 hardware flow control	Enabled
COM1 session parity	none
COM1 session speed	9600 bps
COM1 session stop bits	1
Virtual terminal inactive session timeout	Disabled (0 minutes)
Virtual terminal sessions limit	32
Modem default initialization string	ATE0Q1&D2&C1S0=1\015

Additional References

For additional information related to implementing Feature-1, see the following sections:

- [Related Documents, page 4-17](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>

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CHAPTER 5

Basic Device Management

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

This chapter includes the following sections:

- [Information About Basic Device Management, page 5-1](#)
- [Configuring the mgmt0 Interface, page 5-3](#)
- [Changing the Device Hostname, page 5-5](#)
- [Configuring the MOTD Banner, page 5-6](#)
- [Configuring the Time Zone, page 5-7](#)
- [Configuring Summer Time \(Daylight Saving Time\), page 5-8](#)
- [Manually Setting the Device Clock, page 5-9](#)
- [Managing Users, page 5-9](#)
- [Example of Basic Device Management, page 5-11](#)
- [Verifying Basic Device Settings, page 5-11](#)
- [Default Settings, page 5-11](#)
- [Additional References, page 5-11](#)

Information About Basic Device Management

This section include the following topics:

- [mgmt0 Interface, page 5-2](#)
- [Device Hostname, page 5-2](#)
- [Message-of-the-Day Banner, page 5-2](#)
- [Device Clock, page 5-2](#)
- [Time Zone and Summer Time \(Daylight Savings Time\), page 5-2](#)
- [User Sessions, page 5-2](#)
- [Virtualization Support, page 5-2](#)

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mgmt0 Interface

The mgmt0 interface on Cisco NX-OS devices provides out-of-band management, which enables you to manage the device by its IPv4 or IPv6 address. The mgmt0 interface uses 10/100/1000 Ethernet.

For detailed information on configuring interfaces, see the *Cisco Nexus 7000 Series NX-OS Interfaces Configuration Guide, Release 4.0* and the *Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 4.0*.

Device Hostname

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

Message-of-the-Day Banner

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

Device Clock

If you do not synchronize your device with a valid outside timing mechanism, such as an NTP clock source, you can manually set the clock time when your device boots. For information about NTP, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.0*.

Time Zone and Summer Time (Daylight Savings Time)

You can configure the time zone and summer time (daylight savings 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 7000 Series NX-OS Security Configuration Guide, Release 4.0*.

Virtualization Support

Basic device management is local to the virtual device context (VDC). The mgmt0 interface exists in the management virtual routing and forwarding instance (VRF) and is accessible from any VDC. You can configure a unique IP address for the mgmt0 interface in each VDC.

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For more information on VDCs, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*. For more information on VRFs, see the *Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide, Release 4.0*.

Licensing Requirements for Basic Device Management

The following table shows the licensing requirements for this feature:

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

Configuring the mgmt0 Interface

You can configure the mgmt0 interface on your Cisco NX-OS device.

BEFORE YOU BEGIN

Ensure that the management Ethernet (MGMT ETH) port on the active supervisor module is connected the network (see the hardware installation guide for your device).

For the default VDC, log in to the console port.

For non-default VDCs, log in to the default VDC and use the **switchto vdc** command.

SUMMARY STEPS

1. **configure terminal**
2. **interface mgmt0**
3. **ip address** *ipv4-address[/length]*
ipv6 address *ipv6-address[/length]*
4. **no shutdown**
5. **exit**
6. **vrf context management**
7. **ip route** *ipv4-prefix[/length] ipv4-nexthop-address*
ipv6 route *ipv6-prefix[/length] ipv6-nexthop-address*
8. **exit**
9. **show interface mgmt0**
10. **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	interface mgmt0 Example: switch(config)# interface mgmt0 switch(config-if)#	Specifies the mgmt0 interface and enters interface configuration mode.
Step 3	ip address ipv4-address[/length] Example: switch(config-if)# ip address 172.20.1.1/23	Configures the IPv4 address.
	ipv6 address ipv6-address[/length] Example: switch(config-if)# ipv6 address 2001:0DB8:c18:1::3/64	Configures the IPv6 address.
Step 4	no shutdown Example: switch(config-if)# no shutdown	Enables the interface.
Step 5	exit Example: switch(config-if)# exit switch(config)#	Exits interface configuration mode.
Step 6	vrf context management Example: switch(config)# vrf context management switch(config-vrf)#	Specifies the management VRF and enters VRF configuration mode.
Step 7	ip route ipv4-prefix[/length] ipv4-nexthop-address Example: switch(config-vrf)# ip route 0.0.0.0/0 172.20.20.1	Configures the IPv4 address of the next hop.
	ipv6 route ipv6-prefix[/length] ipv6-nexthop-address Example: switch(config-vrf)# ipv6 route 2001:0DB8::/16 2001:0DB8:c18:1::2	Configures the IPv6 address of the next hop.
Step 8	exit Example: switch(config-vrf)# exit switch(config)#	Exits interface configuration mode.

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	Command	Purpose
Step 9	show interface mgmt0 Example: switch(config)# show interface mgmt0	(Optional) Displays the mgmt0 interface configuration and status.
Step 10	copy running-config startup-config Example: switch(config)# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Changing the Device Hostname

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

SUMMARY STEPS

1. **configure terminal**
2. **hostname *name***
switchname *name*
3. **exit**
4. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	hostname <i>name</i> Example: switch(config)# hostname Engineering2 Engineering2(config)#	Changes the device hostname. The default is switch.
	switchname <i>name</i> Example: switch# switchname Engineering2 Engineering2(config)#	Changes the device hostname. The default is switch.

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	Command	Purpose
Step 3	exit Example: Engineering2(config)# exit Engineering2#	Exits global configuration mode.
Step 4	copy running-config startup-config Example: Engineering2# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring the MOTD Banner

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

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

SUMMARY STEPS

1. **configure terminal**
2. **banner motd** *delimiting-character message delimiting-character*
3. **exit**
4. **show banner motd**
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	banner motd <i>delimiting-character message delimiting-character</i> Example: switch(config)# banner motd #Welcome to the Switch# switch(config)#	Configures the MOTD banner. Do not use the <i>delimiting-character</i> in the <i>message</i> text. Note Do not use " and % as a delimiting character.
Step 3	exit Example: switch(config)# exit switch#	Exits global configuration mode.

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	Command	Purpose
Step 4	show banner motd Example: switch# show banner motd	(Optional) Displays the configured MOTD banner.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring the Time Zone

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

SUMMARY STEPS

1. **configure terminal**
2. **clock timezone** *zone-name offset-hours offset-minutes*
3. **exit**
4. **show clock**
5. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal Example: switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	clock timezone <i>zone-name offset-hours offset-minutes</i> Example: switch(config)# clock timezone EST -5 0	Configures the time zone. The <i>zone-name</i> argument is a 3-character string for the time zone acronym (for example, PST or EST). The <i>offset-hours</i> argument is the offset from the UTC and the range is from -23 to 23 hours. The range for the <i>offset-minutes</i> argument is from 0 to 59 minutes.
Step 3	exit Example: switch(config)# exit switch#	Exits global configuration mode.
Step 4	show banner clock Example: switch# show clock	(Optional) Displays the time and time zone.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

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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.

SUMMARY STEPS

1. **configure terminal**
2. **clock summer-time** *zone-name start-week start-day start-month start-time end-week end-day end-month end-time offset-minutes*
3. **exit**
4. **show clock detail**
5. **copy running-config startup-config**

DETAILED STEPS

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

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	Command	Purpose
Step 4	show clock detail Example: switch(config)# show clock detail	(Optional) Displays the configured MOTD banner.
Step 5	copy running-config startup-config Example: switch# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Manually Setting the Device Clock

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

BEFORE YOU BEGIN

Configure the time zone (see the “[Configuring the Time Zone](#)” section on page 5-7).

SUMMARY STEPS

1. **clock** *time day month year*
2. **show clock**

DETAILED STEPS

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

Managing Users

This section includes the following topics:

- [Displaying Information about the Users Sessions, page 5-10](#)
- [Sending a Message to Users, page 5-10](#)

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Displaying Information about the Users Sessions

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

SUMMARY STEPS

1. `show users`

DETAILED STEPS

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

For detailed information about the fields in the output from this command, see the [Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0](#).

Sending a Message to Users

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

SUMMARY STEPS

1. `show users`
2. `send [session line] message-text`

DETAILED STEPS

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

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Example of Basic Device Management

This example shows how to configure the mgmt0 interface using IPv4 addressing:

```
interface mgmt0
  ip address 172.10.10.10/24
vrf context management
  ip route 0.0.0.0/0 172.10.10.1
```

Verifying Basic Device Settings

To verify the basic device settings, perform one of the following tasks:

Command	Purpose
show banner motd	Displays the banner MOTD.
show clock	Displays clock and timezone settings.
show clock detail	Displays the summer time settings.

Default Settings

Table 5-1 lists the default settings for basic device parameters.

Table 5-1 Default Basic Device Parameters

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

Additional References

For additional information related to basic device management, see the following sections:

- [Related Documents, page 5-11](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>

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CHAPTER 6

Using the Device File Systems, Directories, and Files

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

This chapter includes the following sections:

- [Information About the Device File Systems, Directories, and Files, page 6-1](#)
- [Licensing Requirements for Configuration Files, page 6-3](#)
- [Using the Tab Key for Completing Filenames, page 6-3](#)
- [Formatting External Flash Devices, page 6-3](#)
- [Working with Directories, page 6-4](#)
- [Working with Files, page 6-7](#)
- [Examples of Using the File System, page 6-13](#)
- [Default Settings, page 6-16](#)
- [Additional References, page 6-17](#)

Information About the Device File Systems, Directories, and Files

This section includes the following topics:

- [File Systems, page 6-1](#)
- [Directories, page 6-2](#)
- [Files, page 6-3](#)
- [Virtualization Support, page 6-3](#)

File Systems

The syntax for specifying a local file system is `filesystem:[/module]`. [Table 6-1](#) describes file systems that you can reference on your device.

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Table 6-1 File System Syntax Components

File System Name	Module	Description
bootflash	sup-active sup-local	Internal CompactFlash memory located on the active supervisor module used for storing image files, configuration files, and other miscellaneous files. The initial default directory is bootflash.
	sup-standby sup-remote	Internal CompactFlash memory located on the standby supervisor module used for storing image files, configuration files, and other miscellaneous files.
slot0		External CompactFlash memory installed in a supervisor module used for storing system images, configuration files, and other miscellaneous files.
volatile	—	Volatile random-access memory (VRAM) located on a supervisor module used for temporary or pending changes.
nvram	—	Nonvolatile random-access memory (NVRAM) located on a supervisor module used for storing the startup-configuration file.
log	—	Memory on the active supervisor that stores logging file statistics.
system	—	Memory on a supervisor module used for storing the running-configuration file.
debug	—	Memory on a supervisor module used for debug logs.
usb1	—	External USB flash memory installed in a supervisor module used for storing image files, configuration files, and other miscellaneous files.
usb2	—	External USB flash memory installed in a supervisor module used for storing image files, configuration files, and other miscellaneous files.

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.

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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 also download files, such as system image files, from remote servers using FTP, Secure Copy (SCP), Secure Shell FTP (SFTP), and TFTP.

Virtualization Support

Most file system, directory, and file configuration and operations are local to the virtual device context (VDC). One exception is formatting an external Flash device, which must be performed from the default VDC. For more information on VDCs. For more information on VDCs, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*.

Licensing Requirements for Configuration Files

The following table shows the licensing requirements for this feature:

Product	License Requirement
NX-OS	Using the file systems, directories, and files requires no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the NX-OS licensing scheme, see the Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0 .

Using the Tab Key for Completing Filenames

You can use the Tab key to complete partial filenames. When you type a partial filename and then press the Tab key, the NX-OS software completes the filename if the characters you typed are unique to a single file. If the partial name is not unique, the NX-OS software lists a selection of filenames that match the characters you typed, as shown in this example:

```
switch# show file bootflash:e<Tab>
bootflash:eem_logs          bootflash:epld.tar.gz
bootflash:epld.scr          bootflash:eth_span.log
switch# show file bootflash:e
```

You can then type enough characters to make the filename unique and NX-OS completes the filename for you.

Formatting External Flash Devices

You can format an external Flash device to erase the contents from the default VDC and restore it to its factory-shipped state.

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**Note**

For information on recovering corrupted bootflash using formatting, see the *Cisco Nexus 7000 Series NX-OS Troubleshooting Guide, Release 4.0*.

BEFORE YOU BEGIN

Ensure you are in the default VDC.

Insert the external Flash device in the active supervisor module.

SUMMARY STEPS

1. `dir {slot0: | usb1: | usb2:}`
1. `format {slot0: | usb1: | usb2:}`

DETAILED STEPS

	Command	Purpose
Step 1	<code>dir {slot0: usb1: usb2:}</code> Example: switch# dir slot0:	(Optional) Displays the contents of an external Flash device.
Step 2	<code>format {slot0: usb1: usb2:}</code> Example: switch# format slot0:	Formats an external Flash device.

Working with Directories

This section includes the following topics:

- [Identifying the Current Directory, page 6-4](#)
- [Changing the Current Directory, page 6-5](#)
- [Creating a Directory, page 6-5](#)
- [Displaying Directory Contents, page 6-6](#)
- [Deleting a Directory, page 6-6](#)
- [Accessing Directories on the Standby Supervisor Module, page 6-7](#)

Identifying the Current Directory

You can display the directory name of your current directory.

SUMMARY STEPS

1. `pwd`

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DETAILED STEPS

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

Changing the Current Directory

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

SUMMARY STEPS

1. **pwd**
2. **cd {directory | filesystem:[//module/][directory]}**

DETAILED STEPS

	Command	Purpose
Step 1	<p>pwd</p> <p>Example: switch# pwd</p>	(Optional) Displays the name of your current default directory.
Step 2	<p>cd {directory filesystem:[//module/][directory]}</p> <p>Example: switch# cd slot0:</p>	Changes to a new current directory. The file system, module, and directory names are case sensitive.

Creating a Directory

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

SUMMARY STEPS

1. **pwd**
2. **cd {directory | filesystem:[//module/][directory]}**
3. **mkdir [filesystem:[//module/]]directory**

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DETAILED STEPS

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

Displaying Directory Contents

You can display the contents of a directory.

SUMMARY STEPS

1. `dir [filesystem:[//module/]][directory]`

DETAILED STEPS

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

Deleting a Directory

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

BEFORE YOU BEGIN

Ensure that the directory is empty before you try to delete it (see the “[Deleting Files](#)” section on [page 6-10](#)).

SUMMARY STEPS

1. `pwd`
2. `dir [filesystem:[//module/]][directory]`
3. `rmdir [filesystem:[//module/]]directory`

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DETAILED STEPS

	Command	Purpose
Step 1	<code>pwd</code> Example: switch# pwd	(Optional) Displays the name of your current default directory.
Step 2	<code>dir [filesystem:[//module/]]directory</code> Example: switch# dir bootflash:test	(Optional) Displays the contents of the current directory. The file system, module, and directory names are case sensitive. If the directory is not empty, you must delete all the files before you can delete the directory (see the “Deleting Files” section on page 6-10).
Step 3	<code>rmdir [filesystem:[//module/]]directory</code> Example: switch# mkdir test	Deletes a directory. The file system and directory name are case sensitive.

Accessing Directories on the Standby Supervisor Module

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

Working with Files

This section includes the following topics:

- [Moving Files, page 6-8](#)
- [Copying Files, page 6-9](#)
- [Deleting Files, page 6-10](#)
- [Displaying File Contents, page 6-10](#)
- [Displaying File Checksums, page 6-11](#)
- [Compressing and Uncompressing Files, page 6-11](#)
- [Displaying the Last Lines in a File, page 6-12](#)
- [Redirecting show Command Output to a File, page 6-12](#)
- [Finding Files, page 6-12](#)

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Moving Files

You can move a files 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.



Tip

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

SUMMARY STEPS

1. **pwd**
2. **dir** [*filesystem*:*//module/*][*directory*]
3. **move** [*filesystem*:*//module/*][*directory/*] | *directory/*]*source-filename* {*{filesystem*:*//module/*][*directory/*] | *directory/*}[*target-filename*] | *target-filename*}

DETAILED STEPS

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

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Copying Files

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



Note

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

SUMMARY STEPS

1. **pwd**
2. **dir** [*filesystem*:*//module/*][*directory*]
3. **copy** [*filesystem*:*//module/*][*directory/*] | *directory/*]*source-filename* {*filesystem*:*//module/*][*directory/*] | *directory/*}[*target-filename*]

DETAILED STEPS

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

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Deleting Files

You can delete a file or a directory and all its contents.

SUMMARY STEPS

1. **dir** [*filesystem*:*//module/*][*directory*]
2. **delete** {*filesystem*:*//module/*}[*directory/*] | *directory/*}*filename*

DETAILED STEPS

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

Displaying File Contents

You can display the contents of a file.

SUMMARY STEPS

1. **show file** [*filesystem*:*//module/*][*directory/*]*filename*

DETAILED STEPS

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

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Displaying File Checksums

You can display checksums to check the file integrity.

SUMMARY STEPS

1. **show file** *[filesystem://module/][directory/]filename {cksum | md5sum}*

DETAILED STEPS

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

Compressing and Uncompressing Files

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

SUMMARY STEPS

1. **dir** *[filesystem://module/][directory]*
2. **gzip** *[filesystem://module/][directory/] | directory/]filename*
gunzip *[filesystem://module/][directory/] | directory/]filename.gz*

DETAILED STEPS

	Command	Purpose
Step 1	dir <i>[filesystem://module/][directory]</i> Example: switch# dir bootflash	(Optional) Displays the contents of the current directory. The file system and directory name are case sensitive.
Step 2	gzip <i>[filesystem://module/][directory/] directory/]filename</i> Example: switch# gzip show_tech	Compresses a file. After the file is compressed, it has a .gz prefix.
	gunzip <i>[filesystem://module/][directory/] directory/]filename.gz</i> Example: switch# gunzip show_tech.gz	Uncompresses a file. The file to uncompress must have the .gz prefix. After the file is uncompressed, it does not have the .gz prefix.

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Displaying the Last Lines in a File

You can display the last lines of a file.

SUMMARY STEPS

1. `tail [filesystem://module/][directory/]filename [lines]`

DETAILED STEPS

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

Redirecting show Command Output to a File

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

For information about saving configuration files, see [Chapter 7, “Working with Configuration Files”](#).

SUMMARY STEPS

1. `show-command > [filesystem://module/][directory/] | directory/]filename`

DETAILED STEPS

	Command	Purpose
Step 1	<pre>show-command > [filesystem://module/][directory/] directory/]filename Example: switch# show tech-support > bootflash:techinfo</pre>	Redirects the output from a show command to a file.

Finding Files

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

SUMMARY STEPS

1. `pwd`
2. `cd {filesystem://module/}[directory/] | directory}`
3. `find filename-prefix`

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DETAILED STEPS

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

Examples of Using the File System

This section includes the following topics:

- [Accessing Directories on Standby Supervisor Modules, page 6-13](#)
- [Moving Files, page 6-14](#)
- [Copying Files, page 6-14](#)
- [Deleting Files, page 6-14](#)
- [Displaying File Contents, page 6-15](#)
- [Displaying File Contents, page 6-15](#)
- [Displaying File Checksums, page 6-15](#)
- [Compressing and Uncompressing Files, page 6-15](#)

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/a0ldConfig.txt
```

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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
```

This example shows how to overwrite the contents of an existing configuration in NVRAM:

```
switch# copy nvram:snapshot-config nvram:startup-config
Warning: this command is going to overwrite your current startup-config:
Do you wish to continue? {y/n} [y] y
```

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 Files

This example shows how to delete a file from the current working directory:

```
switch# delete dns_config.cfg
```

This example shows how to delete a file from an external CompactFlash (slot0):

```
switch# delete slot0:dns_config.cfg
```

This example shows how to delete an entire directory and all its contents:

```
switch# delete bootflash:my-dir
This is a directory. Do you want to continue (y/n)? [y] y
```


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Displaying File Contents

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

```
switch# show file slot0:test
config t
Int fc1/1
no shut
end
show int fc1/1
```

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

```
switch# show file myfile
```

Displaying File Checksums

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

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

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

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

Compressing and Uncompressing Files

This example shows how to compress a file:

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

```

This example shows how to uncompress a compressed file:

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

```

Redirecting show Command Output

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

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

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

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

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

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

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

```
switch# show tech-support > Samplefile
Building Configuration ...
switch# dir
 1525859      Jul 04 00:51:03 2003 Samplefile
Usage for volatile://
 1527808 bytes used
19443712 bytes free
20971520 bytes total
```

Finding Files

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

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

Default Settings

Table 6-2 lists the default settings for the file system parameters.

Table 6-2 *Default File System Settings*

Parameters	Default
Default filesystem	bootflash:

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Additional References

For additional information related to the file systems, see the following sections:

- [Related Documents, page 6-17](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>

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CHAPTER 7

Working with Configuration Files

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

This chapter includes the following sections:

- [Information About Configuration Files, page 7-1](#)
- [Licensing Requirements for Configuration Files, page 7-2](#)
- [Managing Configuration Files, page 7-2](#)
- [Verifying the Device Configuration, page 7-12](#)
- [Examples of Working With Configuration Files, page 7-12](#)
- [Additional References, page 7-13](#)

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 (see the [“Copying a Configuration File to a Remote Server” section on page 7-3](#)).

This section includes the following topics:

- [Types of Configuration Files, page 7-1](#)
- [Virtualization Support, page 7-2](#)

Types of Configuration Files

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

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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. For information about configuration modes, see [Chapter 3, “Understanding the CLI.”](#)

To change the startup-configuration file, you can either save the running configuration file to the startup configuration (see the [“Saving the Running Configuration to the Startup Configuration”](#) section on [page 7-3](#)) or download a configuration file from a file server to the startup configuration (see the [“Downloading the Startup Configuration From a Remote Server”](#) section on [page 7-5](#)).

Virtualization Support

Except for removing the configuration for a missing module, the configuration file operations are local to the virtual device context (VDC). You can remove the missing module configuration only from the default VDC. For more information on VDCs, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*.

Licensing Requirements for Configuration Files

The following table shows the licensing requirements for this feature:

Product	License Requirement
NX-OS	Configuration files require no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the NX-OS licensing scheme, see the <i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i> .

Managing Configuration Files

This section describes how to manage configuration files and includes the following topics:

- [Saving the Running Configuration to the Startup Configuration, page 7-3](#)
- [Copying a Configuration File to a Remote Server, page 7-3](#)
- [Downloading the Running Configuration From a Remote Server, page 7-4](#)
- [Downloading the Startup Configuration From a Remote Server, page 7-5](#)
- [Copying Configuration Files to an External Flash Memory Device, page 7-6](#)
- [Copying the Running Configuration From an External Flash Memory Device, page 7-7](#)
- [Copying the Startup Configuration From an External Flash Memory Device, page 7-8](#)
- [Copying Configuration Files to an Internal File System, page 7-8](#)
- [Rolling Back to a Previous Configuration, page 7-9](#)
- [Removing the Configuration for a Missing Module, page 7-10](#)
- [Erasing Device Configurations, page 7-11](#)

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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.



Caution

When multiple user sessions are updating the running configuration simultaneously, updates to the running configuration entered while saving the running configuration to the startup configuration might not appear in startup configuration.

For information on saving the running configuration for all VDCs on the physical device, see the *Cisco Nexus 7000 Series NX-OS Virtual Device Context Configuration Guide, Release 4.0*.

SUMMARY STEPS

1. `show running-config`
2. `copy running-startup-config`

DETAILED STEPS

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

Copying a Configuration File to a Remote Server

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

SUMMARY STEPS

1. `copy running-config scheme://server/[url]/filename`
`copy startup-config scheme://server/[url]/filename`

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DETAILED STEPS

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

Downloading the Running Configuration From a Remote Server

You can configure your 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. For more information on copying files, see the [“Copying Files” section on page 6-9](#).

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 NX-OS device has a route to the remote server. The 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.

SUMMARY STEPS

1. **copy *scheme://server/[url/]filename* running-config**
2. **show running-config**
3. **copy running-config startup-config**
4. **show startup-config**

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DETAILED STEPS

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

Downloading the Startup Configuration From a Remote Server

You can configure your 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. For more information on copying files, see the [“Copying Files” section on page 6-9](#).

BEFORE YOU BEGIN

Ensure that the configuration file you that 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 NX-OS device has a route to the remote server. The 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.

SUMMARY STEPS

1. **copy scheme://server/[url/]filename startup-config**
2. **show startup-config**

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DETAILED STEPS

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

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.

SUMMARY STEPS

1. `dir {slot0: | usb1: | usb2:}[directory/]`
2. `copy running-config {slot0: | usb1: | usb2:}[directory/]filename`
`copy startup-config {slot0: | usb1: | usb2:}[directory/]filename`

DETAILED STEPS

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

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Copying the Running Configuration From an External Flash Memory Device

You can configure your NX-OS device by copying configuration files created on another Cisco NX-OS device and saved to an external Flash memory device. For more information on copying files, see the “Copying Files” section on page 6-9.

BEFORE YOU BEGIN

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

SUMMARY STEPS

1. `dir {slot0: | usb1: | usb2:}[directory/]`
2. `copy {slot0: | usb1: | usb2:}[directory/]filename running-config`
3. `show running-config`
4. `copy running-config startup-config`
5. `show startup-config`

DETAILED STEPS

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

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Copying the Startup Configuration From an External Flash Memory Device

You can recover the startup configuration on your NX-OS device by downloading a new startup configuration file saved on an external Flash memory device. For more information on copying files, see the “Copying Files” section on page 6-9.

BEFORE YOU BEGIN

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

SUMMARY STEPS

1. **dir {slot0: | usb1: | usb2:}[directory/]**
2. **copy {slot0: | usb1: | usb2:}[directory/]filename startup-config**
3. **show startup-config**

DETAILED STEPS

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

SUMMARY STEPS

1. **copy running-config [filesystem:[directory/] | directory/]filename**
copy startup-config [filesystem:[directory/] | directory/]filename

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DETAILED STEPS

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

Rolling Back to a Previous Configuration

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



Note

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

SUMMARY STEPS

1. **copy [filesystem:[directory/] | directory/]backup-filename running-config**
copy [filesystem:[directory/] | directory/]backup-filename startup-config

DETAILED STEPS

	Command	Purpose
Step 1	copy [filesystem:][directory/] directory/]backup-filename running-config Example: <pre>switch# copy bootflash:run-config.bak running-config</pre>	Copies a backed-up configuration to the running configuration. The <i>filesystem</i> , <i>directory</i> , and <i>backup-filename</i> arguments are case sensitive.
	copy [filesystem:][directory/] directory/]backup-filename startup-config Example: <pre>switch# copy bootflash:start-config.bak startup-config</pre>	Copies a backed-up configuration to the startup configuration. The <i>filesystem</i> , <i>directory</i> , and <i>backup-filename</i> arguments are case sensitive.

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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. You can only remove the configuration for a missing module from the default VDC.



Note

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

BEFORE YOU BEGIN

Ensure that you are in the default VDC.

Remove the I/O module from the chassis.

SUMMARY STEPS

1. **show hardware**
2. **purge module *slot* running-config**
3. **copy running-config startup-config**

DETAILED STEPS

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

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Erasing Device Configurations

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
 - Route address in the management VRF

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

SUMMARY STEPS

1. write erase [boot | debug]

DETAILED STEPS

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

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Verifying the Device Configuration

To verify the device configuration, perform one of the following tasks:

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

Examples of Working With Configuration Files

This section includes the following topics:

- [Copying Configuration Files, page 7-12](#)
- [Backing Up Configuration Files, page 7-12](#)
- [Rolling Back to a Previous Configuration, page 7-13](#)

Copying Configuration Files

This example shows how to overwrite the contents of an existing configuration in NVRAM:

```
switch# copy nvram:snapshot-config nvram:startup-config
Warning: this command is going to overwrite your current startup-config.
Do you wish to continue? {y/n} [y] y
```

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

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

Backing Up Configuration Files

This example shows how to create a snapshot of the startup configuration in a predefined location on the device (binary file):

```
switch# copy startup-config nvram:snapshot-config
```

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
```


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Rolling Back to a Previous Configuration

This example shows how to roll back to a snapshot copy of a previously saved running configuration (binary file):

```
switch# copy nvram:snapshot-config startup-config
```

This example shows how to roll back to a configuration copy that was previously saved in the bootflash: file system (ASCII file):

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

Additional References

For additional information related to managing configuration files, see the following sections:

- [Related Documents, page 7-13](#)

Related Documents

Related Topic	Document Title
Licensing	<i>Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.0</i>
Command reference	<i>Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.0</i>

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