



Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Dublin 17.10.x

First Published: 2022-11-30

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



CONTENTS

CHAPTER 1	Introduction	1
	Supported Hardware	1
	Cisco Catalyst 9400 Series Switches—Model Numbers	1
	Supported Hardware on Cisco Catalyst 9400 Series Switches	2
	Optics Modules	4
<hr/>		
CHAPTER 2	Whats New in Cisco IOS XE Dublin 17.10.x	5
	Hardware Features in Cisco IOS XE Dublin 17.10.1	5
	Software Features in Cisco IOS XE Dublin 17.10.1	5
	Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.10.1	7
<hr/>		
CHAPTER 3	Important Notes	9
	Important Notes	9
<hr/>		
CHAPTER 4	Compatibility Matrix and Web UI System Requirements	11
	Compatibility Matrix	11
	Web UI System Requirements	18
<hr/>		
CHAPTER 5	Licensing and Scaling Guidelines	21
	Licensing	21
	License Levels	21
	Available Licensing Models and Configuration Information	22
	License Levels - Usage Guidelines	22
	Scaling Guidelines	23

CHAPTER 6	Limitations and Restrictions	25
	Limitations and Restrictions	25

CHAPTER 7	ROMMON and CPLD Versions	31
	ROMMON and CPLD Versions	31

CHAPTER 8	Upgrading the Switch Software	35
	Finding the Software Version	35
	Software Images	35
	Upgrading the ROMMON	36
	Software Installation Commands	36
	Upgrading in Install Mode	37
	Downgrading in Install Mode	43
	Upgrading the Complex Programmable Logic Device Version	51
	Upgrading the CPLD Version: High Availability Setup	51
	Upgrading the CPLD Version: Cisco StackWise Virtual Setup	52
	Upgrading the CPLD Version: Single Supervisor Module Setup	53

CHAPTER 9	Caveats	55
	Cisco Bug Search Tool	55
	Open Caveats in Cisco IOS XE Dublin 17.10.x	55
	Resolved Caveats in Cisco IOS XE Dublin 17.10.1	55

CHAPTER 10	Additional Information	57
	Troubleshooting	57
	Related Documentation	57
	Communications, Services, and Additional Information	57



CHAPTER 1

Introduction

Cisco Catalyst 9400 Series Switches are Cisco's leading modular enterprise switching access platform and have been purpose-built to address emerging trends of Security, IoT, Mobility, and Cloud.

They deliver complete convergence with the rest of the Cisco Catalyst 9000 Series Switches in terms of ASIC architecture with Unified Access Data Plane (UADP) 2.0 and UADP 3.0. The platform runs an Open Cisco IOS XE that supports model driven programmability, has the capacity to host containers, and run 3rd party applications and scripts natively within the switch (by virtue of x86 CPU architecture, local storage, and a higher memory footprint). This series forms the foundational building block for SD-Access, which is Cisco's lead enterprise architecture.

Cisco Catalyst 9400 Series Switches are enterprise optimized with a dual-serviceable fan tray design, side to side airflow, and are closet-friendly with a 16-inch depth

- [Supported Hardware, on page 1](#)

Supported Hardware

Cisco Catalyst 9400 Series Switches—Model Numbers

The following table lists the supported switch models. For information about the available license levels, see section *License Levels*.

Switch Model (append with "=" for spares)	Description
C9404R	Cisco Catalyst 9400 Series 4 slot chassis <ul style="list-style-type: none">• Redundant supervisor module capability• Two switching module slots• Hot-swappable, front and rear serviceable, non-redundant fan tray assembly• Four power supply module slots

Switch Model (append with "=" for spares)	Description
C9407R	Cisco Catalyst 9400 Series 7 slot chassis <ul style="list-style-type: none"> • Redundant supervisor module capability • Five switching module slots • Hot-swappable, front and rear serviceable fan tray assembly • Eight power supply module slots
C9410R	Cisco Catalyst 9400 Series 10 slot chassis <ul style="list-style-type: none"> • Redundant supervisor module capability • Eight switching module slots • Hot-swappable, front and rear serviceable fan tray assembly • Eight power supply module slots

Supported Hardware on Cisco Catalyst 9400 Series Switches

Product ID (append with "=" for spares)	Description
Supervisor Modules	
C9400-SUP-1	Cisco Catalyst 9400 Series Supervisor 1 Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400-SUP-1XL	Cisco Catalyst 9400 Series Supervisor 1XL Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400-SUP-1XL-Y	Cisco Catalyst 9400 Series Supervisor 25XL Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400X-SUP-2	Cisco Catalyst 9400 Series Supervisor 2 Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400X-SUP-2XL	Cisco Catalyst 9400 Series Supervisor 2XL Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.

Product ID (append with "=" for spares)	Description
Line Cards	
C9400-LC-24S	24-port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASE-T with Cu-SFP
C9400-LC-24XS	24-port Gigabit Ethernet module that supports 1 and 10 Gbps connectivity.
C9400-LC-48H	48-port Gigabit Ethernet UPOE+ module supporting up to 90W on each of its 48 RJ45 ports.
C9400-LC-48HN	48-port, UPOE+ 100 Mbps/1G/2.5G/5G Multigigabit Ethernet Module
C9400-LC-48HX	48-port UPOE+ 100 Mbps/1G/2.5G/5G/10G Multigigabit Module
C9400-LC-48P	48-port, 1 Gigabit Ethernet POE/POE+ module supporting up to 30W per port.
C9400-LC-48S	48-port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASE-T with Cu-SFP.
C9400-LC-48T	48-port, 10/100/1000 BASE-T Gigabit Ethernet module.
C9400-LC-48U	48-port UPOE 10/100/1000 (RJ-45) module supporting up to 60W per port.
C9400-LC-48UX	48-port, UPOE Multigigabit Ethernet Module with: <ul style="list-style-type: none"> • 24 ports (Ports 1 to 24) 1G UPOE 10/100/1000 (RJ-45) • 24 ports (Ports 25 to 48) MultiGigabit Ethernet 100/1000/2500/5000/10000 UPOE ports
C9400-LC-48XS	Cisco Catalyst 9400 Series 48-Port SFP/SFP+ Module
M.2 SATA SSD Modules¹ (for the Supervisor)	
C9400-SSD-240GB	Cisco Catalyst 9400 Series 240GB M2 SATA memory
C9400-SSD-480GB	Cisco Catalyst 9400 Series 480GB M2 SATA memory
C9400-SSD-960GB	Cisco Catalyst 9400 Series 960GB M2 SATA memory
AC Power Supply Modules	
C9400-PWR-2100AC	Cisco Catalyst 9400 Series 2100W AC Power Supply
C9400-PWR-3200AC	Cisco Catalyst 9400 Series 3200W AC Power Supply
DC Power Supply Modules	
C9400-PWR-3200DC	Cisco Catalyst 9400 Series 3200W DC Power Supply

¹ M.2 Serial Advanced Technology Attachment (SATA) Solid State Drive (SSD) Module

Optics Modules

Cisco Catalyst Series Switches support a wide range of optics and the list of supported optics is updated on a regular basis. Use the [Transceiver Module Group \(TMG\) Compatibility Matrix](#) tool, or consult the tables at this URL for the latest transceiver module compatibility information: https://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html



CHAPTER 2

Whats New in Cisco IOS XE Dublin 17.10.x

- [Hardware Features in Cisco IOS XE Dublin 17.10.1, on page 5](#)
- [Software Features in Cisco IOS XE Dublin 17.10.1, on page 5](#)
- [Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.10.1, on page 7](#)

Hardware Features in Cisco IOS XE Dublin 17.10.1

Feature Name	Description
Cisco SFP Modules for Gigabit Ethernet	Supported transceiver module product numbers: <ul style="list-style-type: none">• GLC-EX-SMD For information about the module, see Cisco SFP Modules for Gigabit Ethernet Data Sheet . For information about device compatibility, see the Transceiver Module Group (TMG) Compatibility Matrix .
Cisco 10GBASE SFP+ Module	Supported transceiver module product numbers: <ul style="list-style-type: none">• SFP-10G-T-X For information about the module, see Cisco 10GBASE SFP+ Modules Data Sheet . For information about device compatibility, see the Transceiver Module Group (TMG) Compatibility Matrix .

Software Features in Cisco IOS XE Dublin 17.10.1

Feature Name	Description
BGP EVPN VXLAN with IPv6 in the Underlay (VXLANv6)	Introduces support for IPv6 addressing in the underlay of a BGP EVPN VXLAN fabric. In a new deployment, you can build your BGP EVPN VXLAN fabric with IPv6 underlay. For an existing BGP EVPN VXLAN fabric with IPv4 underlay, you can seamlessly migrate to an IPv6 or dual stack underlay.

Feature Name	Description
Custom EAPoL	Allows customization of the default EAPoL EtherType to configure MACsec with EtherType as 876F.
DHCP Gleaning	Introduces support for a read-only DHCP snooping functionality that allows components to register and glean only DHCP version 4 packets.
Enhanced Password Security Through Updated Combination Rule	The character-repetition and restrict-consecutive-letters keywords were introduced for the aaa common-criteria policy command.
MACsec Fallback Key Support with High Availability	Introduces support for the MACsec Fallback Key feature with High Availability. The MACsec Fallback Key feature establishes an MKA session with the pre-shared fallback key whenever the PSK fails to establish a session because of key mismatch.
Programmability <ul style="list-style-type: none"> Upgrade YANG Models to YANG 1.1 YANG Data Models App-Hosting: ERSPAN Capabilities on AppGigabitEthernet Port 	<p>The following programmability features are introduced in this release:</p> <ul style="list-style-type: none"> Upgrade YANG Models to YANG 1.1: Cisco-defined YANG models are in YANG Version 1.1 in Cisco IOS XE Dublin 17.10.1 and later releases. YANG Data Models: For the list of Cisco IOS XE YANG models available with this release, navigate to: https://github.com/YangModels/yang/tree/master/vendor/cisco/xe/17101. App-Hosting: ERSPAN Capabilities on AppGigabitEthernet Port: To mirror data traffic, the spanning traffic and captured traffic is transported to the IOx virtual application through the AppGigabitEthernet port. This ensures that the ERSPAN destination is reachable through the AppGigabitEthernet interface.
PTPv2 with Cisco StackWise Virtual	Introduces support for PTPv2 with Cisco StackWise Virtual.
RADIUS Automated Testing Probe-on	The command automate-tester probe-on was introduced. It starts a dead timer and packets are sent to the external RADIUS server after the timer expires.
Reflexive Access Lists (IPv4)	Reflexive access lists allow IP packets to be filtered based on upper-layer session information.
Secure Data Wipe	Introduces support for performing factory reset by using the keyword all secure in the factory-reset command. This option performs data sanitisation and securely resets the device.
SHA256 based Password-masking support	You can use the masked-secret keyword on the enable algorithm type command and username command. The keyword masks the secret input and converts to the selected encryption.

Feature Name	Description
Standalone Mode on Layer 3 EtherChannels	Introduces support for configuring standalone mode/independent mode on Layer 3 EtherChannels.

New on the WebUI

There are no new WebUI features in this release.

Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.10.1

Behavior Change	Description
debug platform command	The debug platform software fed switch active inject packet-capture start command was modified. full-packet keyword was added. It allows you to capture 1500 bytes of packet. The default packet capture was only for 128 bytes of the packet prior to Cisco IOS XE Dublin 17.10.1.



CHAPTER 3

Important Notes

- [Important Notes](#), on page 9

Important Notes

Unsupported Features

- **Cisco TrustSec**
 - Cisco TrustSec Network Device Admission Control (NDAC) on Uplinks
- **High Availability**
 - Cisco StackWise Virtual solution does not support Resilient Ethernet Protocol (REP) and Remote Switched Port Analyzer (RSPAN).
- **Interface and Hardware**
 - Fast PoE
- **Layer 2**
 - Audio Video Bridging (including IEEE802.1AS, IEEE 802.1Qat, and IEEE 802.1Qav)
- **Security**
 - IPsec VPN
 - MACsec switch-to-switch connections on C9400-SUP-1XL-Y.
 - MACsec switch-to-host connections in an overlay network.
 - Virtual Routing and Forwarding (VRF)-Aware web authentication
- **System Management**
 - Performance Monitoring (PerfMon)
- Converged Access for Branch Deployments
- Network Load Balancing (NLB)

Complete List of Supported Features

For the complete list of features supported on a platform, see the [Cisco Feature Navigator](#).

Accessing Hidden Commands

Starting with Cisco IOS XE Fuji 16.8.1a, as an improved security measure, the way in which hidden commands can be accessed has changed.

Hidden commands have always been present in Cisco IOS XE, but were not equipped with CLI help. That is, entering a question mark (?) at the system prompt did not display the list of available commands. These commands were only meant to assist Cisco TAC in advanced troubleshooting and were not documented either.

Starting with Cisco IOS XE Fuji 16.8.1a, hidden commands are available under:

- Category 1—Hidden commands in privileged or User EXEC mode. Begin by entering the **service internal** command to access these commands.
- Category 2—Hidden commands in one of the configuration modes (global, interface and so on). These commands do not require the **service internal** command.

Further, the following applies to hidden commands under Category 1 and 2:

- The commands have CLI help. Enter a question mark (?) at the system prompt to display the list of available commands.

Note: For Category 1, enter the **service internal** command before you enter the question mark; you do not have to do this for Category 2.

- The system generates a %PARSER-5-HIDDEN syslog message when a hidden command is used. For example:

```
*Feb 14 10:44:37.917: %PARSER-5-HIDDEN: Warning!!! 'show processes memory old-header '
is a hidden command.
Use of this command is not recommended/supported and will be removed in future.
```

Apart from category 1 and 2, there remain internal commands displayed on the CLI, for which the system does NOT generate the %PARSER-5-HIDDEN syslog message.



Important We recommend that you use any hidden command only under TAC supervision.

If you find that you are using a hidden command, open a TAC case for help with finding another way of collecting the same information as the hidden command (for a hidden EXEC mode command), or to configure the same functionality (for a hidden configuration mode command) using non-hidden commands.

Default Behaviour

Beginning from Cisco IOS XE Gibraltar 16.12.5 and later, do not fragment bit (DF bit) in the IP packet is always set to 0 for all outgoing RADIUS packets (packets that originate from the device towards the RADIUS server).



CHAPTER 4

Compatibility Matrix and Web UI System Requirements

- [Compatibility Matrix](#), on page 11
- [Web UI System Requirements](#), on page 18

Compatibility Matrix

The following table provides software compatibility information between Cisco Catalyst 9400 Series Switches, Cisco Identity Services Engine, Cisco Access Control Server, and Cisco Prime Infrastructure.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Dublin 17.10.1	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads .
Cupertino 17.9.5	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads .

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Cupertino 17.9.4	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Cupertino 17.9.3	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Cupertino 17.9.2	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Cupertino 17.9.1	3.2 3.1 + Patch 1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Cupertino 17.8.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Cupertino 17.7.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.7	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.6a	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.6	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.5	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.4	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Bengaluru 17.6.3	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.2	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Bengaluru 17.6.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Bengaluru 17.5.1	3.0 Patch 1 2.7 Patch 2 2.6 Patch 7 2.4 Patch 13	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Bengaluru 17.4.1	3.0 2.7 Patch 2	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Amsterdam 17.3.8a	2.7	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Amsterdam 17.3.8	2.7	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Amsterdam 17.3.7	2.7	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Amsterdam 17.3.6	2.7	-	PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → Downloads.
Amsterdam 17.3.5	2.7	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Amsterdam 17.3.4	2.7	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Amsterdam 17.3.3	2.7	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Amsterdam 17.3.2a	2.7	-	PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack See Cisco Prime Infrastructure 3.8 → Downloads.
Amsterdam 17.3.1	2.7	-	PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack See Cisco Prime Infrastructure 3.8 → Downloads.
Amsterdam 17.2.1	2.7	-	PI 3.7 + PI 3.7 latest maintenance release + PI 3.7 latest device pack See Cisco Prime Infrastructure 3.7 → Downloads.
Amsterdam 17.1.1	2.7	-	PI 3.6 + PI 3.6 latest maintenance release + PI 3.6 latest device pack See Cisco Prime Infrastructure 3.6 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Gibraltar 16.12.8	2.6	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.7	2.6	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.6	2.6	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.5b	2.6	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.5	2.6	-	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.4	2.6	-	PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack See Cisco Prime Infrastructure 3.8 → Downloads.
Gibraltar 16.12.3a	2.6	-	PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack See Cisco Prime Infrastructure 3.5 → Downloads.
Gibraltar 16.12.3	2.6	-	PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack See Cisco Prime Infrastructure 3.5 → Downloads.
Gibraltar 16.12.2	2.6	-	PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack See Cisco Prime Infrastructure 3.5 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Gibraltar 16.12.1	2.6	-	PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack See Cisco Prime Infrastructure 3.5 → Downloads.
Gibraltar 16.11.1	2.6 2.4 Patch 5	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Gibraltar 16.10.1	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.9.8	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Fuji 16.9.7	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → Downloads.
Fuji 16.9.6	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.9.5	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.9.4	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.9.3	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Fuji 16.9.2	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.9.1	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → Downloads.
Fuji 16.8.1a	2.3 Patch 1 2.4	5.4 5.5	PI 3.3 + PI 3.3 latest maintenance release + PI 3.3 latest device pack See Cisco Prime Infrastructure 3.3 → Downloads.
Everest 16.6.4a	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → Downloads.
Everest 16.6.4	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → Downloads.
Everest 16.6.3	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → Downloads
Everest 16.6.2	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → Downloads
Everest 16.6.1	2.2	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → Downloads
Everest 16.5.1a	2.1 Patch 3	5.4 5.5	-

Web UI System Requirements

The following subsections list the hardware and software required to access the Web UI:

Minimum Hardware Requirements

Processor Speed	DRAM	Number of Colors	Resolution	Font Size
233 MHz minimum ²	512 MB ³	256	1280 x 800 or higher	Small

² We recommend 1 GHz

³ We recommend 1 GB DRAM

Software Requirements**Operating Systems**

- Windows 10 or later
- Mac OS X 10.9.5 or later

Browsers

- Google Chrome—Version 59 or later (On Windows and Mac)
- Microsoft Edge
- Mozilla Firefox—Version 54 or later (On Windows and Mac)
- Safari—Version 10 or later (On Mac)



CHAPTER 5

Licensing and Scaling Guidelines

- [Licensing, on page 21](#)
- [Scaling Guidelines, on page 23](#)

Licensing

This section provides information about the licensing packages for features available on Cisco Catalyst 9000 Series Switches.

License Levels

The software features available on Cisco Catalyst 9400 Series Switches fall under these base or add-on license levels.

Base Licenses

- Network Essentials
- Network Advantage—Includes features available with the Network Essentials license and more.

Add-On Licenses

Add-On Licenses require a Network Essentials or Network Advantage as a pre-requisite. The features available with add-on license levels provide Cisco innovations on the switch, as well as on the Cisco Digital Network Architecture Center (Cisco DNA Center).

- DNA Essentials
- DNA Advantage— Includes features available with the DNA Essentials license and more.

To find information about platform support and to know which license levels a feature is available with, use Cisco Feature Navigator. To access Cisco Feature Navigator, go to <https://cfng.cisco.com>. An account on cisco.com is not required.

Available Licensing Models and Configuration Information

- Cisco IOS XE Fuji 16.8.x and earlier: RTU Licensing is the default and the only supported method to manage licenses.
- Cisco IOS XE Fuji 16.9.1 to Cisco IOS XE Amsterdam 17.3.1: Smart Licensing is the default and the only supported method to manage licenses.

In the [software configuration guide](#) of the required release, see **System Management** → **Configuring Smart Licensing**.

- Cisco IOS XE Amsterdam 17.3.2a and later: Smart Licensing Using Policy, which is an enhanced version of Smart Licensing, is the default and the only supported method to manage licenses.

In the [software configuration guide](#) of the required release (17.3.x onwards), see **System Management** → **Smart Licensing Using Policy**.

For a more detailed overview on Cisco Licensing, go to cisco.com/go/licensingguide.

License Levels - Usage Guidelines

- The duration or term for which a purchased license is valid:

Smart Licensing Using Policy	Smart Licensing
<ul style="list-style-type: none"> • Perpetual: There is no expiration date for such a license. • Subscription: The license is valid only until a certain date (for a three, five, or seven year period). 	<ul style="list-style-type: none"> • Permanent: for a license level, and without an expiration date. • Term: for a license level, and for a three, five, or seven year period. • Evaluation: a license that is not registered.

- Base licenses (Network Essentials and Network-Advantage) are ordered and fulfilled only with a perpetual or permanent license type.
- Add-on licenses (DNA Essentials and DNA Advantage) are ordered and fulfilled only with a subscription or term license type.
- An add-on license level is included when you choose a network license level. If you use DNA features, renew the license before term expiry, to continue using it, or deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.
- When ordering an add-on license with a base license, note the combinations that are permitted and those that are not permitted:

Table 1: Permitted Combinations

	DNA Essentials	DNA Advantage
Network Essentials	Yes	No
Network Advantage	Yes ⁴	Yes

⁴ You will be able to purchase this combination only at the time of the DNA license renewal and not when you purchase DNA-Essentials the first time.

- Evaluation licenses cannot be ordered. They are not tracked via Cisco Smart Software Manager and expire after a 90-day period. Evaluation licenses can be used only once on the switch and cannot be regenerated. Warning system messages about an evaluation license expiry are generated only 275 days after expiration and every week thereafter. An expired evaluation license cannot be reactivated after reload. This applies only to *Smart Licensing*. The notion of evaluation licenses does not apply to *Smart Licensing Using Policy*.

Scaling Guidelines

For information about feature scaling guidelines, see these datasheets for Cisco Catalyst 9400 Series Switches:

<https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/nb-06-cat9400-ser-data-sheet-cte-en.html>

<https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/nb-06-cat9600-series-line-data-sheet-cte-en.html>

<https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9400-series-switches/nb-06-cat9400-ser-sup-eng-data-sheet-cte-en.html>



CHAPTER 6

Limitations and Restrictions

- [Limitations and Restrictions, on page 25](#)

Limitations and Restrictions

- Control Plane Policing (CoPP)—The **show run** command does not display information about classes configured under `system-cpp policy`, when they are left at default values. Use the **show policy-map system-cpp-policy** or the **show policy-map control-plane** commands in privileged EXEC mode instead.
- Cisco TrustSec restrictions—Cisco TrustSec can be configured only on physical interfaces, not on logical interfaces.
- Flexible NetFlow limitations
 - You cannot configure NetFlow export using the Ethernet Management port (GigabitEthernet0/0).
 - You can not configure a flow monitor on logical interfaces, such as layer 2 port-channels, loopback, tunnels.
 - You can not configure multiple flow monitors of same type (ipv4, ipv6 or datalink) on the same interface for same direction.
- Hardware Limitations (Optics)—Multi-rate SFPs are not preferred for SVL or DAD links because auto-negotiation may lead to speed mismatches on some ports. If they are used, set both sides to the same speed; highest speed is recommended (example, 25G for SFP-10/25G and 100G for QSFP-40/100G). Also, both sides of the link should be multi-rate SFPs and all the other SVL or DAD link ports should use multi-rate SFPs. Use the **show interfaces transceiver** command to view the physical properties of SFPs used in the device.
- Hardware Limitations—When you use Cisco QSFP-4SFP10G-CUxM Direct-Attach Copper Cables, autonegotiation is enabled by default. If the other end of the line does not support autonegotiation, the link does not come up.
- Interoperability limitations—When you use Cisco QSFP-4SFP10G-CUxM Direct-Attach Copper Cables, if one end of the 40G link is a Catalyst 9400 Series Switch and the other end is a Catalyst 9500 Series Switch, the link does not come up, or comes up on one side and stays down on the other. To avoid this interoperability issue between devices, apply the **speed nonegotiate** command on the Catalyst 9500 Series Switch interface. This command disables autonegotiation and brings the link up. To restore autonegotiation, use the **no speed nonegotiation** command.

- In-Service Software Upgrade (ISSU)
 - ISSU from Cisco IOS XE Fuji 16.9.x to Cisco IOS XE Gibraltar 16.10.x or to Cisco IOS XE Gibraltar 16.11.x is not supported. This applies to both a single and dual supervisor module setup.
 - While performing ISSU from Cisco IOS XE Fuji 16.9.x to Cisco IOS XE Gibraltar 16.12.x, if **interface-id snmp-if-index** command is not configured with OSPFv3, packet loss can occur. Configure the **interface-id snmp-if-index** command either during the maintenance window or after isolating the device (by using maintenance mode feature) from the network before doing the ISSU.
 - While ISSU allows you to perform upgrades with zero downtime, we recommend you to do so during a maintenance window only.
 - If a new feature introduced in a software release requires a change in configuration, the feature should not be enabled during ISSU.
 - If a feature is not available in the downgraded version of a software image, the feature should be disabled before initiating ISSU.
- M.2 SATA SSD drive: With bootloader version 16.6.2r, you cannot access the M.2 SATA SSD drive at the ROMMON prompt (`rommon> dir disk0`). The system displays an error message indicating that the corresponding file system protocol is not found on the device. The only way to access the drive when on bootloader version 16.6.2r, is through the Cisco IOS prompt, after boot up.
- No service password recovery—With ROMMON versions R16.6.1r and R16.6.2r, the 'no service password-recovery' feature is not available.
- QoS restrictions
 - When configuring QoS queuing policy, the sum of the queuing buffer should not exceed 100%.
 - Policing and marking policy on sub interfaces is supported.
 - Marking policy on witched virtual interfaces (SVI) is supported.
 - QoS policies are not supported for port-channel interfaces, tunnel interfaces, and other logical interfaces.
 - Stack Queuing and Scheduling (SQS) drops CPU bound packets exceeding 1.4 Gbps.
- Redundancy—The supervisor module (hardware) supports redundancy. Software redundancy is supported starting with Cisco IOS XE Everest 16.6.2. However, the associated route processor redundancy (RPR) feature is not supported.

Before performing a switchover, use the **show redundancy**, **show platform**, and **show platform software iomd redundancy** commands to ensure that both the SSOs have formed and that the IOMD process is completed.

In the following sample output for the **show redundancy**, note that both the SSOs have formed.

```
Switch# show redundancy
Redundant System Information :
-----
Available system uptime = 3 hours, 30 minutes
Switchovers system experienced = 2
Standby failures = 0
Last switchover reason = active unit removed

Hardware Mode = Duplex
```

```

Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
-----
Active Location = slot 3
Current Software state = ACTIVE
Uptime in current state = 2 hours, 57 minutes
Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE),
Version 16.8.1, RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 27-Mar-18 13:43 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =
Configuration register = 0x1822

Peer Processor Information :
-----
Standby Location = slot 4
Current Software state = STANDBY HOT
Uptime in current state = 2 hours, 47 minutes
Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE),
Version 16.8.1, RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 27-Mar-18 13:43 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =
Configuration register = 0x1822

```

In the following sample output for the **show platform software iomd redundancy** command, note that both SSOs have formed and the `HA_STATE` field is `ready`.

```

Switch# show platform software iomd redundancy
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Local RF state = ACTIVE
Peer RF state = STANDBY HOT

slot  PSM STATE   SPA INTF   HA_STATE HA_ACTIVE
  1    ready      started   ready    00:01:16
  2    ready      started   ready    00:01:22
  3    ready      started   ready    00:01:27 ***active RP
  4    ready      started   ready    00:01:27
<output truncated>

```

In the following sample output for the **show platform** command, note that the `State` for all the linecards and supervisor modules is `ok`. This indicates that the IOMD processes are completed.

```

Switch# show platform
Chassis type: C9407R

Slot      Type                State                Insert time (ago)
-----
1         C9400-LC-24XS       ok                   3d09h
2         C9400-LC-48U        ok                   3d09h
R0        C9400-SUP-1         ok, active           3d09h
R1        C9400-SUP-1         ok, standby          3d09h
P1        C9400-PWR-3200AC    ok                   3d08h
P2        C9400-PWR-3200AC    ok                   3d08h

```

```
P17          C9407-FAN          ok          3d08h
<output truncated>
```

- Secure Shell (SSH)

- Use SSH Version 2. SSH Version 1 is not supported.
- When the device is running SCP and SSH cryptographic operations, expect high CPU until the SCP read process is completed. SCP supports file transfers between hosts on a network and uses SSH for the transfer.

Since SCP and SSH operations are currently not supported on the hardware crypto engine, running encryption and decryption process in software causes high CPU. The SCP and SSH processes can show as much as 40 or 50 percent CPU usage, but they do not cause the device to shutdown.

- Smart Licensing Using Policy: Starting with Cisco IOS XE Amsterdam 17.3.2a, with the introduction of Smart Licensing Using Policy, even if you configure a hostname for a product instance or device, only the Unique Device Identifier (UDI) is displayed. This change in the display can be observed in all licensing utilities and user interfaces where the hostname was displayed in earlier releases. It does not affect any licensing functionality. There is no workaround for this limitation.

The licensing utilities and user interfaces that are affected by this limitation include only the following: Cisco Smart Software Manager (CSSM), Cisco Smart License Utility (CSLU), and Smart Software Manager On-Prem (SSM On-Prem).

This limitation is removed from Cisco IOS XE Cupertino 17.9.1. If you configure a hostname and disable hostname privacy (**no license smart privacy hostname** global configuration command), hostname information is sent from the product instance and displayed on the applicable user interfaces (CSSM, CSLU, SSM On-Prem). For more information, see the command reference for this release.

- TACACS legacy command: Do not configure the legacy **tacacs-server host** command; this command is deprecated. If the software version running on your device is Cisco IOS XE Gibraltar 16.12.2 or a later release, using the legacy command can cause authentication failures. Use the **tacacs server** command in global configuration mode.
- Uplink Symmetry—When a redundant supervisor module is inserted, we recommend that you have symmetric uplinks, to minimize packet loss during a switchover.

Uplinks are said to be in symmetry when the same interface on both supervisor modules have the same type of transceiver module. For example, a TenGigabitEthernet interface with no transceiver installed operates at a default 10G mode; if the matching interface of the other supervisor has a 10G transceiver, then they are in symmetry. Symmetry provides the best SWO packet loss and user experience.

Asymmetric uplinks have at least one or more pairs of interfaces in one supervisor not matching the transceiver speed of the other supervisor.

- USB Authentication—When you connect a Cisco USB drive to the switch, the switch tries to authenticate the drive against an existing encrypted preshared key. Since the USB drive does not send a key for authentication, the following message is displayed on the console when you enter **password encryption aes** command:

```
Device(config)# password encryption aes
Master key change notification called without new or old key
```

- MACsec is not supported on Software-Defined Access deployments.
- VLAN Restriction—It is advisable to have well-defined segregation while defining data and voice domain during switch configuration and to maintain a data VLAN different from voice VLAN across the switch

stack. If the same VLAN is configured for data and voice domains on an interface, the resulting high CPU utilization might affect the device.

- YANG data modeling limitation—A maximum of 20 simultaneous NETCONF sessions are supported.
- Embedded Event Manager—Identity event detector is not supported on Embedded Event Manager.
- The File System Check (fsck) utility is not supported in install mode.



CHAPTER 7

ROMMON and CPLD Versions

- [ROMMON and CPLD Versions, on page 31](#)

ROMMON and CPLD Versions

ROM Monitor (ROMMON)

ROMMON, also known as the boot loader, is firmware that runs when the device is powered up or reset. It initializes the processor hardware and boots the operating system software (Cisco IOS XE software image). The ROMMON is stored on the following Serial Peripheral Interface (SPI) flash devices on your switch:

- Primary: The ROMMON stored here is the one the system boots every time the device is powered-on or reset.
- Golden: The ROMMON stored here is a backup copy. If the one in the primary is corrupted, the system automatically boots the ROMMON in the golden SPI flash device.

ROMMON upgrades may be required to resolve firmware defects, or to support new features, but there may not be new versions with every release.

Complex Programmable Logic Device (CPLD)

CPLD refers to hardware-programmable firmware. CPLD upgrades may be required to resolve firmware defects, or to support new features, but there may not be new versions with every release. CPLD version upgrade process must be completed after upgrading the software image.

The following table provides ROMMON and CPLD version information for the Cisco Catalyst 9400 Series Supervisor Modules. For ROMMON and CPLD version information of Cisco IOS XE 16.x.x releases, refer to the corresponding Cisco IOS XE 16.x.x release notes of the respective platform.

Release	ROMMON Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	CPLD Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	ROMMON Version (C9400X-SUP-2, C9400X-SUP-2XL)	CPLD Version (C9400X-SUP-2, C9400X-SUP-2XL)
Dublin 17.10.1	17.10.1r	20062105	17.9.1r[FC1]	21080305
Cupertino 17.9.5	17.8.1r[FC1]	20062105	17.9.3r	21080305

Release	ROMMON Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	CPLD Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	ROMMON Version (C9400X-SUP-2, C9400X-SUP-2XL)	CPLD Version (C9400X-SUP-2, C9400X-SUP-2XL)
Cupertino 17.9.4	17.8.1r[FC1]	20062105	17.9.3r	21080305
Cupertino 17.9.3	17.8.1r[FC1]	20062105	17.9.3r	21080305
Cupertino 17.9.2	17.8.1r[FC1]	20062105	17.9.2r	21080305
Cupertino 17.9.1	17.8.1r[FC1]	20062105	17.9.1r[FC1]	21080305
Cupertino 17.8.1	17.8.1r[FC1]	20062105	17.8.1r[FC1]	21080305
Cupertino 17.7.1	17.6.1r[FC2]	20062105	17.7.1r[FC3]	21080305
Bengaluru 17.6.7	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.6a	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.6	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.5	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.4	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.3	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.2	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.6.1	17.6.1r[FC2]	20062105	-	-
Bengaluru 17.5.1	17.5.1r	20062105	-	-
Bengaluru 17.4.1	17.3.1r[FC2]	20062105	-	-
Amsterdam 17.3.8a	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.8	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.7	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.6	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.5	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.4	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.3	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.2a	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.3.1	17.3.1r[FC2]	19082605	-	-
Amsterdam 17.2.1	17.1.1r	19082605	-	-

Release	ROMMON Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	CPLD Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	ROMMON Version (C9400X-SUP-2, C9400X-SUP-2XL)	CPLD Version (C9400X-SUP-2, C9400X-SUP-2XL)
Amsterdam 17.1.1	17.1.1r	19032905	-	-



CHAPTER 8

Upgrading the Switch Software

- [Finding the Software Version, on page 35](#)
- [Software Images, on page 35](#)
- [Upgrading the ROMMON, on page 36](#)
- [Software Installation Commands, on page 36](#)
- [Upgrading in Install Mode, on page 37](#)
- [Downgrading in Install Mode, on page 43](#)
- [Upgrading the Complex Programmable Logic Device Version, on page 51](#)

Finding the Software Version

The package files for the Cisco IOS XE software are stored on the system board flash device (flash:).

You can use the **show version** privileged EXEC command to see the software version that is running on your switch.



Note Although the **show version** output always shows the software image running on the switch, the model name shown at the end of this display is the factory configuration and does not change if you upgrade the software license.

You can also use the **dir filesystem:** privileged EXEC command to see the directory names of other software images that you might have stored in flash memory.

Software Images

Release	Image Type	File Name
Cisco IOS XE Dublin 17.10.1	CAT9K_IOSXE	cat9k_iosxe.17.10.01.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.10.01.SPA.bin

Upgrading the ROMMON

To know the ROMMON or bootloader version that applies to every major and maintenance release, see [ROMMON and CPLD Versions, on page 31](#).

You can upgrade the ROMMON before, or, after upgrading the software version. If a new ROMMON version is available for the software version you are upgrading to, proceed as follows:

- Upgrading the ROMMON in the primary SPI flash device

This ROMMON is upgraded automatically. When you upgrade from an existing release on your switch to a later or newer release for the first time, and there is a new ROMMON version in the new release, the system automatically upgrades the ROMMON in the primary SPI flash device, based on the hardware version of the switch.

- Upgrading the ROMMON in the golden SPI flash device

You must manually upgrade this ROMMON. Enter the **upgrade rom-monitor capsule golden switch** command in privileged EXEC mode.



Note

- Golden ROMMON upgrade is only applicable to Cisco IOS XE Amsterdam 17.3.5 and later releases.
- Golden ROMMON upgrade will fail if the FPGA version is 17101705 or older. To upgrade the FPGA version, see [Upgrading the Complex Programmable Logic Device Version, on page 51](#).
- In case of a Cisco StackWise Virtual setup, upgrade the active and standby supervisor modules.
- In case of a High Availability set up, upgrade the active and standby supervisor modules.

After the ROMMON is upgraded, it will take effect on the next reload. If you go back to an older release after this, the ROMMON is not downgraded. The updated ROMMON supports all previous releases.

Software Installation Commands

Summary of Software Installation Commands	
To install and activate the specified file, and to commit changes to be persistent across reloads:	
install add file <i>filename</i> [activate commit]	
To separately install, activate, commit, cancel, or remove the installation file: install ?	
add file tftp: <i>filename</i>	Copies the install file package from a remote location to the device and performs a compatibility check for the platform and image versions.

Summary of Software Installation Commands	
activate [auto-abort-timer]	Activates the file, and reloads the device. The auto-abort-timer keyword automatically rolls back image activation.
commit	Makes changes persistent over reloads.
rollback to committed	Rolls back the update to the last committed version.
abort	Cancels file activation, and rolls back to the version that was running before the current installation procedure started.
remove	Deletes all unused and inactive software installation files.

Upgrading in Install Mode

Follow these instructions to upgrade from one release to another, in install mode. To perform a software image upgrade, you must be booted into IOS via **boot flash:packages.conf**.

Before you begin



Caution You must comply with these cautionary guidelines during an upgrade:

- Do not power cycle the switch.
- Do not disconnect power or remove the supervisor module.
- Do not perform an online insertion and replacement (OIR) of either supervisor (in a High Availability setup), if one of the supervisor modules in the chassis is in the process of a bootloader upgrade or when the switch is booting up.
- Do not perform an OIR of a switching module (linecard) when the switch is booting up.



Note Disconnecting and reconnecting power to a Cisco Catalyst 9400 Series Supervisor 1 Module within a 5-second window, can corrupt the boot SPI.

Note that you can use this procedure for the following upgrade scenarios.

When upgrading from ...	Permitted Supervisor Setup (Applies to the release you are upgrading from)	First upgrade to...	To upgrade to ...
Cisco IOS XE Everest 16.6.1 ⁵	Upgrade a single supervisor, and complete the boot loader and CPLD upgrade. After completing the first supervisor upgrade, remove and swap in the second supervisor. After both supervisors are upgraded, they can be inserted and booted in a high availability setup. Note Do not simultaneously upgrade dual supervisors from Cisco IOS XE Everest 16.6.1 to a later release. Doing so may cause hardware damage.	Cisco IOS XE Everest 16.6.3 Follow the upgrade steps as in the Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Everest 16.6.x → Upgrading the Switch Software → Upgrading in Install Mode	Cisco IOS XE Dublin 17.10.x
Cisco IOS XE Everest 16.6.2 and later releases	This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously upgraded.	Not applicable	

⁵ When upgrading from Cisco IOS XE Everest 16.6.1 to a later release, the upgrade may take a long time, and the system will reset three times due to rommon and complex programmable logic device (CPLD) upgrade. Stateful switchover is supported from Cisco IOS XE Everest 16.6.2

The sample output in this section displays upgrade from Cisco IOS XE Cupertino 17.9.1 to Cisco IOS XE Dublin 17.10.1 using **install** commands.

Procedure

Step 1

Clean-up

install remove inactive

Use this command to clean-up old installation files in case of insufficient space and to ensure that you have at least 1GB of space in flash, to expand a new image.

The following sample output displays the cleaning up of unused files, by using the **install remove inactive** command:

```
Switch# install remove inactive
install_remove: START Fri Nov 11 14:14:40 UTC 2022
Cleaning up unnecessary package files
No path specified, will use booted path flash:packages.conf
Cleaning flash:
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat9k-cc_srdriver.17.09.01.SPA.pkg
```

```

File is in use, will not delete.
cat9k-espbase.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-rpbase.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-rpboot.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-sipbase.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-sipspa.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-srdriver.17.09.01.SPA.pkg
File is in use, will not delete.
cat9k-webui.17.09.01.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.

```

The following files will be deleted:

```

[R0]:
/flash/cat9k-cc_srdriver.17.09.01.SPA.pkg
/flash/cat9k-espbase.17.09.01.SPA.pkg
/flash/cat9k-guestshell.17.09.01.SPA.pkg
/flash/cat9k-rpbase.17.09.01.SPA.pkg
/flash/cat9k-rpboot.17.09.01.SPA.pkg
/flash/cat9k-sipbase.17.09.01.SPA.pkg
/flash/cat9k-sipspa.17.09.01.SPA.pkg
/flash/cat9k-srdriver.17.09.01.SPA.pkg
/flash/cat9k-webui.17.09.01.SPA.pkg
/flash/cat9k-wlc.17.09.01.SPA.pkg
/flash/packages.conf
/flash/cat9k_iosxe.17.09.01.SPA.bin

```

Do you want to remove the above files? [y/n/y]

```

[R0]:
Deleting file flash:cat9k-cc_srdriver.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-guestshell.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.17.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-wlc.17.09.01.SPA.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
SUCCESS: Files deleted.
--- Starting Post_Remove_Cleanup ---
Performing Post_Remove_Cleanup on Active/Standby
[R0] Post_Remove_Cleanup package(s) on R0
[R0] Finished Post_Remove_Cleanup on R0
Checking status of Post_Remove_Cleanup on [R0]
Post_Remove_Cleanup: Passed on [R0]
Finished Post_Remove_Cleanup

SUCCESS: install_remove Fri Nov 11 14:16:29 UTC 2022
Switch#

```

Step 2 Copy new image to flash

a) **copy tftp:[//location/]directory/filenameflash:**

Use this command to copy the new image from a TFTP server to flash memory. The location is either an IP address or a host name. The filename is specified relative to the directory used for file transfers. Skip this step if you want to use the new image from a TFTP server.

```
Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.10.01.SPA.bin flash:
destination filename [cat9k_iosxe.17.10.01.SPA.bin]?
Accessing tftp://10.8.0.6/image/cat9k_iosxe.17.10.01.SPA.bin...
Loading /cat9k_iosxe.17.10.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 601216545 bytes]

601216545 bytes copied in 50.649 secs (11870255 bytes/sec)
```

b) **dir flash:**

Use this command to confirm that the image has been successfully copied to flash.

```
Switch# dir flash:*.bin
Directory of flash:/*.bin

Directory of flash:/

434184 -rw- 601216545   Nov 11 2022 10:18:11 -07:00 cat9k_iosxe.17.10.01.SPA.bin
11353194496 bytes total (8976625664 bytes free)
```

Step 3 Set boot variable

a) **boot system flash:packages.conf**

Use this command to set the boot variable to **flash:packages.conf**.

```
Switch(config)# boot system flash:packages.conf
```

b) **no boot manual**

Use this command to configure the switch to auto-boot. Settings are synchronized with the standby switch, if applicable.

```
Switch(config)# no boot manual
Switch(config)# exit
```

c) **write memory**

Use this command to save boot settings.

```
Switch# write memory
```

d) **show bootvar**

Use this command to verify the boot variable (packages.conf) and manual boot setting (no):

```
Switch# show bootvar
BOOT variable = bootflash:packages.conf
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =

Standby BOOT variable = bootflash:packages.conf
Standby MANUAL_BOOT variable = no
Standby BAUD variable = 9600
Standby ENABLE_BREAK variable = yes
```

```
Standby BOOTMODE variable does not exist
Standby IPXE_TIMEOUT variable does not exist
Standby CONFIG_FILE variable =
```

Step 4 Install image to flash **install add file activate commit**

Use this command to install the image.

The following sample output displays installation of the Cisco IOS XE Dublin 17.10.1 software image in the flash memory:

```
Switch# install add file flash:cat9k_iosxe.17.10.01.SPA.bin
activate commit

install_add_activate_commit: START Fri Nov 11 22:49:41 UTC 2022

*Nov 11 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Nov 11 22:49:42 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install one-shot flash:cat9k_iosxe.17.10.01.SPA.bin

install_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.17.10.01.SPA.bin
to the selected switch(es)
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
[1] Add package(s) on switch 1
[1] Finished Add on switch 1
Checking status of Add on [1]
Add: Passed on [1]
Finished Add

install_add_activate_commit: Activating PACKAGE

/flash/cat9k-webui.17.10.01.SPA.pkg
/flash/cat9k-srdriver.17.10.01.SPA.pkg
/flash/cat9k-sipspa.17.10.01.SPA.pkg
/flash/cat9k-sipbase.17.10.01.SPA.pkg
/flash/cat9k-rpboot.17.10.01.SPA.pkg
/flash/cat9k-rpbase.17.10.01.SPA.pkg
/flash/cat9k-guestshell.17.10.01.SPA.pkg
/flash/cat9k-espbase.17.10.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.10.01.SPA.pkg

This operation requires a reload of the system. Do you want to proceed? [y/n/y]

--- Starting Activate ---
Performing Activate on all members
[1] Activate package(s) on switch 1
[1] Finished Activate on switch 1
Checking status of Activate on [1]
Activate: Passed on [1]
Finished Activate

--- Starting Commit ---
Performing Commit on all members
[1] Commit package(s) on switch 1
[1] Finished Commit on switch 1
Checking status of Commit on [1]
Commit: Passed on [1]
```

```

Finished Commit

Install will reload the system now!

Chassis 1 reloading, reason - Reload command
SUCCESS: install_add_activate_commit
/flash/cat9k-webui.17.10.01.SPA.pkg
/flash/cat9k-srdriver.17.10.01.SPA.pkg
/flash/cat9k-sipspace.17.10.01.SPA.pkg
/flash/cat9k-sipbase.17.10.01.SPA.pkg
/flash/cat9k-rpboot.17.10.01.SPA.pkg
/flash/cat9k-rpbase.17.10.01.SPA.pkg
/flash/cat9k-guestshell.17.10.01.SPA.pkg
/flash/cat9k-espbase.17.10.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.10.01.SPA.pkg
Fri Nov 11 22:53:58 UTC 2022
Switch#

```

Note Old files listed in the logs will not be removed from flash.

Step 5 Verify installation

After the software has been successfully installed, check that the ten new .pkg files and two .conf are in the flash partition, and also check the version installed on the switch.

a) **dir flash:*.pkg**

The following is sample output of the **dir flash:*.pkg** command:

```

Switch# dir flash:*.pkg
Directory of flash:/*.*.pkg
Directory of flash:/
475140 -rw- 2012104      Jul 20 2022 09:52:41 -07:00 cat9k-cc_srdriver.17.09.01.SPA.pkg
475141 -rw- 70333380     Jul 20 2022 09:52:44 -07:00 cat9k-espbase.17.09.01.SPA.pkg
475142 -rw- 13256       Jul 20 2022 09:52:44 -07:00 cat9k-guestshell.17.09.01.SPA.pkg
475143 -rw- 349635524     Jul 20 2022 09:52:54 -07:00 cat9k-rpbase.17.09.01.SPA.pkg
475149 -rw- 24248187     Jul 20 2022 09:53:02 -07:00 cat9k-rpboot.17.09.01.SPA.pkg
475144 -rw- 25285572     Jul 20 2022 09:52:55 -07:00 cat9k-sipbase.17.09.01.SPA.pkg
475145 -rw- 20947908     Jul 20 2022 09:52:55 -07:00 cat9k-sipspace.17.09.01.SPA.pkg
475146 -rw- 2962372     Jul 20 2022 09:52:56 -07:00 cat9k-srdriver.17.09.01.SPA.pkg
475147 -rw- 13284288    Jul 20 2022 09:52:56 -07:00 cat9k-webui.17.09.01.SPA.pkg
475148 -rw- 13248       Jul 20 2022 09:52:56 -07:00 cat9k-wlc.17.09.01.SPA.pkg

491524 -rw- 25711568    Nov 11 2022 11:49:33 -07:00 cat9k-cc_srdriver.17.10.01.SPA.pkg
491525 -rw- 78484428    Nov 11 2022 11:49:35 -07:00 cat9k-espbase.17.10.01.SPA.pkg
491526 -rw- 1598412     Nov 11 2022 11:49:35 -07:00 cat9k-guestshell.17.10.01.SPA.pkg
491527 -rw- 404153288   Nov 11 2022 11:49:47 -07:00 cat9k-rpbase.17.10.01.SPA.pkg
491533 -rw- 31657374     Nov 11 2022 11:50:09 -07:00 cat9k-rpboot.17.10.01.SPA.pkg
491528 -rw- 27681740    Nov 11 2022 11:49:48 -07:00 cat9k-sipbase.17.10.01.SPA.pkg
491529 -rw- 52224968    Nov 11 2022 11:49:49 -07:00 cat9k-sipspace.17.10.01.SPA.pkg
491530 -rw- 31130572    Nov 11 2022 11:49:50 -07:00 cat9k-srdriver.17.10.01.SPA.pkg
491531 -rw- 14783432    Nov 11 2022 11:49:51 -07:00 cat9k-webui.17.10.01.SPA.pkg
491532 -rw- 9160       Nov 11 2022 11:49:51 -07:00 cat9k-wlc.17.10.01.SPA.pkg
11353194496 bytes total (8963174400 bytes free)

```

b) **dir flash:*.conf**

The following is sample output of the **dir flash:*.conf** command. It displays the .conf files in the flash partition; note the two .conf files:

```

Switch# dir flash:*.conf

Directory of flash:/*.*.conf

```

```
Directory of flash:/
16631  -rw- 4882 Nov 11 2022 05:39:42 +00:00  packages.conf
16634  -rw- 4882 Nov 11 2022 05:34:06 +00:00  cat9k_iosxe.17.10.01.SPA.conf
```

- `packages.conf`—the file that has been re-written with the newly installed .pkg files
- `cat9k_iosxe.17.10.01.SPA.conf`— a backup copy of the newly installed `packages.conf` file

c) **show install summary**

The following is sample output of the **show install summary** command:

```
Switch# show install summary

[ R0 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
C - Activated & Committed, D - Deactivated & Uncommitted
-----
Type St Filename/Version
-----
IMG C 17.10.01.0.58

-----
Auto abort timer: inactive
-----
```

d) **show version**

After the image boots up, use this command to verify the version of the new image.

The following sample output of the **show version** command displays the Cisco IOS XE Dublin 17.10.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.10.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.10.1,
  RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2022 by Cisco Systems, Inc.
<output truncated>
```

Downgrading in Install Mode

Follow these instructions to downgrade from one release to another, in install mode. To perform a software image downgrade, you must be booted into IOS via **boot flash:packages.conf**.

Before you begin

Note that you can use this procedure for the following downgrade scenarios:

When downgrading from ...	Permitted Supervisor Setup (Applies to the release you are downgrading from)	To ...
Cisco IOS XE Dublin 17.10.x	This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously downgraded. Note Do not perform an Online Removal and Replacement (OIR) of either supervisor module during the process.	Cisco IOS XE Cupertino 17.9.x or earlier releases.



Note New switch models that are introduced in a release cannot be downgraded. The release in which a module is introduced is the minimum software version for that model. We recommend upgrading all existing hardware to the same release as the latest hardware.

The sample output in this section shows downgrade from Cisco IOS XE Dublin 17.10.1 to Cisco IOS XE Cupertino 17.9.1, using **install** commands.

Procedure

Step 1

Clean-up

install remove inactive

Use this command to clean-up old installation files in case of insufficient space and to ensure that you have at least 1GB of space in flash, to expand a new image.

The following sample output displays the cleaning up of unused files, by using the **install remove inactive** command:

```
Switch# install remove inactive
install_remove: START Fri Nov 11 11:42:27 UTC 2022

Cleaning up unnecessary package files

No path specified, will use booted path bootflash:packages.conf

Cleaning bootflash:
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat9k-cc_srdriver.17.10.01.SSA.pkg
File is in use, will not delete.
cat9k-espbase.17.10.01.SSA.pkg
File is in use, will not delete.
cat9k-guestshell.17.10.01.SSA.pkg
File is in use, will not delete.
cat9k-rpbase.17.10.01.SSA.pkg
File is in use, will not delete.
cat9k-rpboot.17.10.01.SSA.pkg
File is in use, will not delete.
cat9k-sipbase.17.10.01.SSA.pkg
File is in use, will not delete.
```



```

cat9k-sipsa.17.10.01.SSA.pkg
  File is in use, will not delete.
cat9k-srdriver.17.10.01.SSA.pkg
  File is in use, will not delete.
cat9k-webui.17.10.01.SSA.pkg
  File is in use, will not delete.
cat9k-wlc.17.10.01.SSA.pkg
  File is in use, will not delete.
packages.conf
  File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.

SUCCESS: install_remove  Fri Nov 11 11:42:39 UTC 2022

--- Starting Post_Remove_Cleanup ---
Performing Post_Remove_Cleanup on all members
[1] Post_Remove_Cleanup package(s) on switch 1
[1] Finished Post_Remove_Cleanup on switch 1
Checking status of Post_Remove_Cleanup on [1]
Post_Remove_Cleanup: Passed on [1]
Finished Post_Remove_Cleanup

SUCCESS: install_remove  Fri Nov 11 19:52:25 UTC 2022
Switch#

```

Step 2 Copy new image to flash

a) **copy tftp:[//location/]directory/filenameflash:**

Use this command to copy the new image from a TFTP server to flash memory. The location is either an IP address or a host name. The filename is specified relative to the directory used for file transfers. Skip this step if you want to use the new image from a TFTP server.

```

Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.09.01.SPA.bin flash:
Destination filename [cat9k_iosxe.17.09.01.SPA.bin]?
Accessing tftp://10.8.0.6//cat9k_iosxe.17.09.01.SPA.bin...
Loading /cat9k_iosxe.17.09.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 508584771 bytes]
508584771 bytes copied in 101.005 secs (5035244 bytes/sec)

```

b) **dir flash:**

Use this command to confirm that the image has been successfully copied to flash.

```

Switch# dir flash:*.bin
Directory of flash:/*.bin

Directory of flash:/

434184 -rw- 508584771 Nov 11 2022 13:35:16 -07:00 cat9k_iosxe.17.09.01.SPA.bin
11353194496 bytes total (9055866880 bytes free)

```

Step 3 Set boot variable

a) **boot system flash:packages.conf**

Use this command to set the boot variable to **flash:packages.conf**.

```

Switch(config)# boot system flash:packages.conf

```

b) no boot manual

Use this command to configure the switch to auto-boot. Settings are synchronized with the standby switch, if applicable.

```
Switch(config)# no boot manual
Switch(config)# exit
```

c) write memory

Use this command to save boot settings.

```
Switch# write memory
```

d) show bootvar

Use this command to verify the boot variable (packages.conf) and manual boot setting (no):

```
Switch# show bootvar
BOOT variable = bootflash:packages.conf
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =

Standby BOOT variable = bootflash:packages.conf
Standby MANUAL_BOOT variable = no
Standby BAUD variable = 9600
Standby ENABLE_BREAK variable = yes
Standby BOOTMODE variable does not exist
Standby IPXE_TIMEOUT variable does not exist
Standby CONFIG_FILE variable =
```

Step 4 Downgrade software image

Use one of these options, to downgrade:

- **install add file activate commit**
- **install rollback to committed**

The following example displays the installation of the `cat9k_iosxe.17.09.01.SPA.bin` software image to flash, to downgrade the switch by using the **install add file activate commit** command. You can point to the source image on your tftp server or in flash if you have it copied to flash.

```
Switch# install add file flash:cat9k_iosxe.17.09.01.SPA.bin activate commit

install_add_activate_commit: START Fri 11 Nov 22:49:41 UTC 2022

*Nov 11 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Nov 11 22:49:42 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install one-shot
flash:cat9k_iosxe.17.09.01.SPA.bininstall_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.17.09.01.SPA.bin to the selected switch(es)
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
[1] Add package(s) on switch 1
[1] Finished Add on switch 1
Checking status of Add on [1]
Add: Passed on [1]
```

```

Finished Add

install_add_activate_commit: Activating PACKAGE

/flash/cat9k-webui.17.09.01.SPA.pkg
/flash/cat9k-srdriver.17.09.01.SPA.pkg
/flash/cat9k-sipspa.17.09.01.SPA.pkg
/flash/cat9k-sipbase.17.09.01.SPA.pkg
/flash/cat9k-rpboot.17.09.01.SPA.pkg
/flash/cat9k-rpbase.17.09.01.SPA.pkg
/flash/cat9k-espbase.17.09.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.09.01.SPA.pkg

This operation requires a reload of the system. Do you want to proceed? [y/n]

--- Starting Activate ---
Performing Activate on all members
[1] Activate package(s) on switch 1
[1] Finished Activate on switch 1
Checking status of Activate on [1]
Activate: Passed on [1]
Finished Activate

--- Starting Commit ---
Performing Commit on all members
[1] Commit package(s) on switch 1
[1] Finished Commit on switch 1
Checking status of Commit on [1]
Commit: Passed on [1]
Finished Commit

Install will reload the system now!

Chassis 1 reloading, reason - Reload command
SUCCESS: install_add_activate_commit
/flash/cat9k-webui.17.09.01.SPA.pkg
/flash/cat9k-srdriver.17.09.01.SPA.pkg
/flash/cat9k-sipspa.17.09.01.SPA.pkg
/flash/cat9k-sipbase.17.09.01.SPA.pkg
/flash/cat9k-rpboot.17.09.01.SPA.pkg
/flash/cat9k-rpbase.17.09.01.SPA.pkg
/flash/cat9k-guestshell.17.09.01.SPA.pkg
/flash/cat9k-espbase.17.09.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.09.01.SPA.pkg
Fri Nov 11 22:53:58 UTC 2022
Switch#

```

The following example displays sample output when downgrading the switch by using the **install rollback to committed** command.

Caution Use the **install rollback to committed** command for downgrading, *only* if the version you want to downgrade to, is committed.

```

Switch# install rollback to committed

install_rollback: START Fri 11 Nov 14:24:56 UTC 2022

This operation requires a reload of the system. Do you want to proceed? [y/n]
*Nov 11 14:24:57.555: %IOSXE-5-PLATFORM: R0/0: Nov 11 14:24:57 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install rollback
--- Starting Rollback ---
Performing Rollback on Active/Standby

```

```
WARNING: Found 55 disjoint TDL objects.
[R0] Rollback package(s) on R0
--- Starting rollback impact ---
```

```
Changes that are part of this rollback
Current : rp 0 0 rp_boot cat9k-rpboot.17.10.01.SPA.pkg
Current : rp 1 0 rp_boot cat9k-rpboot.17.10.01.SPA.pkg
Replacement: rp 0 0 rp_boot cat9k-rpboot.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_boot cat9k-rpboot.17.09.01.SPA.pkg
Current : cc 0 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 0 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 0 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 1 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 1 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 1 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 10 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 10 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 10 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 2 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 2 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 2 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 3 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 3 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 3 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 4 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 4 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 4 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 5 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 5 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 5 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 6 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 6 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 6 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 7 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 7 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 7 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 8 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 8 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 8 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : cc 9 0 cc_srdriver cat9k-cc_srdriver.17.10.01.SPA.pkg
Current : cc 9 0 cc_cat9k-sipbase.17.10.01.SPA.pkg
Current : cc 9 0 cc_spa cat9k-sipspa.17.10.01.SPA.pkg
Current : fp 0 0 fp_cat9k-espbase.17.10.01.SPA.pkg
Current : fp 1 0 fp_cat9k-espbase.17.10.01.SPA.pkg
Current : rp 0 0 guestshell cat9k-guestshell.17.10.01.SPA.pkg
Current : rp 0 0 rp_base cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 0 0 rp_daemons cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 0 0 rp_iosd cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 0 0 rp_security cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 0 0 rp_webui cat9k-webui.17.10.01.SPA.pkg
Current : rp 0 0 rp_wlc cat9k-wlc.17.10.01.SPA.pkg
Current : rp 0 0 srdriver cat9k-srdriver.17.10.01.SPA.pkg
Current : rp 1 0 guestshell cat9k-guestshell.17.10.01.SPA.pkg
Current : rp 1 0 rp_base cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 1 0 rp_daemons cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 1 0 rp_iosd cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 1 0 rp_security cat9k-rpbase.17.10.01.SPA.pkg
Current : rp 1 0 rp_webui cat9k-webui.17.10.01.SPA.pkg
Current : rp 1 0 rp_wlc cat9k-wlc.17.10.01.SPA.pkg
Current : rp 1 0 srdriver cat9k-srdriver.17.10.01.SPA.pkg
Replacement: cc 0 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 0 0 cc_cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 0 0 cc_spa cat9k-sipspa.17.09.01.SPA.pkg
Replacement: cc 1 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
```

```

Replacement: cc 1 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 1 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 10 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 10 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 10 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 2 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 2 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 2 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 3 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 3 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 3 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 4 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 4 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 4 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 5 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 5 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 5 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 6 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 6 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 6 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 7 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 7 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 7 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 8 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 8 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 8 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: cc 9 0 cc_srdriver cat9k-cc_srdriver.17.09.01.SPA.pkg
Replacement: cc 9 0 cc cat9k-sipbase.17.09.01.SPA.pkg
Replacement: cc 9 0 cc_spa cat9k-sipspace.17.09.01.SPA.pkg
Replacement: fp 0 0 fp cat9k-espace.17.09.01.SPA.pkg
Replacement: fp 1 0 fp cat9k-espace.17.09.01.SPA.pkg
Replacement: rp 0 0 guestshell cat9k-guestshell.17.09.01.SPA.pkg
Replacement: rp 0 0 rp_base cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 0 0 rp_daemons cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 0 0 rp_iosd cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 0 0 rp_security cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 0 0 rp_webui cat9k-webui.17.09.01.SPA.pkg
Replacement: rp 0 0 srdriver cat9k-srdriver.17.09.01.SPA.pkg
Replacement: rp 1 0 guestshell cat9k-guestshell.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_base cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_daemons cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_iosd cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_security cat9k-rpbase.17.09.01.SPA.pkg
Replacement: rp 1 0 rp_webui cat9k-webui.17.09.01.SPA.pkg
Replacement: rp 1 0 srdriver cat9k-srdriver.17.09.01.SPA.pkg

```

```

Finished rollback impact
[R0] Finished Rollback on R0
Checking status of Rollback on [R0]
Rollback: Passed on [R0]
Finished Rollback

```

```

Install will reload the system now!
SUCCESS: install_rollback Fri 11 Nov 14:26:35 UTC 2022

```

```

Switch#
*Nov 11 14:26:35.880: %IOSXE-5-PLATFORM: R0/0: Nov 11 14:26:35 install_engine.sh:
%INSTALL-5-INSTALL_COMPLETED_INFO: Completed install rollback PACKAGE
*Nov 11 14:26:37.740: %IOSXE_OIR-6-REMCARD: Card (rp) removed from slot R1
*Nov 11 14:26:39.253: %IOSXE_OIR-6-INSCARD: Card (rp) inserted in slot R1 Nov 11 14:26:5

```

```

Initializing Hardware...

```

```

System Bootstrap, Version 17.3.1r

```

Compiled Tue 03/16/2022 10:19:23.77 by rel

Current image running:
Primary Rommon Image

Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Preparing to autoboot. [Press Ctrl-C to interrupt] 0
attempting to boot from [bootflash:packages.conf]

Located file packages.conf

#

Warning: ignoring ROMMON var "BOOT_PARAM"
Warning: ignoring ROMMON var "USER_BOOT_PARAM"

Restricted Rights Legend

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c) of the Commercial Computer Software - Restricted Rights clause at FAR sec. 52.227-19 and subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS sec. 252.227-7013.

cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706
Cisco IOS XE Software, Version 17.09.01
Cisco IOS Software [Cupertino], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.09.1, RELEASE SOFTWARE (fc1)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Fri 11-Nov-22 23:25 by mcpre

Cisco IOS-XE software, Copyright (c) 2005-2017 by cisco Systems, Inc. All rights reserved. Certain components of Cisco IOS-XE software are licensed under the GNU General Public License ("GPL") Version 2.0. The software code licensed under GPL Version 2.0 is free software that comes with ABSOLUTELY NO WARRANTY. You can redistribute and/or modify such GPL code under the terms of GPL Version 2.0. For more details, see the documentation or "License Notice" file accompanying the IOS-XE software, or the applicable URL provided on the flyer accompanying the IOS-XE software.

FIPS: Flash Key Check : Begin
FIPS: Flash Key Check : End, Not Found, FIPS Mode Not Enabled

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to

```

export@cisco.com.

cisco C9410R (X86) processor (revision V00) with 868521K/6147K bytes of memory.
Processor board ID FXS2118Q1GM
312 Gigabit Ethernet interfaces
40 Ten Gigabit Ethernet interfaces
4 Forty Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
15958516K bytes of physical memory.
11161600K bytes of Bootflash at bootflash:.
1638400K bytes of Crash Files at crashinfo:.
0K bytes of WebUI ODM Files at webui:.

%INIT: waited 0 seconds for NVRAM to be available

Press RETURN to get started!

```

Step 5 Verify version**show version**

After the image boots up, use this command to verify the version of the new image.

Note When you downgrade the software image, the ROMMON version does not downgrade. It remains updated.

The following sample output of the **show version** command displays the Cisco IOS XE Cupertino 17.9.1 image on the device:

```

Switch# show version
Cisco IOS XE Software, Version 17.09.01
Cisco IOS Software [Cupertino], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.9.1,
  RELEASE SOFTWARE (fcl)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2022 by Cisco Systems, Inc.
<output truncated>

```

Upgrading the Complex Programmable Logic Device Version

You can trigger a CPLD version upgrade after upgrading the software image. During CPLD upgrade, the supervisor module automatically power cycles. This completes the CPLD upgrade process for the supervisor module but also causes traffic disruption. Therefore, auto-upgrade of CPLD is not supported. You must manually perform CPLD upgrade.

Upgrading the CPLD Version: High Availability Setup

Beginning in the privileged EXEC mode, complete the following steps:

Before you begin

When performing the CPLD version upgrade as shown, the **show platform** command can be used to confirm the CPLD version after the upgrade. This command output shows the CPLD version on all modules. However, the CPLD upgrade only applies to the supervisors, not the line cards. The line cards CPLD version is a cosmetic

display. After the upgrade is completed in a high availability setup, the supervisors will be upgraded, but the line cards will still show the old CPLD version. The version mismatch between the supervisors and line cards is expected until a chassis reload.

Procedure

Step 1 Upgrade the CPLD Version of the standby supervisor module

Enter the following commands on the active supervisor:

- a) Device# **configure terminal**
- b) Device(config)# **service internal**
- c) Device(config)# **exit**
- d) Device# **upgrade hw-programmable cpld filename bootflash: rp standby**

The standby supervisor module reloads automatically and the upgrade occurs in ROMMON. During the upgrade, the supervisor module automatically power cycles and remains inactive for approximately 5 minutes.

Wait until the standby supervisor module boots up and the SSO has formed (HOT) before you proceed to the next step; this takes approximately 17 minutes.

Step 2 Perform a switch over

- a) Device# **redundancy force-switchover**

This causes the standby supervisor (on which you have completed the CPLD upgrade in Step 1) to become the active supervisor module

Step 3 Upgrade the CPLD Version of the new standby supervisor module

Repeat Step 1 and all its substeps.

Note Do not operate an HA system with mismatched FPGA versions. FPGA version should be upgraded on both the supervisors one at a time.

Upgrading the CPLD Version: Cisco StackWise Virtual Setup

Beginning in the privileged EXEC mode, complete the following steps:

Procedure

Step 1 Upgrade the CPLD version of the standby supervisor module

Enter the following commands on the active supervisor:

- a) Device# **configure terminal**
- b) Device(config)# **service internal**
- c) Device(config)# **exit**
- d) Device# **upgrade hw-programmable cpld filename bootflash: switch standby r1**

Note For the **upgrade hw-programmable cpld filename bootflash** command, configure with the **switch** keyword only. The other available keywords are not applicable when upgrading with Cisco StackWise Virtual.

Step 2 Reload the standby supervisor module

a) Device# **redundancy reload peer**

The upgrade occurs in ROMMON. During the upgrade, the supervisor module automatically power cycles and remains inactive for approximately 5 minutes.

Wait until the standby supervisor module boots up and the SSO has formed (HOT) before you proceed to the next step; this takes approximately 17 minutes.

Step 3 Perform a switch over

a) Device# **redundancy force-switchover**

This causes the standby supervisor (on which you have completed the CPLD upgrade in step 1) to become the active supervisor module

Step 4 Upgrade the CPLD version of the new standby supervisor module

Perform Steps 1 and 2, including all substeps, on the new standby supervisor module

Upgrading the CPLD Version: Single Supervisor Module Setup

Beginning in the privileged EXEC mode, complete the following steps:

Procedure

Upgrade the CPLD version of the active supervisor module

Enter the following commands on the active supervisor:

a) Device# **configure terminal**

b) Device(config)# **service internal**

c) Device(config)# **exit**

d) Device# **upgrade hw-programmable cpld filename bootflash: rp active**

The supervisor module reloads automatically and the upgrade occurs in ROMMON. During the upgrade, the supervisor module automatically power cycles and remains inactive for approximately 5 minutes.



CHAPTER 9

Caveats

- [Cisco Bug Search Tool](#), on page 55
- [Open Caveats in Cisco IOS XE Dublin 17.10.x](#), on page 55
- [Resolved Caveats in Cisco IOS XE Dublin 17.10.1](#), on page 55

Cisco Bug Search Tool

The Cisco [Bug Search Tool](#) (BST) allows partners and customers to search for software bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. The BST is designed to improve the effectiveness in network risk management and device troubleshooting. The tool has a provision to filter bugs based on credentials to provide external and internal bug views for the search input.

To view the details of a caveat, click on the identifier.

Open Caveats in Cisco IOS XE Dublin 17.10.x

There are no open caveats in this release.

Resolved Caveats in Cisco IOS XE Dublin 17.10.1

Identifier	Headline
CSCwc35584	Multicast traffic may stop after ISSU or stby reload followed by switchover if stby AppGigE enabled



CHAPTER 10

Additional Information

- [Troubleshooting](#), on page 57
- [Related Documentation](#), on page 57
- [Communications, Services, and Additional Information](#), on page 57

Troubleshooting

For the most up-to-date, detailed troubleshooting information, see the Cisco TAC website at this URL:

<https://www.cisco.com/en/US/support/index.html>

Go to **Product Support** and select your product from the list or enter the name of your product. Look under **Troubleshoot and Alerts**, to find information for the problem that you are experiencing.

Related Documentation

Information about Cisco IOS XE at this URL: <https://www.cisco.com/c/en/us/products/ios-nx-os-software/ios-xe/index.html>

All support documentation for Cisco Catalyst 9400 Series Switches is at this URL: <https://www.cisco.com/c/en/us/support/switches/catalyst-9400-series-switches/tsd-products-support-series-home.html>

Cisco Validated Designs documents at this URL: <https://www.cisco.com/go/designzone>

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <https://cfmg.cisco.com/mibs>

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
- To get the business impact you're looking for with the technologies that matter, visit [Cisco Services](#).
- To submit a service request, visit [Cisco Support](#).
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit [Cisco Marketplace](#).

- To obtain general networking, training, and certification titles, visit [Cisco Press](#).
- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/c/en/us/about/legal/trademarks.html>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2024 Cisco Systems, Inc. All rights reserved.

